

Internship Report

Internship report submitted in partial fulfilment of the requirement for
the degree

of

Bachelor of Technology in
Computer Science and Engineering

By

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Under the supervision of Mrs.Parasakthi Balakrishnan

to



Department of Computer Science & Engineering and Information
Technology

**Jaypee University of Information Technology Wahnaghat, Solan-
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Project Report Undertaking

I Mr.Rishabh Bhanot -Roll No. 171338 Branch CSE is doing my internship with **Cognizant Technology Solutions India Private Limited** from 27/Feb/2021 to 16/Aug/2021

As per procedure I have to submit my project report to the university related to my work that I have done during this internship.

I have compiled my project report. But due to COVID-19 situation my project mentor in the company is not able to sign my project report.

So I hereby declare that the project report is fully designed/developed by me and no part of the work is borrowed or purchased from any agency. And I'll produce a certificate/document of my internship completion with the company to TnP Cell whenever COVID-19 situation gets normal.

Signature



Name RISHABH BHANOT

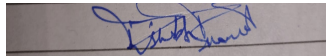
Roll No. 171338

Date 21st May 2021

Candidate's Declaration

I hereby declare that the work presented in this report entitled “**Internship Report**” in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science And Engineering** submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from Mar 2021 to May 2021 under the supervision of Mrs.Parasakthi Balakrishnan(Trainer at Cognizant).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.



Student Signature

Rishabh Bhanot

171338

This is to certify that the above affirmation made by the candidate is true to the best of my knowledge.

Mrs.Parasakthi Balakrishnan

(Trainer at Cognizant)

Dated: 21st May 2021

Acknowledgement

This is a matter of pleasure for me to acknowledge my deep sense of gratitude to Jaypee University and my college, Jaypee university of information technology for giving me an opportunity to explore my abilities via this internship programme. I would like to express my sincere gratitude to our TnP officer, Mr. Pankaj kumar and our faculty Coordinator, Dr. Nafis U Khan for this opportunity. I also wish to express my gratitude to my internship supervisor, for their valuable guidance and advice in completing this project.

I would like to record my sincere appreciation and gratitude towards all the officials and employees of cognizant, without whose kind assistance, my internship program would not have succeeded. The facts and other vital information provided by them have contributed towards making this report as comprehensive as possible. I am indeed thankful to them.

Last but not the least, I would like to express my sincere thanks to all my family members, friends and well-wishers for their immense support and best wishes throughout the internship duration and the preparation of this report. I believe that this report will be a valuable asset not only for academic institution, but will also be useful for all those who are interested to learn about internship experiences in auditing and consulting firm.

Date: 21th May 2021

Abstract

A Gen-C job, you'll be assigned to a specific organisation for the duration of your internship. They arranged for her to participate in a 12-week internship that included educational workshops, webinars, Udemy courses, and group work assignments.

a large IT company based in the United States and India Cognizant employed a large number of Indians last year, and it now employs about 3 lakh employees. The Cognizant Corporation also recruits and hires international workers from all around the globe.

Cognizant offers a variety of roles in the firm, including creator, tester, and boss, but each job requires a year of preparation after the internship.

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Chapter 1 Introduction

1.1 Background:

To get a Gen-C position, you would take a position in a certain organisation until the internship is over. They placed her in an internship that was 12 weeks in length, which consisted of training programs, webinars, Udemy classes, and project work projects.

a big American and Indian IT firm A great number of people from India were hired by Cognizant last year, and it has about 3 lakh workers. The Cognizant Corporation often attracts and employs foreign employees from around the world.

Cognizant provides different positions in the business including developer, tester, and manager but before making the decision to work there is a year of planning after the internship for each.

Cognizant offers compensation to interns and is about Rs.12,000 a month over the internship time. A thousand dollars comes in cash, but Rs.12000 gets reduced by the levy. This internship takes on a bit of a sliding scale. It changes depending on what kind of job the intern takes. With a developer profile, it may be only 4 months, but with QEA, it is as long as 6. It will vary between the cognizant variation for the students, but it's all based on the assimilatory measure, and first arrive, first done.

Cognizant's task, vision, value proposition, and creative/strategic goals

Cognizant goal is to put the newly hired talent into training. All who were invited were offered an internship with organization

In addition to trainees, every year many colleges give associateships to graduates of cognizant courses of study. This candidate is impressive, since he or she comes from all across India.

They put a lot of time, effort, resources, and money into teaching the intern before they start doing it in the real world

Students who are newly hired will go into our ongoing onboarding training course so long as they are either a college graduate or college graduates.

1.2 Values

By and large, these are the ideals of the organisation:

Their biggest asset is the employees. To keep high-quality partnerships with our customers, knowledgeable peers, retailers, the suppliers, community leaders, and

the general public, we have to treat all of them with dignity.

We are working to gain long-term consumer satisfaction through respecting each individual's company and customer interests, as well as doing so with utmost dedication and honesty, and we want to have a long-term and positive impact on each customer by serving as an impartial adviser.

Everyone in the company will uphold the commitments to excellence, justice, integrity, and professionalism in all of their operations.

Keys to Success:

1. Be out front and truthful in the completion of the project.
2. finish the project on schedule.
3. How can you finish the job?
4. Finish the job on budget.
5. SMEs, personal trainers, and mentors will all be very helpful if you make an effort to pick up their advice and take it in.
6. An eager, open student is always a good student.

1.3 Objectives

In order to concentrate on what we are the company doing best, Cognizant would aim to focus on a few areas and be a national market leader.

In Expanding the company to be simultaneously growth-inducing and manageable.

Chapter 2:Introduction

2.1 Stage 1 – QEA Basics

I was recruited before I began QEA. This is a similar training to SDET, but we have to master additional software and do research assignments for the duration of the SDET internship.

2.2 Week 1

Throughout the internship, all of the competency-based classes must be complete (not only the Udemy ones).

Since reading about the core quality assurance concepts in week 1, we worked on things like practical monitoring and app testing.

following the online Udemy courses, we performed a quick hands-on, which was required for all interns, and then a lengthy final exam which was used for the performance assessment.

As critical as covering all the bases of QEA,Agile, and black box and white box testing was for the creative part of this week, so that we will be able to design effectively

It has given some research techniques in addition to spreadsheets as well.

2.2.1 Concepts Studied.

1. Flexible testing: reflects the principles of agile product growth. In contrast to the Waterfall testing, Agile testing can begin early in a project and works together with progress. The Agile Testing approach is non-iterative, not done in a certain order, but it is done during the creation phase.

2. A test plan for agile: Includes test data specifications, test environment conditions, and results from the previous version. Agile technique, as opposed to waterfall methodology, puts the focus on writing and revising a test plan each time a release is done. Agile test programmes usually include:

1. Elements which are being experimented with
2. Often known as either as function checking
3. loading and stress testing
4. Minimizing risk in the infrastructure Strategy implementation and Milestones

For agile testing, there are four distinct phases: planning, doing, studying, optimising, transitioning, and sustaining.

To see if a system works or not Which is part of the testing phase to ensure that consistency goals are met. "Verification" and "as well as "validation" are

components of the whole software development phase." The term "software testing" should not be limited to a single action. The methodical set of operations aid in the validation of your applications. The life cycle of software testing is referred to as an STLC.

The Creativity Phases Any STLC has the following six stages:

1. Analysis of Requirements
2. Test Preparation
3. The development of test cases and the establishment of a test environment
4. Execution of the Test
5. Closure of the Test Cycle

Entry and Expiry : Exit criteria to be completed includes beginning to end, end to beginning, and beginning to end (STLC)

In the Entry Criteria column are all the prerequisites for the experiment; before the experiment may begin, these must be completed.

Exit conditions can be described as those activities that must be completed prior to testing.

It is the first of two phases of the quality assurance process, where a senior QA manager outlines the test strategy, the commitment, and expense expectations. Tools, research setting, test constraints, and testing times are almost all predetermined, The test plan is over.

Writing a research schedule and approach with different testing methods

Selecting a test tool,apportioning effort among various test cases,testing various functions,determining roles and resources

unbiased research A manager in charge of project quality assurance decides on a research strategy and estimates how much time and money the project would take to test it as well. The tools, research setting, as well as the test design specification, test length, and testing requirements are also decided. The plan of action (Test Plan) is developed in the same process.

The following are the most popular varieties of Black Box Testing:

Functional research has two dimensions: the outer layer and the inner layer.

Non-functional research is looking for parameters rather than technical features, such as performance and scalability, when functionality is tested using black-box testing.

In order to guarantee the new technology does not affect the existing code, regression testing is done before going live, as modifications are made, updates are

performed, even when everything is run to see that everything still works properly.

The following are the most common test techniques in black box technology.

Same equivalence reducing the amount of research cases while ensuring complete test coverage

Limit Checking: Limit testing focuses on the limit values defined at the limits. To test if a value set is suitable to the scheme, you may use this tool. The less the test cases you have, the better, in my opinion. It is preferable for devices whose numbers of inputs lie between a certain set.

For judgement tables, testing conditions and outcomes are arrayed in a row. There are six columns in a list; each has a different combination.

White box testing is a software testing strategy which requires looking within the product and at its architecture to see if its functionality and design are sound, and finding any flaws in the input-output framework. In addition to "white box checking", "open box testing", "transparent box testing", and "glass testing", it is often classified as "code-based testing", "glass testing", and "code-based", "observable" Not only is it part of the software engineering methodology known as Box Testing, but it's also one of two components

A number of research approaches can be referred to as 'creative' when they are applied to evaluate the programme, the code, or a particular software package's creativity. A number of form classes follows:

Memory leaks can be tested regularly. Memory leaks are very often seen in slow-running applications. When you have a memory-leaking application, you need a specialised software testing specialist who knows about finding latent problems with slow-running software.

checking and iterating." It is not uncommon for unit research to be the first kind of testing done. Each new piece of code goes through unit testing as it is created. The primary responsibility of the compiler is to verify the correctness of the software. Testing also means writing a small amount of code, writing a single function, or writing simple classes before going on to the next level. In the early stages of software production, unit testing helps to find many of the problems. Bugs are less costly and simpler to track down at this point.

Code coverage is widely adopted as an effective tool for White box checking. code coverage informs us which tests have been executed, and which have not. It finds software components that aren't exercised in the test suite. When the weak points of the app have been identified, you verify the unknowns in the test cases, improving

Table 2.2 All Possible Test Cases with the Given Constraint

Test Scenario ID	Test case ID	Test case description	Prerequisites	Steps to reproduce	Expected results
TSD_001	TC0_001	Search for Hotels in India with Valid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed
TSD_002	TC0_002	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed to the user
TC0_003	TC0_003	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TC0_004	TC0_004	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TC0_005	TC0_005	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TC0_006	TC0_006	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TC0_007	TC0_007	Search for Hotels in India with Invalid input	Flx Travels website launched and the radio button where it is mentioned India should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TSD_001	TC0_008	Search for Hotels in International with Valid input	Flx Travels website launched and the radio button where it is mentioned International should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed
TSD_004	TC0_009	Search for Hotels in International with Invalid input	Flx Travels website launched and the radio button where it is mentioned International should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message
TC0_009	TC0_009	Search for Hotels in International with Invalid input	Flx Travels website launched and the radio button where it is mentioned International should be selected	1. Open the website from the list box 2. Select check in date from the check in list box 3. Select check out date from Check out list box 4. Select Number of Rooms from the room list box 5. Select Number of adults from adults list box 6. Select Number of children from children list box 7. Click on the Search button	The intended city displayed Check in date selected displayed Check out date should be displayed Number of rooms selected displayed Number of adults entered should be displayed Number of children entered should be displayed The user messages the status entered should be displayed as an entered one invalid input and give error message

Table 2.3 Defect Report with possible defects

Serial no.	Defect id	Description	Reproducible (yes/no)	Steps to reproduce	Severity	Priority
1	DFD_001	On clicking "International" radio button the "country" list box is not displayed Expected Result: The country list box should be displayed Actual Result: The country list box not displayed Impacted Test case: TC0_008	Yes	Preconditions: Flx travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "www.rajtravel" website 2. Select "International" radio button	Medium	Medium
2	DFD_002	Enter check-in date greater than check-out date and clicking "search" after selecting all other valid details the website is showing all the messages displaying "Invalid check-in and check-out dates" and no other results should be shown Expected Result: All the records are displayed to the user despite of invalid dates in "check-in" and "check-out" Impacted Test case: TC0_003, TC0_004, TC0_005	Yes	Preconditions: Flx travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "www.rajtravel" website 2. Choose any of the radio button "India" or "International" 3. Select a valid check-in date which is greater than check-out date 4. Click "Search"	Medium	Medium
3	DFD_003	After selecting "Delhi" from city list box and clicking "Submit" after entering all the required fields hotel details of city "Calcutta" are displayed Expected Result: hotel details for city "Delhi" should be displayed to the user Actual Result: hotel details for city "Calcutta" are displayed to the user Impacted Test case: TC0_001	Yes	Preconditions: Flx travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "www.rajtravel" website 2. Choose the location radio button "India" 3. Select any city "Delhi" from the city list box 4. Click "Search"	Medium	Medium

Table 2.4 Requirement Table

Serial no	Requirement id	Requirement description	Test scenario id	Test case id	Defect id
1	REQ_001	To search the functionality with India radio button	TSID_001	TCID_001	DFID_003
			TSID_002	TCID_002	
				TCID_003	DFID_002
				TCID_004	
				TCID_005	
				TCID_006	
				TCID_007	
2	REQ_002	To search the functionality with International radio button	TSID_003	TCID_008	DFID_001
			TSID_004	TCID_009	
				TCID_010	DFID_002
				TCID_011	
				TCID_012	
				TCID_013	
				TCID_014	

2. Student Enquiry Form

The screenshot shows a web-based 'Students Enquiry Form' for 'ARENA COURSES'. The form is titled 'Please fill up the form below (* fields are mandatory)'. It contains the following fields and controls:

- Name ***: Text input field.
- Gender ***: Radio buttons for Male (selected) and Female.
- Date of Birth ***: Three dropdown menus for Date, Month, and Year.
- Email ID**: Text input field.
- Phone ***: Text input field.
- City**: Text input field.
- Pincode**: Text input field.
- Interested in**: Dropdown menu with 'Select Course' as the current selection.
- Comments**: Text area with a vertical scrollbar.
- Buttons**: 'SUBMIT' and 'CANCEL' buttons at the bottom of the form.

On the left side, there is a navigation menu with the following items:

- Overview
- AAASP
- AAIP
- BSc
- DAE Film Making
- Short term
- Students Enquiry (highlighted)

Below the menu, there are logos for 'Autodesk Authorized Training Center' and 'Adobe AUTHORIZED Training Centre'. At the bottom left, there is a badge that says 'INDIA AMONG 1 ARENA CENTRES'.

Fig 2.2 User Interface Provided

Table 2.7 Defect Report with possible defects

Serial no.	Defect id	Description	Reproducible (yes/no)	Steps to reproduce	Severity	Priority	Reported by	Reported date	Status
1	DFID_001	On clicking the "Submit" button without entering any value in the "Phone" text box, no error message is displayed to the user. Expected Result: An appropriate error message should be displayed Actual Result: No error message displayed and NULL in "PHONE" text box accepted Impacted Test case: TCID_021	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Application 2. Click on the "Submit" button without entering any value in "PHONE" text box	High	High	Rishabh Bhanot	3/31/2021	New
2	DFID_002	On clicking "Interested in" list box and it is blank without any value Expected Result: An appropriate error message should be displayed Actual Result: No error message got displayed Impacted Test case: TCID_008	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Arena Application 2. Click on "Interested in" listbox	High	High	Rishabh Bhanot	3/31/2021	New
3	DFID_003	All the details are entered by the user and then the user clicks on "Cancel" button. The system does not erase the data Expected Result: "CANCEL" button when clicked the system erases data Actual Result: The system did not erase the data after clicking the "Cancel" button Impacted Test case: TCID_022	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Arena Application 2. Click on the "Cancel" button after entering all the data in the all the mandatory fields	High	High	Rishabh Bhanot	3/31/2021	New

Table 2.4 Requirement Table

Serial no	Requirement id	Requirement description	Test scenario id	Test case id	Defect id
1	REQID_001	Search for a course on interest in Animation	TSID_001	TCID_001	
				TCID_002	
				TCID_003	
				TCID_004	
				TCID_005	
				TCID_006	
				TCID_007	
				TCID_008	DFID_002
				TCID_009	
			TSID_002	TCID_010	
				TCID_0011	
				TCID_0012	
				TCID_0013	
				TCID_0014	
				TCID_0015	
				TCID_0016	
			TSID_003	TCID_0017	
				TCID_0018	
				TCID_0019	
				TCID_0020	
			TSID_004	TCID_0021	DFID_001
				TCID_0022	DFID_003

Chapter 3 Java Programming Fundamentals

3.1 Week-2

3.1.1 Java Overview

Java is a general purpose, class-oriented object-oriented programming, built for high-level, independent design. It lets Java developers write once and run on every computer that has a Java, eliminating the need for sacrificing functionality. Usually, Java programmes are compiled to bytecode, and run on every Java Virtual Machine (JVM) platform. C and C++ have identical syntax, but less low-level services. The Java Virtual Machine (JVM) features versatile functions (such as introspection and dynamic code execution). According to GitHub, Java is one of the most common programming languages for end - user web - based applications as of 2019. The Java programming language was created by Sun Microsystems and made available on Sun's Java programming language in 1995. These compilers, as well as the APIs, implementations, and DLLs, are distributed by Sun under non-open source licences. As the Java Community Design objectives are in use, Sun relicensed its Java innovations under GNU GPL. Oracle provides its own Virtualization Layer, however the default Vm, OpJVM, is open-source and used by many programmers on Linux distros. The new edition is Java 16, with the current stable long-term version launched on September 25, 2018. Oracle will launch the final no more minimal cost improvements for legacy Java 8 for commercial exploitation, but will keep providing public updates for Java 8 personal use as well.

These five were central to the design of Java: usability, security, portability, expressiveness, efficiency, scalability, and extensibility, performance, and versatility, and reliability.

1. It has to be easy to use, focused on the user, and succinct.
2. To be of good quality, it must be hardy and tough.
3. It has to be impartial with regards to construction and compact.
4. High-quality execution is important.
5. Fluency, continuity, and versatility

At Sun, they have specified four separate versions of Java APIs that are deployed for separate platform-specific application areas.

Various Java-based applications

1. GUI apps may be developed using Java. These applications are built on AWT, Swing, JavaFX.
2. Most software applications are developed with a mobile device in mind,

whether or not Android is the predominant mobile operating system that now requires the use of Java in order to function on almost all smartphones. J2ME is a lightweight and common mobile-oriented tool that can be used to create applications for any device, including cell phones and feature phones. Also, in addition, Java is also supported by Android Studio and Kotlin.

3. Empirical applications are large software systems which are developed by the company for use in an organisational setting, rather than human, or personal, purposes. As well as Java's features that meet the specifications, it's a popular option among businesses because of this. Today's enterprises are all for Java because it's the most stable and flexible programming language of choice. . Enterprise examples include companies, educational institutions, banking networks, ERP (ERP) schemes, association databases, foundations, and government programs, as well as various interest groups.

4. A real-world implementation of mathematics would inevitably be affected by science. Because Java's excellent features are supportive of scientific software, it's a good development platform for science. When you work with large volumes of data, particularly numerical data, Java will be the best software language to use. It provides a fast, stable, and simple platform for these apps. MATLAB, which is an ideal for science computing, is used to build the front-end (an integrated UI and a back-end implementation) (a core part of the system).

5. Interactive websites A software application is a software that is used on the internet as a web client or server, and as such may be delivered by a device.

6. Embedded System: An Embedded Device, also recognized as an integrated solution, combines several tiny processing devices to carry out dedicated operations with larger systems together. Embedded systems are developing using Java. Until Java was developed, it was created for the sake of embedded systems. There is a notable lack of efficiency in Java for small embedded/embedded systems, which necessitates a smaller amount of Java runtime memory

7. Large Data Technologies: The word "huge data" means "highly large and dynamic databases that are processed to collect valuable knowledge, patterns and trends. Networking is a subject of current technology that is common around the world. I think of Java as being a projective methodology for big data. Many website developers are now turning to large datasets as their second career path since launching successful startups. A large, multi-dimensional database named Hadoop is based on Java's accessible free software architecture. In addition, the Automated

Waste Management and the solid memory maintenance give it more emphasis than other computer languages.

3.1.2 JVM

At runtime, the JVM serves as a Java programme host. A JVM runs the code that invokes the key function that is included in a Java source file. Feature is needed for a successful installation of Java Runtime Environment. disposable from the wealth of acronyms All runs on Java, which ensures that if you can understand and write Java code, you can be certain it will work on every Java-powered machine. This can all be done because of the Java Virtual Machine (JVM). A .class file (which is a filename containing bytecode) is created whenever we compilation the .java document. This class file progresses through many distinct stages as it is executed. It gives you the entire picture of the Virtual machine

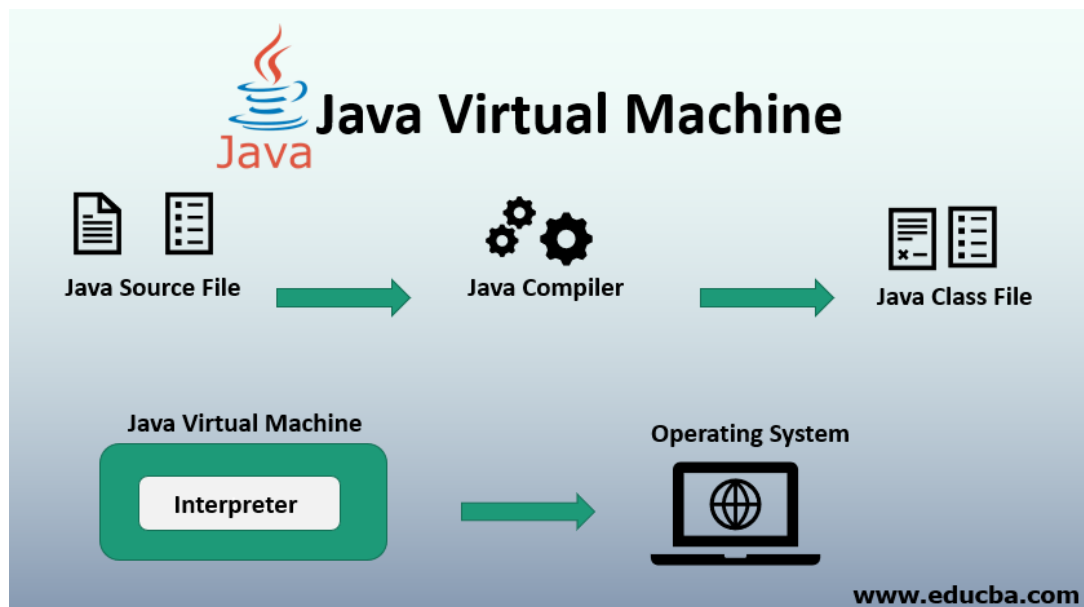


Fig 3.1 The Working of Java Virtual Machine

The Class Loader subsystem is primarily involved in three activities: loading classes, processing registrations, and managing garbage collection.

1. The object loader loads “.class” data and saves it to the method. the system stores the following for each “.class” file: The eligible title of a class, followed by its complete name as well as its class label. And if the “.class” file pertains to a Class or Enum, they are incompatible. Advanced, Feature, name, arguments, and parameters, etc.

2. Linkisng consists of linking, planning, verification, and the (optionally) to resolve the same. Fully verifying the class files guarantees that the consistency of the .class file, in other words, it confirms that this file was created with a suitable compiler or not. We get an operated exception which authentication fails. This

process is carried out by the Bytecode Validator component. Once the class file is ready for compilation, the game will be complete. Preparation is where the JVM prepares and initialises the class-level variables to their default values. Replacement of conceptual reference to the form occurs as a result of resolution. It's achieved by locating the object in the technique or process in question.

3. Finalization: Static variables are specified in the code, and are allocated their values in the first step of execution. This is done from the top down on down, starting from the class and proceeding across the class hierarchy.

Java memory is made up of these:

All class-level information including names, parent class names, instance variables, etc. is stored in the process field.

The heap is all about everything. Finally, there is one heap area per Java Virtual Machine. This may also be considered a shared property.

interchange field To allocate a new memory, the JVM builds a new runtime stack, and stores it here. Each block of this stack record has been named an "activation record". Since it executes ".class", it has a standard classloader (bytecode). The Python programming language reads byte-code line by character, field by field, and executes byte and assembly code. There are three basic categories of part: simple, complex, and compositional

strategic tool It works line by line to read the bytecode, and then executes. The problem with this strategy is that each time you call a system, an explanation is necessary. Increment the effectiveness of an interpreter with a Just-In-Time compiler putrefaction It gets rid of unessential artefacts If you're interested in garbage collection, see the article about it.

It is commonly used for designing Java Web-based apps and applets. The Python language contains a runtime, an interpreter/loader, a compiler, and other resources for Java creation.

Java Runtime Environment or may be abbreviated as "JRE.". A free, open-source Java software platform like the Java Runtime Environment (JRE) is needed to run a Java application; it includes the Java Virtual Machine (JVM), core classes, and data.

3.1.3 Java Identifiers

In computer languages, identifiers are used for the purpose of recognition. Any kind of name that can be used as a symbol can be called a class name, like variables, methods, constructors, and class names.

3.1.4 Data Types

Programming languages such as Java must predefine any form of data (integer, character, decimal, and so on) whereas strict typing is enforced statically since each constant or vector must reference an actual part of the language definition.

Javascript has two types of data: uninterpreted and scripted.

The primitive data elements such as binary, character, integer, and so on, as well as the non-primitive types of data are presented.

Simplistic data are simply data with just a single attribute and don't have any unique capabilities. Primitive data types in Java are made up of eight basic data types.

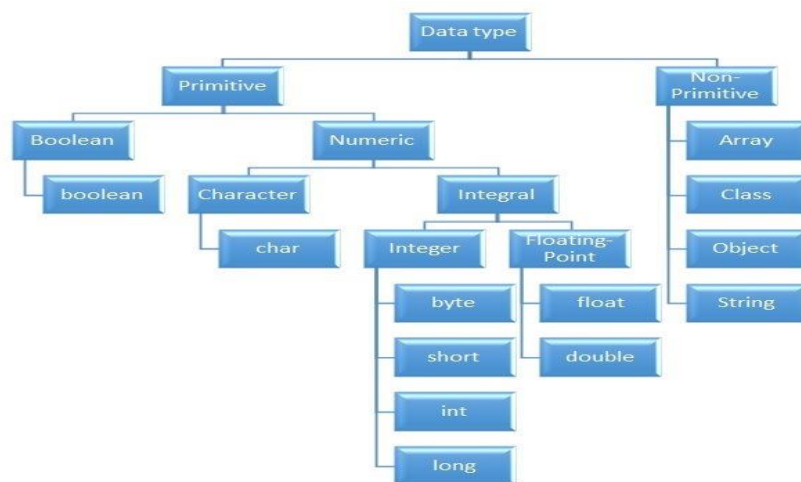


Fig 3.2 Different Data Types in Java

Non-Primitive Data Type or Reference Data Types-The Reference Data Types will contain a memory address of variable value because the reference types won't store the variable value directly in memory. They are strings, objects, arrays, etc.

3.1.5 Variables

An expression refers to a memory spot, often known as a vector. The fundamental element in a curriculum. During the software execution, the value of a variable may be modified.

The variable is a designation for only: everything that happens to the memory position; everything that is achieved with the variable changes the memory location. Java requires all variables to be made known before they are included.

A data form for the attribute referring to several kinds of variables: Name for the various variables.It's the variable's original value.Variable declarations A block or process or constructor-defined vector is referred to as a variable.Static variables, non-members, and variables that are declared inside the body of every class (also known as members), are known as Instance variables.

You may distinguish between instance variables and static variables from the context in which they are used: instance variables are used within a process or other instance, whereas static variables are not.

3.1.6 Type Conversion

Value of one data form assigned to another is unlikely to be comparable. Automatic style conversion happens if the first time the data is fetched; afterward, you have to manually cast or transform it if you need to. To do something like this, you can do, for instance, assign an integer to a longer variable.

3.1.7 Loops

Using a looping languages allows a series of instructions/functions to be executed when any optimized delivery to be valid is a very useful feature for writing software. For example, a while loop performs an action while a variable remains true. although statements can be imagined as repeated a "while" looping

FOR loops are provided by for various reasons, but this is one of the more notable ones. As compared to a while loop, a for loop initialises, tests, and increments/decrements in one sentence, the for method offers simpler, readable form in which iterates a certain number of times.

There are two versions of the while loop; while, which only verifies the position after performing states in the block, and do while, which tests for the conditions while performing sentences.

3.1.8 Decision Making

Programming choices are the same as life-altering choices. We sometimes require a line of statement to be executed for such circumstances in programming. circumstances that have been predetermined They're programmed by a computer such that when the software changes, the flow of operations changes as well.

If the state is true, the blocks will be executed. Unless, of course, we prefer to do something else. Here's where the if comes in. We will use the Else Statement to execute the following sentence of statement if a condition is wrong.

```
if (condition) {  
    // block of code to be executed if the condition is true  
}
```

Fig 3.3 Syntax for if statement

nested-if: A nested if is an if statement that is the target of another if or else. Nested

if statements mean an if statement inside an if statement.

Switch-Case The switch statement is a multiway branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression.

The RETURN statement is used to explicitly return from a method. That is, it causes a program control to transfer back to the caller of the method

3.1.9 Static Variable

A static element is also known as a class variable which is often considered a static. You can access it by class name or using its value and is exclusive to the class, but not always.

3.1.10 Non-Static Variable

Any variable of a class which is not static is called a non-static variable or an instance variable.

3.1.11 Classes and Objects

Object-Oriented Programming is built on object - oriented as their core principles revolve in the actual world.

Objects are derived from class-A classes; Class-A classes are self-defined blueprints or mock-ups that aid in the construction of others. The property or process may be called from every entity of that kind. This part will appear in a class declaration, generally::

A class may be public or a member function may provide public access.

Class defines a type which is used to define a type, whether it is well-designed.

A letter, and then be followed by additional letters, numbers, or numbers, that are each followed by an alphabetically-delimited sequence of underscores"

best-and-division classification)if some (parent) class name is followed by the term "extends", then a parent class extends class A class may only be a subset of one class.

combination of features the class name and their inclusion in the section, if any, if present. More than one user type should be used to enforce an interface.

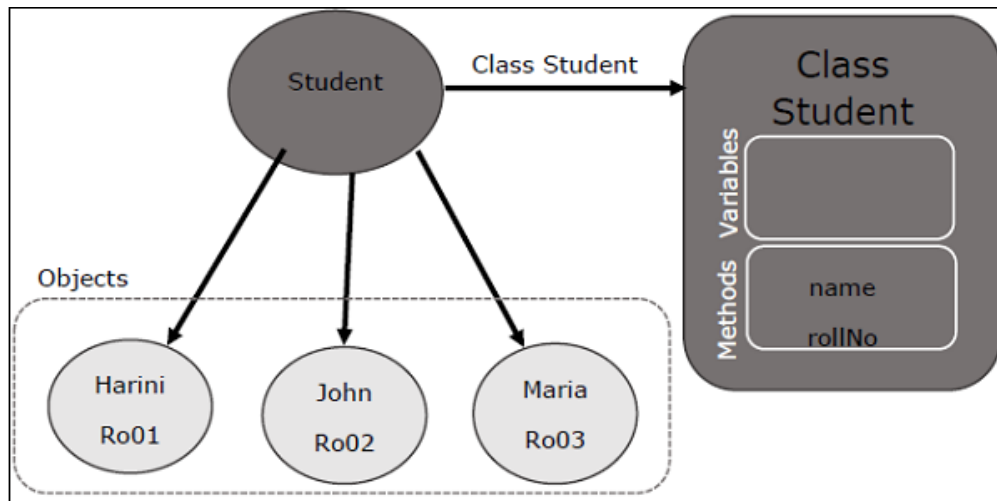


Fig 3.4 Relationship between class and object in JAVA

To assign values to newly created properties, use constructors. A class' variables include the condition of the class, while methods enforce the functions and functions implement the methods.

nested groups, anonymous functions

An object is an elementary object in object-oriented design, and it is an object in the physical world. Typically, Java programmes have a large number of items, and make use methods to communicate between them. Objects have form and colour. When an entity represents a state, it is said to be stateful. Often describes an object's properties. Behaviour is defined by a set of techniques used on an individual. objects to draw on each other objects Name makes an item one in a kind.

3.1.9 Access Modifiers

Using access modifiers limits the range, constructors, variables, and methods and data members of a class. Java has the following control modifiers: Private, Protected, and Public, which have four different levels of access.

3.1.10 Inheritance

A class's feature set (field or method) can be inherited by another.

Syntax:

```
class sub-class extends main-class
{
    //member variables,constructor,member functions
}
```

Types of Inheritance in Java:

Within one base level, subclasses inherit one element from their parent class. Class A is the common ancestor of the classes B and C.

It would be used in multiple inheritance, but the base class will serve as a superclass to its derived class. Inheritance, one class acts as a parent (base class) for two or three child classes.

Multiple inheritance allows a class to use input from different parent groups, but multiple classes may have just one parent.

That is a combination of two or more modes of inheritance.

3.1.11 Constructors

Constructors are used to set the state of an entity. A function `Obj()`, like methods, includes a set of statements that are implemented when an Object is formed.

At least one function `Obj()`, it may be the default function `Object()` is invoked each time an entity is generated using the `new class()` keyword to allocate control parameters to the associated data of the same class. When an entity or object is created, the function `Obj()` is called.

Constructors are divided into two categories:

1. Default constructor- A function `Obj()` with no parameters is referred to as a no-argument function `Obj()`
2. Parameterized Constructor- A parameterized function `Obj()` is a function `Object(params)` that has parameters.

3.1.12 Interfaces

Class methods, while the variables declared inside an implementation are by concrete, by design. A class interface defines what it must do, but not how. This is the class's strategy. An interface consists of capabilities such as an interface-capable. It indicates what procedures the class would adhere to. Complete abstraction is best realised with music. Multiple inheritance is not possible in Java, but having an implementation achieves it. In addition, it is utilised to facilitate loose pairing. Art is used to approximate truth.

As a result, again, then, why do we use class hierarchies if we are not using concrete ones? Cloaking the particular structure, but hiding the functionality from the public. The fact that abstract classes represent the concept of showing/hiding.

Interfaces vs. Abstract Classes

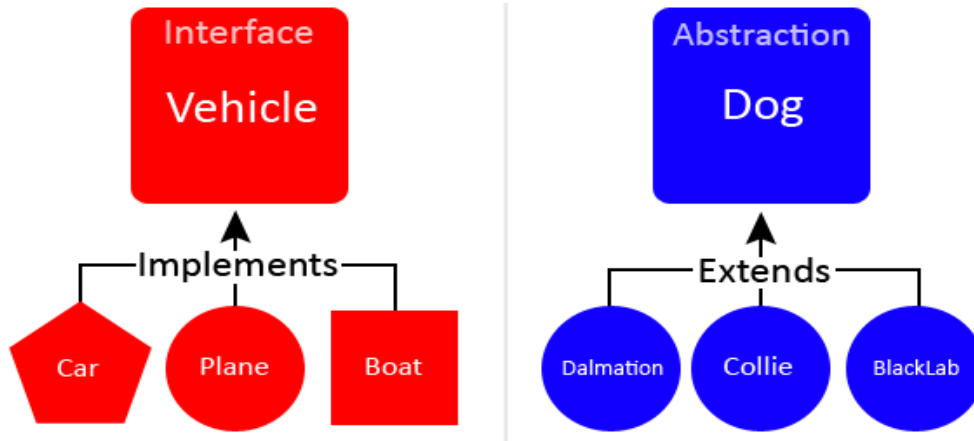


Fig 3.5 Difference between Interface and Abstract

3.1.13 Abstraction

Data Abstraction leaves out the unnecessary information such that only the important facts appear to the viewer. The marginal or the non-essentials units are never shown to the customer. Ex: A car is regarded as an automobile rather than its particular components.

Hide-and-and-polymorph groups and Polymorph-only approaches An arbitrary class is created with the superclass. An abstract method must be formulated without defining any concrete data and must be defined without describing the code..

3.1.14 Encapsulation

The packing up of data into a single device is known as encapsulation. It's the glue that holds coding and the information it tries to manipulate together.

Encapsulation's Benefits:

1. Hiding Data
2. Greater adaptability
3. Adaptability
4. It's simple to test code.

3.1.15 Runtime Polymorphism

Polymorphism is one of the aspects that Java embraces the notion of method overriding. Java looks up the instance method to call when an overridden method is invoked from a superclass reference. To conclude, this is all decided on the fly. Method execution relies on the form of the object being invoked.

Overloading makes methods have the same name, but various parameter types and different numbers of input parameters, while boxing restricts methods to just have the same name.

In any object-oriented language, a function which allows an existing method to be overridden is referred to as "overriding".

The single unit of every set of items is defined as the collection.,the collection classes are specified in a separate "Collections Framework" module. A framework is a set of pre-built classes and protocols which supplies a basic design.

3.2 Week-3

3.2.1 Collections

All items that are seen as a single entity are classified as an array. The “Collection Framework” was used as a separate project, holding all of the collections groups and their associated interfaces.A program is a system of pre-made classes and objects that makes an architecture easier to design.

The below are some of the benefits of the Collection Framework:

1. API that is consistent
2. Increases software pace and consistency thus reducing programming commitment.
3. The Object Interface expands the iterable interface which is enforced by all of the collection new framework classes. This gui includes many of the simple methods that any database has, such as applying data to the collection, extracting data from the collection, removing data, and so on.

3.2.2 Iterators

In the Collection system, iterators are used to go over a list and extract items one at a time. Each of the three ideas is an iterator

EnumerationThis is used to retrieve items from existing collections . It works for every Collection object; it's an iterator in all collections. Use Iterator, they can read and delete operations at the same time. This is an enhanced variant of Enumeration that provides the feature of having an aspect that can be removed. List Iterators like ArrayList are just to be used for list, LinkedList and several other collections. With bi-directional possibilities In applications where we need to walk the elements of a List, we must use a ListIterator. This cursor offers a greater variety of features than the iterator. This is similar to the Java collection framework which is an implementation of the Collection interface. This list is used to provide a skeletal application of the List interface, using a database as the underlying data warehouse . AbstractSequentialList should be preferred to this type of associative list for linked list results.

3.2.3 ArrayList

A List is a built-in component of the Java programming interface which exists in the `java.util` kit. Dynamically generated arrays in Java is a great thing. Though that may be faster than regular arrays, such arrays may be extremely helpful in highly dynamic software programmes, particularly when quite a lot of simulation is involved. In the `java.util.concurrent` bundle, this class is located.

3.2.4 HashMap

The `HashMap` class is a member of the set APIs. In the `java.util.concurrent` bundle, this class is located. It implements the basics of the Java Map interface. The dataset may be accessed through two types of indexes: (Key and Value) and a user defined sequence number. Concepts refer to other concepts; one concept refers to another; an idea points to ideas. If you attempt to repeat the key, the variable is automatically replaced. Unsynchronized Hash function is somewhat close to the Hash Map.

3.2.5 Sets

The `java.util.Set` interfaces provide an attribute type where duplicate values are not allowed to be kept. It consists of a mathematical series. Providing the `java.util.Set` implementation

Since the `HashSet` class is a part of the code, it is efficient at implementing a hash table. `EnumSet` class, which is available on the collection's API, has been one of the enumeration types using the set protocol.

3.2.6 Exception Handling

An anomaly is an unnecessary or accidental occurrence, which happens during the program's operation, such as a run-time failure, which is usually considered an exception in all applications.

Since it supports exceptions such as `ClassNotFoundException`, `IOException`, `SQLException`, and others, exception management is needed for programmes to be robust.

Exception management preserves natural system behavior. For error management, an exception usually interferes with the usual flow of the programme.

3.2.7 File Handling

With the aid of the `java.io` kit, you can do virtually every operation involving endpoints in Java. all these things go to or have come from an input or an output system As part of the `java.io` kit, the stream offers numerous built-in data types including primitives, objects, localizable strings, and more

It is a series of data represented as a river. Streams may be divided into two classes:

clearly noxious and harmless.

Source – To interpret metadata, use the Source. To write data to a target, use the Output Stream.

The aim of the Byte Streams in Java is to transfer ASCII characters and to and display 8-bit bytes. While there are several file input/output stream-related classes, the most commonly encountered ones are those that are subclasses of class `java.io.InputStream`. `READ`, `WRITE` the whole files

A stream is a flow of data. The origin stream reads data and the target is where it is written.

3.3 Week-4

3.3.1 JDBC

Java Database Connectivity. A query API connects and queries the database, and JDBC enables you to do so with Java. An essential feature of Java SE . A JDBC API connects to a JDBC database using drivers.

There is little to stop one from using JDBC to get tabular data from every database system. We have been able to successfully save, modify, delete, and fetch our game data with JDBC API. This is as if Microsoft had invented Open Database Connectivity .Everyone who will use JDBC.

By implementing a common series of interfaces, JDBC allows for easy access to involvement with the study on different platforms. a Java could be used to compose executables that perform various functions, including

1. Applications written in Java
2. Applets in Java
3. Servlets in Java
4. Pages for Java Server (JSPs)
5. JavaBeans for Company (EJBs).

Architecture of JDBC

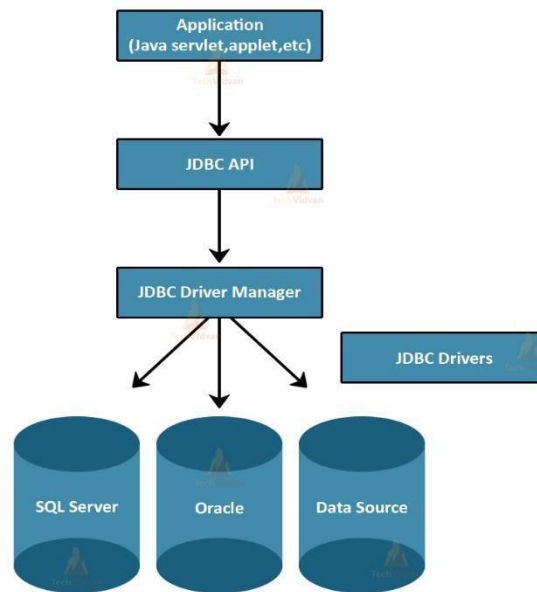


Fig 3.6 Architecture of JAVA DATABASE CONNECT

Both of these various programmes have access to the records with a JDBC engine, and may even use storage data. JAVA DATABASE CONNECT is, in short, has the same functionality as JDBC, thereby enabling non-database-specific applications to run on any and all Java programmes.

Chapter 4: Web User Interface And DATASOURCE

4.1 Week 6

We just have to do two things this week: accept the Udemy courses that are offered by the company, complete the hands-on project, and the combined Skill Exam.

I took the learning to the next level and doing the on-the-the-job assessments are now needed.

It is absolutely essential to know html and xml and xpath from scratch while working on new projects.

4.1.1 HTML

The World Wide Web Consortium's standard, or Cascading Style Sheets and scripting languages, such as JavaScript, can be used to modify the look and feel of the web pages. Both web browsers act as an HTML document to a router, or retrieve documents from local or remote storage and generate multimedia websites, based on such documents. Semantics defines a web page layout which is historically used as an aid in visual appearance design as well.

The basic elements of web pages are made up of HTML components. In HTML, there are artefacts such as photos and links that can be placed inside the made document. Structured documents are created using HTML's designation of headings, tables, articles, and hyperlinks. html components are identified by tags, written using braces and published using angle brackets attributes like "IMG " and "INPUT" explicitly contribute to the page material. tags such as <p> enclose and include additional knowledge regarding text and other elements.</tagss> A browser interprets the text, but doesn't show any HTML tags.

Many of today's Web pages are created using HTML, which is the dominant language for the Web's markup

1. It tells you how the structure of a web page is defined by HTML
2. HTML is made up of several parts
3. HTML components are coded instructions for the browser on how to view the material

```

<html>
  <head>
    <title>Page title</title>
  </head>
  <body>
    <h1>This is a heading</h1>
    <p>This is a paragraph.</p>
    <p>This is another paragraph.</p>
  </body>
</html>

```

Fig 4.1:HTML Page Structure

Table 4.1: Basic HTML Tag

Tag	Description
<u><!DOCTYPE></u>	Defines the document type
<u><html></u>	Defines an HTML document
<u><head></u>	Contains metadata/information for the document
<u><title></u>	Defines a title for the document
<u><body></u>	Defines the document's body
<u><h1> to <h6></u>	Defines HTML headings
<u><p></u>	Defines a paragraph
<u>
</u>	Inserts a single line break
<u><hr></u>	Defines a thematic change in the content
<u><!--...--></u>	Defines a comment

Table 4.2: Input And Form Tags

Tag	Description
<code><form></code>	Defines an HTML form for user input
<code><input></code>	Defines an input control
<code><textarea></code>	Defines a multiline input control (text area)
<code><button></code>	Defines a clickable button
<code><select></code>	Defines a drop-down list
<code><optgroup></code>	Defines a group of related options in a drop-down list
<code><option></code>	Defines an option in a drop-down list
<code><label></code>	Defines a label for an <code><input></code> element
<code><fieldset></code>	Groups related elements in a form
<code><legend></code>	Defines a caption for a <code><fieldset></code> element
<code><datalist></code>	Specifies a list of pre-defined options for input controls
<code><output></code>	Defines the result of a calculation

Table 4.3: Table Tags

Tag	Description
<code><table></code>	Defines a table
<code><caption></code>	Defines a table caption
<code><th></code>	Defines a header cell in a table
<code><tr></code>	Defines a row in a table
<code><td></code>	Defines a cell in a table
<code><thead></code>	Groups the header content in a table
<code><tbody></code>	Groups the body content in a table
<code><tfoot></code>	Groups the footer content in a table
<code><col></code>	Specifies column properties for each column within a <code><colgroup></code> element
<code><colgroup></code>	Specifies a group of one or more columns in a table for formatting

```

<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>TravelClient</title>
  <base href="/">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="icon" type="image/x-icon" href="favicon.ico">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta3/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-e
</head>
<body>
  <app-root></app-root>
</body>
</html>

```

Fig 4.2: Sample of HTML code

4.1.2 XML

It is a mark - up language in which no predefined tags can be used. Instead, you describe your desires so you can choose your own tags. This is a more efficient means of data storage, since it is searchable, and shareable. Additionally, because the XML format is structured, whether you send or distribute XML over the web, the receiver would be able to read the data with no problems because of the standardised XML notation.

XML isn't a suffix, it's a declarative. The Hypertext Transfer Protocol (HTTP) is commonly used for the transport of report information..

```
<?xml version="1.0" encoding="UTF-8"?>
```

Fig 4.3 XML versioning And Encoding

A small business has one department. That department has one employee. The employee details is given in the table below.

Parent Element is "Department"

Employee

empid	name	salary	email	phoneno
1001	Tom	20000	tom@gmail.com	9874563210

```

<Department>
  <Employee>
    <empid>1001</empid>
    <name>Tom</name>
    <salary>20000</salary>
    <email>tom@gmail.com</email>
    <phoneno>9874563210</phoneno>
  </Employee>
</Department>

```

Fig 4.4 XML Document For Employee and Department

Table 4.4 Table of XML Entities

Entity	Character	Description
<	<	Less than sign
>	>	Greater than sign
&	&	Ampersand
"	"	One double-quotation mark
'	'	One apostrophe (or single-quotation mark)

4.1.3 JSON

JSON is a language-agnostic way of expressing data that uses a text format built on JavaScript object syntax. This is often seen in the context of "the technique used to convey data around the internet in websites" you may encounter it often, so here we offer it all to you in plain text form, along with both how to access data and how to create it

More details can be found in the block above: JSON syntax is pretty much like the JavaScript entity literal style. The same simple data types can be used in JSON documents, as you can in normal JavaScript objects.

There will only be text in the exchange between a browser and a server.

As discussed above, JSON is essentially text, every JavaScript entity may be converted to JSON and sent to the server.

A JSON from the server may also be converted into JavaScript artefacts.

Such that we don't have to have to do some difficult-to-to-debug decoding with no localization.


```
{
  "squadName": "Super hero squad",
  "homeTown": "Metro City",
  "formed": 2016,
  "secretBase": "Super tower",
  "active": true,
  "members": [
    {
      "name": "Molecule Man",
      "age": 29,
      "secretIdentity": "Dan Jukes",
      "powers": [
        "Radiation resistance",
        "Turning tiny",
        "Radiation blast"
      ]
    },
    {
      "name": "Madame Uppercut",
      "age": 39,
      "secretIdentity": "Jane Wilson",
      "powers": [
        "Million tonne punch",
        "Damage resistance",
        "Superhuman reflexes"
      ]
    },
    {
      "name": "Eternal Flame",
      "age": 1000000,
      "secretIdentity": "Unknown",
      "powers": [
        "Immortality",
        "Heat Immunity",
        "Inferno",
        "Teleportation",
        "Interdimensional travel"
      ]
    }
  ]
}
```

Fig 4.5 Sample of JSON

At the end of this week, everybody would have to take online Udemy courses offered by Cognizant to finish the hands-on, in-person assignments and get an online evaluation. At the end of week 7, we discovered how to script JavaScript. Since we finished the online Udemy courses, our intern and test takers had to execute their final project tasks. Lately, the most significant task this week was learning Javascript from scratch. And it integrated HTML with JavaScript to provide advanced functionality

4.2.1 Javascript

JavaScript is the lightweight, translated, or just-in-time compiled code, depending on the definition of class, is a general-purpose or high-feature language. Although it is most commonly recognised as the language for Web sites, a lot of people use it for writing Perl scripts as well.

In browser-based environments, CouchDB, Adobe Acrobat, and Node.js are among the prime examples. prototype-based, multi-paradject, multi-structured, JavaScript; prototype-based, single-threaded, object-oriented, interactive Learn more about the JavaScript language.

This segment describes the JavaScript language in its entirety, not host environment specifics. For more regarding the WAPs, please see the DOM API site.

JavaScript programming specifications are and the internationalisation API ECMA-402) All in MDN is focused on the current proposed standards ECMA-262 and ECMA-402 draughts. Features from ECMAScript that have already exist in the current MDN docs/tutorials will still be included in new proposals

Table 4.6 : Javascript Data Types

Variable	Explanation	Example
String	This is a sequence of text known as a string. To signify that the value is a string, enclose it in single quote marks.	let myVariable = 'Bob';
Number	This is a number. Numbers don't have quotes around them.	let myVariable = 10;
Boolean	This is a True/False value. The words true and false are special keywords that don't need quote marks.	let myVariable = true;
Array	This is a structure that allows you to store multiple values in a single reference.	let myVariable = [1,'Bob','Steve',10]; Refer to each member of the array like this: myVariable[0], myVariable[1], etc.
Object	This can be anything. Everything in JavaScript is an object and can be stored in a variable. Keep this in mind as you learn.	let myVariable = document.querySelector('h1'); All of the above examples too.

JAVA SCRIPT supports four essential data structures: arrays, known as 'one-dimensional arrays' in the language, but called 'one-dimensional sets' or 'one-dimensional arrays' in JavaScript, which are called 'dynamic collections' or 'one-arrays'

records are special JS objects, such as {firstName:"Tomhh",lastName:"Sgggmith"}; similarly, data are rather simple JS objects, such as {"twkho":1, "thrgoe":{}} such as seen here:

```
// program to format the date
// get current date
let currentDate = new Date();

// get the day from the date
let day = currentDate.getDate();

// get the month from the date
// + 1 because month starts from 0
let month = currentDate.getMonth() + 1;

// get the year from the date
let year = currentDate.getFullYear();

// if day is less than 10, add 0 to make consistent format
if (day < 10) {
    day = '0' + day;
}

// if month is less than 10, add 0
if (month < 10) {
    month = '0' + month;
}

// display in various formats
const formattedDate1 = month + '/' + day + '/' + year;
console.log(formattedDate1);

const formattedDate2 = month + '-' + day + '-' + year;
```

Fig 4.7 Sample Javascript Code.

4.3 Week 8

We just have to do two things this week: accept the Udemy courses that are offered

by the company, complete the hands-on project, and the combined Skill Exam. Once we finished the Udemy courses, we completed all assignments and projects, as well, to calculate final results. There is no way to overestimate the significance of HTML, CSS, CSS and Bootstrap week in web design. Web design includes web page design as well.

4.3.1 CSS

CSS (Cascading Style Sheets) is the code that styles web content. Like HTML, CSS is not a programming language. It's not a markup language either. CSS is a style sheet language. CSS is what you use to selectively style HTML elements.



Fig 4.8 Ruleset for CSS

To date, SGML has existed since the beginning of the nineties, and Stylesheet was created to include stylesheets for the World Wide Web. For a web style book language, style books were needed from various sources on the internet. DSS and FOSI just weren't adequate. Using CSS, you can apply styles to different documents using the same selector. As HTML expanded, a broader range of design skills were created to satisfy the needs of web designers.

Because of this, the architecture of the web has increased in sophistication, albeit at the expense of using complicated HTML. Due to the diversity of browser configurations, such as ViolaWW and client controls, the web material was inconsistently presented in several ways and less flexible. The browser/editor created by Berners had difficult style sheets. This combination of fonts may not be

associated with any documents on the internet

Table 4.7 Different Selectors in CSS

Selector name	What does it select	Example
Element selector (sometimes called a tag or type selector)	All HTML elements of the specified type.	p selects <p>
ID selector	The element on the page with the specified ID. On a given HTML page, each id value should be unique.	#my-id selects <p id="my-id"> or
Class selector	The element(s) on the page with the specified class. Multiple instances of the same class can appear on a page.	.my-class selects <p class="my-class"> and
Attribute selector	The element(s) on the page with the specified attribute.	img[src] selects but not
Pseudo-class selector	The specified element(s), but only when in the specified state. (For example, when a cursor hovers over a link.)	a:hover selects <a>, but only when the mouse pointer is hovering over the link.

CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes.

```
body {  
  background-color: lightblue;  
}  
  
h1 {  
  color: white;  
  text-align: center;  
}  
  
p {  
  font-family: verdana;  
  font-size: 20px;  
}
```

Fig 4.9 CSS Code

4.3.2 Bootstrap

This intuitive and mobile-first CSS platform is free and open source. It includes concept templates in the form of CSS and JavaScript.

sites by making it work the same across all different platforms, including desktops, tablets, smartphones, and TVs (as opposed to web apps). It's to use Bootstrap's paint, scale, font, and style options to your web project. For that purpose, the most important thing is to evaluate the designers. Both HTML items in the project are styled with Bootstrap after they have been applied to a Bootstrap project. They

produce a more-or-less monotonous appearance for prose, tables, and heterogeneous appearance for type elements through web browsers. It is also possible for developers to use Bootstrap classes to modify their content further by taking advantage of them. Bootstrap has headings in either light or dark colours, bigger text, different pull quotations, and bold headings, and some text with a standout. Many of the Bootstrap features are those that impact the whole website. The component element is referred to as "Container", as all other page elements are attached to it. Either a fixed-width container or a fluid-width container is accessible. On the width of the web page, always. But, based on the height of the computer, the width of the web page can vary.

not quite one millimetre in size

1. measuring 576–768 pixels
2. Custom width=10%d, custom length=20%h
3. from ~m 992–1200 pixels
4. Over 12 inches wide and big.

Along with other JavaScript libraries such as jQuery plugins, Bootstrap often provides JavaScript components in the form of plugins. Any jQuery UI plugins have extra configuration elements such as boxes, tooltips, carousels, and rollovers. To know what Bootstrap's components are, you should use the official documentation. The fields also get additional features, for example, auto-completion.

You'll still use our regular grid structure while using Bootstrap containers. Containers have three important functions: they are used to store, pad, and sometimes to divide up the material. In the vast majority of cases, however, a nested container is not needed.

Three separate flavours of Bootstrap containers are installed with Bootstrap:

responding to breakpoint (which limits the maximum widths of devices)

CSS "container-fluid" sets all widths to be the same percentage of the viewport regardless of the resolution size of the browser.

Limit the distance of no matter what width you are up to, before you reach 100%, and then split.

Table 4.5: Illustrates how each container's max-widths width corresponds to the width of its parent.

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	X-Large ≥1200px	XX-Large ≥1400px
<code>.container</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-sm</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-md</code>	100%	100%	720px	960px	1140px	1320px
<code>.container-lg</code>	100%	100%	100%	960px	1140px	1320px
<code>.container-xl</code>	100%	100%	100%	100%	1140px	1320px
<code>.container-xxl</code>	100%	100%	100%	100%	100%	1320px
<code>.container-fluid</code>	100%	100%	100%	100%	100%	100%

See the efficient mobile-first grid created using our twelve-column method, six available variables, and hundreds of predefined groups to handle different screen sizes and widths.

Grid consists of horizontally and vertically blocks, horizontal and vertical patterns, in which our design elements can be set. Components help to ensure that our website templates are consistent across different pages.

A grid would normally be composed of columns, rows, and then spaces in each column.

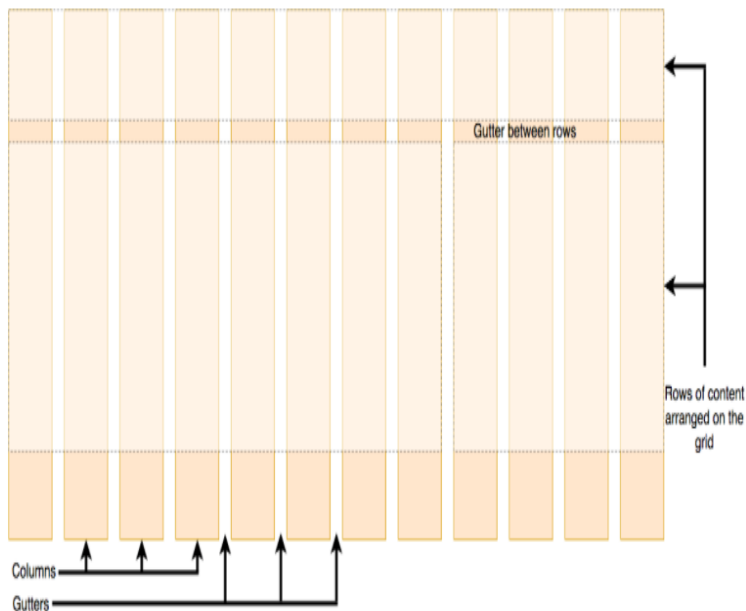


Fig 4.10 Grid System

```

<head>
<title>Bootstrap Example</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css">
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js"></script>
<style>
/* Remove the navbar's default margin-bottom and rounded borders */
.navbar {
margin-bottom: 0;
border-radius: 0;
}
/* Set height of the grid so .sidenav can be 100% (adjust as needed) */
.row.content {height: 450px}
/* Set gray background color and 100% height */
.sidenav {
padding-top: 20px;
background-color: #f1f1f1;
height: 100%;
}
/* Set black background color, white text and some padding */
footer {
background-color: #555;
color: white;
padding: 15px;
}
</style>
</head>
<body>
<nav class="navbar navbar-inverse">
<div class="container-fluid">
<div class="navbar-header">
<button type="button" class="navbar-toggle" data-toggle="collapse" data-target="#myNavbar">
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a class="navbar-brand" href="#">Logo</a>
</div>
<div class="collapse navbar-collapse" id="myNavbar">
<ul class="nav navbar-nav">
<li class="active"><a href="#">Home</a></li>
<li><a href="#">About</a></li>
<li><a href="#">Projects</a></li>
<li><a href="#">Contact</a></li>
</ul>
<ul class="nav navbar-nav navbar-right">
<li><a href="#"><span class="glyphicon glyphicon-log-in"></span> Login</a></li>
</ul>
</div>
</div>
</nav>
<div class="row content">
<!-- FILL NECESSARY CODE FOR COLUMN 1 HERE -->
<div class="col-sm-2 sidenav" id="col1">
<h4>Our Branches </h4>
<hr>
<p>394 SW Courtland Drive  
Egg Harbor Township, NJ 08234</p>
<p>76 East Middle River Street  
Methuen, MA 01844</p>
</div>
<!-- FILL NECESSARY CODE FOR COLUMN 2 HERE -->
<div class="col-sm-8 text-left" id="col2">
<h1>Welcome</h1>
<p>You know, little of this, little of that. Do you have any kahua? I know how he likes to present himself; Father's weakness is vanity. Hence the plot. Please see him, Jeffrey. He's a good man. And thorough. They call Los Angeles the City of Angels. I didn't find it to be that exactly, but I'll allow as there are some nice folks there. "Course, I can't say I seen London, and I never been to France, and I ain't never seen no queen in her damn undies as the fella says, but I'll toll you what, after seeing Los Angeles, and thisahere stony I'm about to unfold wal, I guess I seen somethin' ever' bit as stupefyin' as ya'd see in any a those other places, and in English too, so I can die with a smile on my face without feelin' like the good Lord cheated me. </p>
<hr>

</div>
<!-- FILL NECESSARY CODE FOR COLUMN 3 HERE -->
<div class="col-sm-2 sidenav" id="col3">
<h4>Categories</h4>
<div class="well">
<a href="#">Advice from Our Experts</a>
</div>
<div class="well">
<a href="#">Our Blogs</a>
</div>
<div class="well">
<a href="#">How to Use our Product</a>
</div>
</div>
Logo Home About Projects Contact Login

```

Fig 4.11 Bootstrap Example contains navbar ,grid system

4.4 Week 9 and Week 10

This week only, you have to submit udemy courses offered by the company as well as complete the exercises and the comprehensive skills exam. It was on our own as well as we had to learn how to use the database using Mysql and SQL. Since completing the online Udemy modules, we did the hands-on and then the on-the-the-the-job assessments. It was crucial to be able to explain more of the basics of the database this week so we covered the different facets of the database, including the structure, querying, and syntax with MySQL. In addition, it used HTML and CSS to design a functional web page.

It was created by Microsoft in conjunction with the idea of the relational database management framework, known as Microsoft SQL Server. As a database simply stores and retrieves the data that other programmes request—on the same or other computers (including the Internet). We believe there are at least a dozen distinct flavours of Microsoft SQL Server marketed to different audiences and consumers, with varying requirements, with up to tens of thousands of concurrently used systems in mind.

It is divided into various subcomponents such as clauses, blocks, definitions, functions, commands, procedures, and clauses, including

1. the individual components of sentences and questions (Depending on the application, some of these are not required.)
2. Counts and variables, which may yield countable or table expressions of data
3. Predicates that restrict the results of statements and requests, and may also be used to make statements Valid or Incorrect based on them, for values of True/False (TRUE/FALSE).
4. the basic conditions for obtaining the data In essence, this is an essential feature of SQL.
5. empirical statements, which may impact schemas, contracts, conferences, protocols, and D&Cs, or diagnostics.

4.4.1 SQL Manipulation

The laws that apply to the values of individual columns are known as column constraints:

1. The PRIMARY KEY restriction may be used to define a row uniquely.

2. Per row has a numerical significance for UNIQUE columns.
3. Columns that are NOT NULL should have a value.
4. When no value is defined for a column, DEFAULT assigns a data type.
5. Each table may only have one PRIMARY KEY column and several UNIQUE columns.

When you execute the CreateTABLE expression, the new table is created in the database. You will easily tell the table name and the column names when using it.

```
CREATE TABLE student (  
  id INTEGER PRIMARY KEY,  
  name TEXT UNIQUE,  
  grade INTEGER NOT NULL,  
  age INTEGER DEFAULT 10  
);
```

Fig 4.12 create table example

To add a new record (row) to a table, use the INSERT INTO argument.

It comes in two varieties, as shown:

1. Fill in the blanks in the columns in the same order.
2. Fill in the blanks in the columns by name.

```
-- Insert into columns in order:  
INSERT INTO table_name  
VALUES (value1, value2);  
  
-- Insert into columns by name:  
INSERT INTO table_name (column1, column2)  
VALUES (value1, value2);
```

Fig 4.13 insert table syntax

To change the current table, use the ALTER TABLE expression. The ADD COLUMN function is most often is used to create a new columns, but it may also be used to join together existing ones.

```
ALTER TABLE table_name
ADD column_name datatype;
```

Fig 4.14 Alter table syntax

To remove rows from a table, use the DLE expression. This statement uses a WHERE clause to find the documents to be erased. By default, all documents would be discarded if the WHERE clause is removed.

```
DELETE FROM table_name
WHERE some_column = some_value;
```

Fig 4. 15 Delete Rows in a table

4.4.2 Queries

In all cases, the SELECT * expression returns all columns. You will use the given utility to find all the columns and rows in the movies table.

```
SELECT *
FROM movies;
```

Fig 4.16 Select Statement

The WHERE clause is used to filter (reows) that match a certain condition.

```
SELECT title
FROM library
WHERE pub_year = 2017;
```

Fig 4.17 Where Statement

The BETWEEN operator will filter matches any value between two endpoints. Values may be represented in text, numeric details, or date format

```
SELECT *
FROM movies
WHERE year BETWEEN 1980 AND 1990;
```

Fig 4.18 Select Query

The result set may be sorted either in an ascending or descending order according to a specific column. You may position your order either before it arrives, or after. Sorting the data by default is referred to as "descending."ASC is a term used to describe the sort order of the data (default)

```
SELECT *
FROM contacts
ORDER BY birth_date DESC;
```

Fig 4.19 ORDER BY query in SQL

You may use several AND operators, such as two, three, in the search to get multiple results. Two requirements must be met in order for a record to be included in the set; otherwise, it is irrelevant.

```
SELECT model
FROM cars
WHERE color = 'blue'
AND year > 2014;
```

Fig 4.20 AND Query in SQL

Several factors may be mixed using the OR operator. Records with any meeting either criterion are returned in the collection or do not

```
SELECT name
FROM customers
WHERE state = 'CA'
OR state = 'NY';
```

Fig 4.21 OR Operator in SQL

4.4.3 Aggregate Functions

The Category BY clause will category documents in a result set based on the values of one or more columns that are similar. It's sometimes used in conjunction with aggregate functions to query data from related documents. The GROUP BY clause may be placed after the FROM or WHERE clauses, but must come before any ORDER BY or LIMIT clauses.

```
SELECT rating,  
       COUNT(*)  
FROM movies  
GROUP BY rating;
```

Fig 4.22 GROUP By Clause example

The HAVING clause is used to better sort the Category Through clause's outcome set classes. HAVING is often used in conjunction with logical operators to filter outcome sets into categories dependent on aggregate properties. Only records (rows) from years of more than 5 movies published each year will be returned by the specified question.

```
SELECT year,  
       COUNT(*)  
FROM movies  
GROUP BY year  
HAVING COUNT(*) > 5;
```

Fig 4.23 Having Clause Example

Aggregate functions perform a calculation on a set of values and return a single value:

- COUNT()
- SUM()
- MAX()
- MIN()
- AVG()

4.4.4 Multiple Tables

In a SQL table, the primary main column is used to uniquely classify each document. It is impossible for a primary key to be NULL. Customer id is the unique

identifier in this case. In a primary main column, the same attribute cannot appear twice. In JOIN operations, data types are often used.


 customer_id	f_name	l_name
1	Abby	Caren
2	Aaron	Paul
3	Gratian	Joseph

Fig4.24 Primary Key in a Relational DBMS Table

A foreign key is a connection to the table that contains in the records of one table. The use of a foreign key is important for maintaining several records for a single row. For example, a foreign key may be used in the table order to monitor all of a customer's orders.

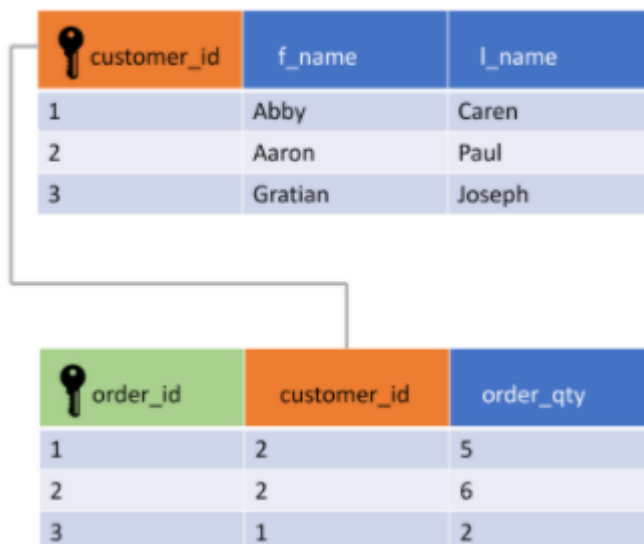


Fig 4.25 Foreign Key in Relational DBMS Table

The UNION agreement is used to merge and filter duplicate outcomes from different SELECT sentences.

```
SELECT name
FROM first_names
UNION
SELECT name
FROM last_names
```

Fig 4.26 UNION of Two Tables

In the result collection, the Crossed JOIN clause can be used to merge each row from one panel with each cell from another. This JOIN is useful for generating all potential variations for two tables' records (rows).

```
SELECT shirts.shirt_color,  
       pants.pants_color  
FROM shirts  
CROSS JOIN pants;
```

Fig 4.27 Cross Join Between Two Tables

The JOIN clause allows for the return of results from more than one table by joining them together with other results based on common column values specified using an ON clause. INNER JOIN is the default JOIN and it will only return results matching the condition specified by ON.

```
SELECT *  
FROM books  
JOIN authors  
ON books.author_id = authors.id;
```

Fig 4.28 Inner JOIN between two tables

And if the join requirement is not satisfied, an OUTER join will merge rows from separate tables. In an LEFT JOIN, any row from the left table is returned in the result collection, and NULL values are used to fill in the columns from the right table if the join requirement is not satisfied.

```
SELECT column_name(s)  
FROM table1  
LEFT JOIN table2  
ON table1.column_name = table2.column_name;
```

Fig 4. 29 Outer Join between two tables

The WITH clause uses an alias to store the output of a question in a temporary table (temporary movies). With only one instance of the WITH keyword, you may build several temporary tables.

Chapter 5 Conclusion

5.1 Conclusion

I'm currently doing my intern with cognizant, and I've grown a lot through it. It's helped me shape my personality and equip me with the understanding of these innovations.

My last internship assignment is still with cognizant internship, and I will try my very utmost to complete it.

I'd like to express my gratitude in advance to the cognizant mentors, SME, tutor, and teacher who led me through my internship at cognizant and answered all of my questions. Coaches, Sme, Mentor, and Tutor were all pleasant people who assisted me if I made a mistake and influenced me during my internship.

My instructor, in particular, put in extra energy and during intern and forwarded all of our questions to the company's higher authorities, whether they were relevant to retaking the evaluation, logistical issues encountered during the assessment, or having more time to complete the project.

Since cognizant is a top fortune organisation in the technology industry, I would strongly advise my juniors to plan well for the offer and get the internship opportunity from the cognizant.

I'd like to express my gratitude to my TNP officer, Mr. Pankaj Kumar, and faculty member, Dr. Nafis.U Khan , for their assistance and dedication during entire placement period, as I understand how difficult it is to handle a placement drive.

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by Rishabh Banot

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Chapter 1 Introduction

1.1 Background:

To get a Gen-C position, you would take a position in a certain organisation until the internship is over. They placed her in an internship that was 12 weeks in length, which consisted of training programs, webinars, Udemy classes, and project work projects.

a big American and Indian IT firm A great number of people from India were hired by Cognizant last year, and it has about 3 lakh workers. The Cognizant Corporation often attracts and employs foreign employees from around the world.

Cognizant provides different positions in the business including developer, tester, and manager but before making the decision to work there is a year of planning after the internship for each.

Cognizant offers compensation to interns and is about Rs.12,000 a month over the internship time. A thousand dollars comes in cash, but Rs.12000 gets reduced by the levy. This internship takes on a bit of a sliding scale. It changes depending on what kind of job the intern takes. With a developer profile, it may be only 4 months, but with QEA, it is as long as 6. It will vary between the cognizant variation for the students, but it's all based on the assimilatory measure, and first arrive, first done.

Cognizant's task, vision, value proposition, and creative/strategic goals

Cognizant goal is to put the newly hired talent into training. All who were invited were offered an internship with organization

In addition to trainees, every year many colleges give associateships to graduates of cognizant courses of study. This candidate is impressive, since he or she comes from all across India.

They put a lot of time, effort, resources, and money into teaching the intern before they start doing it in the real world

Students who are newly hired will go into our ongoing onboarding training course so long as they are either a college graduate or college graduates.

1.2 Values

By and large, these are the ideals of the organisation:

Their biggest asset is the employees. To keep high-quality partnerships with our customers, knowledgeable peers, retailers, the suppliers, community leaders, and

the general public, we have to treat all of them with dignity.

We are working to gain long-term consumer satisfaction through respecting each individual's company and customer interests, as well as doing so with utmost dedication and honesty, and we want to have a long-term and positive impact on each customer by serving as an impartial adviser.

Everyone in the company will uphold the commitments to excellence, justice, integrity, and professionalism in all of their operations.

Keys to Success:

1. Be out front and truthful in the completion of the project.
2. finish the project on schedule.
3. How can you finish the job?
4. Finish the job on budget.
5. SMEs, personal trainers, and mentors will all be very helpful if you make an effort to pick up their advice and take it in.
6. An eager, open student is always a good student.

1.3 Objectives

In order to concentrate on what we are the company doing best, Cognizant would aim to focus on a few areas and be a national market leader.

In Expanding the company to be simultaneously growth-inducing and manageable.

Chapter 2:Introduction

2.1 Stage 1 – QEA Basics

I was recruited before I began QEA. This is a similar training to SDET, but we have to master additional software and do research assignments for the duration of the SDET internship.

2.2 Week 1

Throughout the internship, all of the competency-based classes must be complete (not only the Udemy ones).

Since reading about the core quality assurance concepts in week 1, we worked on things like practical monitoring and app testing.

following the online Udemy courses, we performed a quick hands-on, which was required for all interns, and then a lengthy final exam which was used for the performance assessment.

As critical as covering all the bases of QEA, Agile, and black box and white box testing was for the creative part of this week, so that we will be able to design effectively

It has given some research techniques in addition to spreadsheets as well.

2.2.1 Concepts Studied.

1. Flexible testing: reflects the principles of agile product growth. In contrast to the Waterfall testing, Agile testing can begin early in a project and works together with progress. The Agile Testing approach is non-iterative, not done in a certain order, but it is done during the creation phase.

2. A test plan for agile: Includes test data specifications, test environment conditions, and results from the previous version. Agile technique, as opposed to waterfall methodology, puts the focus on writing and revising a test plan each time a release is done. Agile test programmes usually include:

1. Elements which are being experimented with
2. Often known as either as function checking
3. loading and stress testing
4. Minimizing risk in the infrastructure Strategy implementation and Milestones

For agile testing, there are four distinct phases: planning, doing, studying, optimising, transitioning, and sustaining.

To see if a system works or not Which is part of the testing phase to ensure that consistency goals are met. "Verification" and "as well as "validation" are

components of the whole software development phase." The term "software testing" should not be limited to a single action. The methodical set of operations aid in the validation of your applications. The life cycle of software testing is referred to as an STLC.

The Creativity Phases Any STLC has the following six stages:

1. Analysis of Requirements
2. Test Preparation
3. The development of test cases and the establishment of a test environment
4. Execution of the Test
5. Closure of the Test Cycle

Entry and Expiry : Exit criteria to be completed includes beginning to end, end to beginning, and beginning to end (STLC)

In the Entry Criteria column are all the prerequisites for the experiment; before the experiment may begin, these must be completed.

Exit conditions can be described as those activities that must be completed prior to testing.

It is the first of two phases of the quality assurance process, where a senior QA manager outlines the test strategy, the commitment, and expense expectations. Tools, research setting, test constraints, and testing times are almost all predetermined, The test plan is over.

Writing a research schedule and approach with different testing methods

Selecting a test tool,apportioning effort among various test cases,testing various functions,determining roles and resources

unbiased research A manager in charge of project quality assurance decides on a research strategy and estimates how much time and money the project would take to test it as well. The tools, research setting, as well as the test design specification, test length, and testing requirements are also decided. The plan of action (Test Plan) is developed in the same process.

The following are the most popular varieties of Black Box Testing:

Functional research has two dimensions: the outer layer and the inner layer.

Non-functional research is looking for parameters rather than technical features, such as performance and scalability, when functionality is tested using black-box testing.

In order to guarantee the new technology does not affect the existing code, regression testing is done before going live, as modifications are made, updates are

performed, even when everything is run to see that everything still works properly.

The following are the most common test techniques in black box technology.

Same equivalence reducing the amount of research cases while ensuring complete test coverage

Limit Checking: Limit testing focuses on the limit values defined at the limits. To test if a value set is suitable to the scheme, you may use this tool. The less the test cases you have, the better, in my opinion. It is preferable for devices whose numbers of inputs lie between a certain set.

For judgement tables, testing conditions and outcomes are arrayed in a row. There are six columns in a list; each has a different combination.

White box testing is a software testing strategy which requires looking within the product and at its architecture to see if its functionality and design are sound, and finding any flaws in the input-output framework. In addition to "white box checking", "open box testing", "transparent box testing", and "glass testing", it is often classified as "code-based testing", "glass testing", and "code-based", "observable" Not only is it part of the software engineering methodology known as Box Testing, but it's also one of two components

A number of research approaches can be referred to as 'creative' when they are applied to evaluate the programme, the code, or a particular software package's creativity. A number of form classes follows:

Memory leaks can be tested regularly. Memory leaks are very often seen in slow-running applications. When you have a memory-leaking application, you need a specialised software testing specialist who knows about finding latent problems with slow-running software.

checking and iterating." It is not uncommon for unit research to be the first kind of testing done. Each new piece of code goes through unit testing as it is created. The primary responsibility of the compiler is to verify the correctness of the software. Testing also means writing a small amount of code, writing a single function, or writing simple classes before going on to the next level. In the early stages of software production, unit testing helps to find many of the problems. Bugs are less costly and simpler to track down at this point.

Code coverage is widely adopted as an effective tool for White box checking. code coverage informs us which tests have been executed, and which have not. It finds software components that aren't exercised in the test suite. When the weak points of the app have been identified, you verify the unknowns in the test cases, improving

Table 2.2 All Possible Test Cases with the Given Constraint

Test Case #	Test Case #	Test Case Description	Precondition	Steps to reproduce	Expected Results
TC-001	TC-001	Search for Hotels in India with valid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-002	TC-002	Search for Hotels in India with invalid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-003	TC-003	Search for Hotels in India with valid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-004	TC-004	Search for Hotels in India with invalid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-005	TC-005	Search for Hotels in India with valid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-006	TC-006	Search for Hotels in India with invalid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-007	TC-007	Search for Hotels in India with valid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-008	TC-008	Search for Hotels in India with invalid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-009	TC-009	Search for Hotels in India with valid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed
TC-010	TC-010	Search for Hotels in India with invalid date	PC: Travels website launched and the valid button when to search is available	1. Open the browser and go to the website 2. Click on the search button 3. Enter the search criteria 4. Click on the search button 5. Check the results	The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed The search results should be displayed

Table 2.3 Defect Report with possible defects

Serial No	Defect id	Description	Reproducible (y/n)	Steps to reproduce	Severity	Priority
1	DPF_001	On clicking "International" radio button the "Country" list box is not displayed Expected Result: The country list box should be displayed Actual Result: The country list box not displayed Impact Test case: TC_001	Yes	Precondition: Travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "International" website 2. Select "International" radio button	Medium	Medium
2	DPF_002	Enter check-in date greater than check-out date and clicking "Search" after selecting all other valid details the website is showing all the records Expected Result: message displaying "Invalid check-in and check-out dates" and no other results should be shown Actual Result: all the records are displayed to the user despite of invalid dates in "check-in" and "check-out" Impact Test case: TC_002, TC_003, TC_004	Yes	Precondition: Travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "International" website 2. Choose any other radio button "India" or "International" 3. Select a valid check-in date which is greater than check-out date 4. Click "Search"	Medium	Medium
3	DPF_003	After selecting "Delhi" from city list box and clicking "Submit" after entering all the required fields hotel details of city "Calcutta" are displayed Expected Result: hotel details for city "Delhi" should be displayed to the user Actual Result: hotel details for city "Calcutta" are displayed to the user Impact Test case: TC_001	Yes	Precondition: Travels website launched and "India" location radio button already selected Steps to reproduce: 1. Launch the "International" website 2. Choose the location radio button "India" 3. Select after city "Delhi" from the city list box 4. Click "Search"	Medium	Medium

Table 2.4 Requirement Table

Serial no	Requirement id	Requirement description	Test scenario id	Test case id	Defect id
1	REQ_001	To search the functionality with India radio button	TSID_001	TCID_001	DFID_003
			TSID_002	TCID_002	
				TCID_003	DFID_002
				TCID_004	
				TCID_005	
				TCID_006	
				TCID_007	
2	REQ_002	To search the functionality with International radio butto	TSID_003	TCID_008	DFID_001
			TSID_004	TCID_009	
				TCID_010	DFID_002
				TCID_011	
				TCID_012	
				TCID_013	
				TCID_014	

2. Student Enquiry Form

The screenshot displays a web-based 'Students Enquiry Form' for 'ARENA COURSES'. The form is titled 'Please fill up the form below (* fields are mandatory)'. It contains the following fields:

- Name**: A text input field.
- Gender**: Radio buttons for 'Male' (selected) and 'Female'.
- Date of Birth**: Three dropdown menus for 'Date', 'Month', and 'Year'.
- Email ID**: A text input field.
- Phone**: A text input field.
- City**: A text input field.
- Pincode**: A text input field.
- Interested in**: A dropdown menu with 'Select Course' as the current selection.
- Comments**: A text area with a vertical scrollbar.

 At the bottom of the form are two buttons: 'SUBMIT' and 'CANCEL'. The page header includes 'Home', 'Arena Courses', and 'Students Enquiry Form'. On the left, a sidebar menu lists various course categories, with 'Students Enquiry' highlighted. Below the menu are logos for 'Autodesk Authorized Training Center', 'Adobe AUTHORIZED Training Centre', and 'INDIA'S ARENA CENTRES'.

Fig 2.2 User Interface Provided

Table 2.7 Defect Report with possible defects

Serial no.	Defect id	Description	Reproducible (yes/no)	Steps to reproduce	Severity	Priority	Reported by	Reported date	Status
1	DFID_001	On clicking the "Submit" button without entering any value in the "PHONE" text box, no error message is displayed to the user. Expected Result: An appropriate error message should be displayed. Actual Result: No error message displayed and NULL in "PHONE" text box accepted Impacted Test case: TCID_021	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Application 2. Click on the "Submit" button without entering any value in "PHONE" text box	High	High	Rishabh Bhandot	3/31/2021	New
2	DFID_002	On clicking "Interested in" list box and it is blank without any value Expected Result: An appropriate error message should be displayed. Actual Result: No error message got displayed Impacted Test case: TCID_068	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Arena Application 2. Click on "Interested in" listbox	High	High	Rishabh Bhandot	3/31/2021	New
3	DFID_003	All the details are entered by the user and then the user clicks on "Cancel" button. The system does not erase the data Expected Result: "CANCEL" button when clicked, the system erases data Actual Result: The system did not erase the data after clicking the "Cancel" button Impacted Test case: TCID_022	Yes	Precondition: Arena app launched and Students Enquiry Form should be displayed to the user Steps to reproduce: 1. Launch the Arena Application 2. Click on the "Cancel" button after entering all the data in the all the mandatory fields	High	High	Rishabh Bhandot	3/31/2021	New

Table 2.4 Requirement Table

Serial no	Requirement id	Requirement description	Test scenario id	Test case id	Defect id
1	REQID_001	Search for a course on interest in Animation	TSID_001	TCID_001	
				TCID_002	
				TCID_003	
				TCID_004	
				TCID_005	
				TCID_006	
				TCID_007	
				TCID_008	DFID_002
				TCID_009	
			TSID_002	TCID_010	
				TCID_0011	
				TCID_0012	
				TCID_0013	
				TCID_0014	
				TCID_0015	
				TCID_0016	
			TSID_003	TCID_0017	
				TCID_0018	
				TCID_0019	
				TCID_0020	
			TSID_004	TCID_0021	DFID_001
				TCID_0022	DFID_003

Chapter 3 Java Programming Fundamentals

3.1 Week-2

3.1.1 Java Overview

Java is a general purpose, class-oriented object-oriented programming, built for high-level, independent design. It lets Java developers write once and run on every computer that has a Java, eliminating the need for sacrificing functionality. Usually, Java programmes are compiled to bytecode, and run on every Java Virtual Machine (JVM) platform. C and C++ have identical syntax, but less low-level services. The Java Virtual Machine (JVM) features versatile functions (such as introspection and dynamic code execution). According to GitHub, Java is one of the most common programming languages for end - user web - based applications as of 2019. The Java programming language was created by Sun Microsystems and made available on Sun's Java programming language in 1995. These compilers, as well as the APIs, implementations, and DLLs, are distributed by Sun under non-open source licences. As the Java Community Design objectives are in use, Sun relicensed its Java innovations under GNU GPL. Oracle provides its own Virtualization Layer, however the default Vm, OpJVM, is open-source and used by many programmers on Linux distros. The new edition is Java 16, with the current stable long-term version launched on September 25, 2018. Oracle will launch the final no more minimal cost improvements for legacy Java 8 for commercial exploitation, but will keep providing public updates for Java 8 personal use as well.

These five were central to the design of Java: usability, security, portability, expressiveness, efficiency, scalability, and extensibility, performance, and versatility, and reliability.

1. It has to be easy to use, focused on the user, and succinct.
2. To be of good quality, it must be hardy and tough.
3. It has to be impartial with regards to construction and compact.
4. High-quality execution is important.
5. Fluency, continuity, and versatility

At Sun, they have specified four separate versions of Java APIs that are deployed for separate platform-specific application areas.

Various Java-based applications

1. GUI apps may be developed using Java. These applications are built on AWT, Swing, JavaFX.
2. Most software applications are developed with a mobile device in mind,

whether or not Android is the predominant mobile operating system that now requires the use of Java in order to function on almost all smartphones. J2ME is a lightweight and common mobile-oriented tool that can be used to create applications for any device, including cell phones and feature phones. Also, in addition, Java is also supported by Android Studio and Kotlin.

3. Empirical applications are large software systems which are developed by the company for use in an organisational setting, rather than human, or personal, purposes. As well as Java's features that meet the specifications, it's a popular option among businesses because of this. Today's enterprises are all for Java because it's the most stable and flexible programming language of choice. . Enterprise examples include companies, educational institutions, banking networks, ERP (ERP) schemes, association databases, foundations, and government programs, as well as various interest groups.

4. A real-world implementation of mathematics would inevitably be affected by science. Because Java's excellent features are supportive of scientific software, it's a good development platform for science. When you work with large volumes of data, particularly numerical data, Java will be the best software language to use. It provides a fast, stable, and simple platform for these apps. MATLAB, which is an ideal for science computing, is used to build the front-end (an integrated UI and a back-end implementation) (a core part of the system).

5. Interactive websites A software application is a software that is used on the internet as a web client or server, and as such may be delivered by a device.

6. Embedded System: An Embedded Device, also recognized as an integrated solution, combines several tiny processing devices to carry out dedicated operations with larger systems together. Embedded systems are developing using Java. Until Java was developed, it was created for the sake of embedded systems. There is a notable lack of efficiency in Java for small embedded/embedded systems, which necessitates a smaller amount of Java runtime memory

7. Large Data Technologies: The word "huge data" means "highly large and dynamic databases that are processed to collect valuable knowledge, patterns and trends. Networking is a subject of current technology that is common around the world. I think of Java as being a projective methodology for big data. Many website developers are now turning to large datasets as their second career path since launching successful startups. A large, multi-dimensional database named Hadoop is based on Java's accessible free software architecture. In addition, the Automated

Waste Management and the solid memory maintenance give it more emphasis than other computer languages.

3.1.2 JVM

At runtime, the JVM serves as a Java programme host. A JVM runs the code that invokes the key function that is included in a Java source file. Feature is needed for a successful installation of Java Runtime Environment. disposable from the wealth of acronyms All runs on Java, which ensures that if you can understand and write Java code, you can be certain it will work on every Java-powered machine. This can all be done because of the Java Virtual Machine (JVM). A .class file (which is a filename containing bytecode) is created whenever we compilation the .java document. This class file progresses through many distinct stages as it is executed. It gives you the entire picture of the Virtual machine

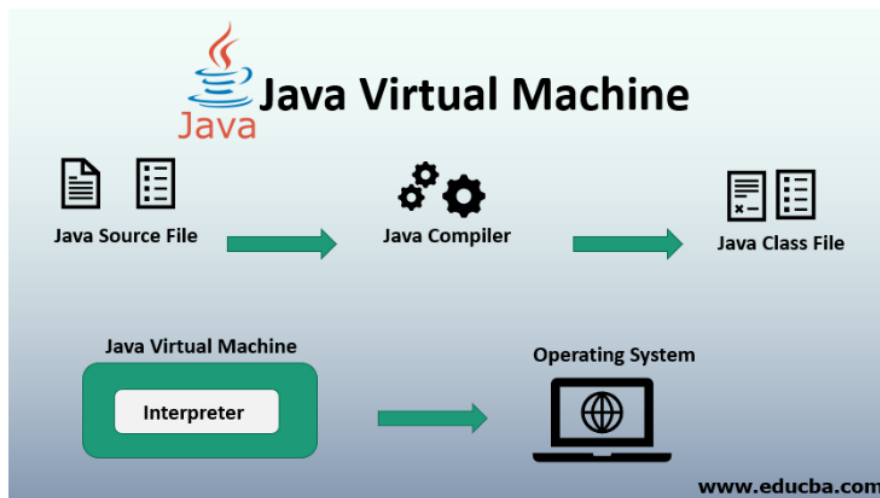


Fig 3.1 The Working of Java Virtual Machine

The Class Loader subsystem is primarily involved in three activities: loading classes, processing registrations, and managing garbage collection.

1. The object loader loads “.class” data and saves it to the method. the system stores the following for each “.class” file: The eligible title of a class, followed by its complete name as well as its class label. And if the “.class” file pertains to a Class or Enum, they are incompatible. Advanced, Feature, name, arguments, and parameters, etc.

2. Linkisng consists of linking, planning, verification, and the (optionally) to resolve the same. Fully verifying the class files guarantees that the consistency of the .class file, in other words, it confirms that this file was created with a suitable compiler or not. We get an operated exception which authentication fails. This

process is carried out by the Bytecode Validator component. Once the class file is ready for compilation, the game will be complete. Preparation is where the JVM prepares and initialises the class-level variables to their default values. Replacement of conceptual reference to the form occurs as a result of resolution. It's achieved by locating the object in the technique or process in question.

3. Finalization: Static variables are specified in the code, and are allocated their values in the first step of execution. This is done from the top down on down, starting from the class and proceeding across the class hierarchy.

Java memory is made up of these:

All class-level information including names, parent class names, instance variables, etc. is stored in the process field.

The heap is all about everything. Finally, there is one heap area per Java Virtual Machine. This may also be considered a shared property.

interchange field To allocate a new memory, the JVM builds a new runtime stack, and stores it here. Each block of this stack record has been named an "activation record". Since it executes ".class", it has a standard classloader (bytecode). The Python programming language reads byte-code line by character, field by field, and executes byte and assembly code. There are three basic categories of part: simple, complex, and compositional

strategic tool It works line by line to read the bytecode, and then executes. The problem with this strategy is that each time you call a system, an explanation is necessary. Increment the effectiveness of an interpreter with a Just-In-Time compiler putrefaction It gets rid of unessential artefacts If you're interested in garbage collection, see the article about it.

It is commonly used for designing Java Web-based apps and applets. The Python language contains a runtime, an interpreter/loader, a compiler, and other resources for Java creation.

Java Runtime Environment or may be abbreviated as "JRE.". A free, open-source Java software platform like the Java Runtime Environment (JRE) is needed to run a Java application; it includes the Java Virtual Machine (JVM), core classes, and data.

3.1.3 Java Identifiers

In computer languages, identifiers are used for the purpose of recognition. Any kind of name that can be used as a symbol can be called a class name, like variables, methods, constructors, and class names.

3.1.4 Data Types

Programming languages such as Java must predefine any form of data (integer, character, decimal, and so on) whereas strict typing is enforced statically since each constant or vector must reference an actual part of the language definition.

Javascript has two types of data: uninterpreted and scripted.

The primitive data elements such as binary, character, integer, and so on, as well as the non-primitive types of data are presented.

Simplistic data are simply data with just a single attribute and don't have any unique capabilities. Primitive data types in Java are made up of eight basic data types.

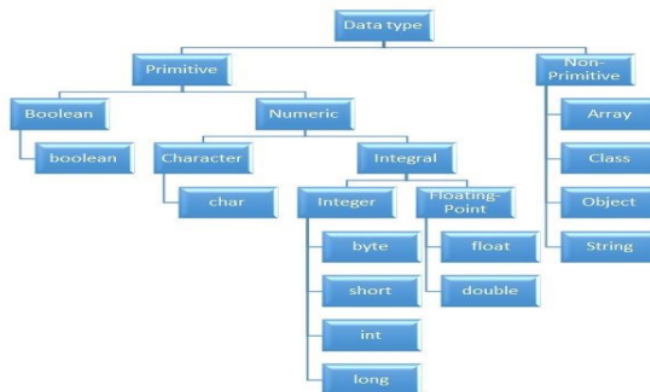


Fig 3.2 Different Data Types in Java

1 Non-Primitive Data Type or Reference Data Types-The Reference Data Types will contain a memory address of variable value because the reference types won't store the variable value directly in memory. They are strings, objects, arrays, etc.

3.1.5 Variables

An expression refers to a memory spot, often known as a vector. The fundamental element in a curriculum. During the software execution, the value of a variable may be modified.

The variable is a designation for only: everything that happens to the memory position; everything that is achieved with the variable changes the memory location. Java requires all variables to be made known before they are included.

A data form for the attribute referring to several kinds of variables: Name for the various variables.It's the variable's original value.Variable declarations A block or process or constructor-defined vector is referred to as a variable.Static variables, non-members, and variables that are declared inside the body of every class (also known as members), are known as Instance variables.

You may distinguish between instance variables and static variables from the context in which they are used: instance variables are used within a process or other instance, whereas static variables are not.

3.1.6 Type Conversion

Value of one data form assigned to another is unlikely to be comparable. Automatic style conversion happens if the first time the data is fetched; afterward, you have to manually cast or transform it if you need to. To do something like this, you can do, for instance, assign an integer to a longer variable.

3.1.7 Loops

Using a looping languages allows a series of instructions/functions to be executed when any optimized delivery to be valid is a very useful feature for writing software. For example, a while loop performs an action while a variable remains true. although statements can be imagined as repeated a "while" looping

FOR loops are provided by for various reasons, but this is one of the more notable ones. As compared to a while loop, a for loop initialises, tests, and increments/decrements in one sentence, the for method offers simpler, readable form in which iterates a certain number of times.

There are two versions of the while loop; while, which only verifies the position after performing states in the block, and do while, which tests for the conditions while performing sentences.

3.1.8 Decision Making

Programming choices are the same as life-altering choices. We sometimes require a line of statement to be executed for such circumstances in programming, circumstances that have been predetermined. They're programmed by a computer such that when the software changes, the flow of operations changes as well.

If the state is true, the blocks will be executed. Unless, of course, we prefer to do something else. Here's where the if comes in. We will **use the Else Statement to execute** the following sentence of statement if a condition is wrong.

```
if (condition) {  
    // block of code to be executed if the condition is true  
}
```

Fig 3.3 Syntax for if statement

1 nested-if: A nested if is an if statement that is the target of another if or else. Nested

if statements mean an if statement inside an if statement.

Switch-Case ⁴ The switch statement is a multiway branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression.

The RETURN statement is used to explicitly return from a ¹ method. That is, it causes a program control to transfer back to the caller of the method

⁵ 3.1.9 Static Variable

A static element is also known as a class variable which is often considered a static. You can access it by class name or using its value and is exclusive to the class, but not always.

⁵ 3.1.10 Non-Static Variable

Any variable of a class which is not static is called a non-static variable or an instance variable.

3.1.11 Classes and Objects

Object-Oriented Programming is built on object - oriented as their core principles revolve in the actual world.

Objects are derived from class-A classes; Class-A classes are self-defined blueprints or mock-ups that aid in the construction of others. The property or process may be called from every entity of that kind. This part will appear in a class declaration, generally::

A class may be public or a member function may provide public access.

¹² Class defines a type which is used to define a type, whether it is well-designed.

A letter, and then be followed by additional letters, numbers, or numbers, that are each followed by an alphabetically-delimited sequence of underscores"

best-and-division classification)if some (parent) class name is followed by the term "extends", then a parent class extends class A class may only be a subset of one class.

combination of features the class name and their inclusion in the section, if any, if present. More than one user type should be used to enforce an interface.

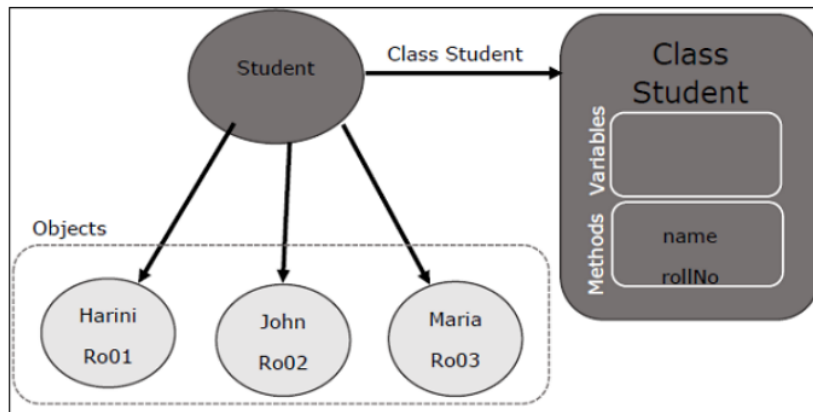


Fig 3.4 Relationship between class and object in JAVA

To assign values to newly created properties, use constructors. A class' variables include the condition of the class, while methods enforce the functions and functions implement the methods.

nested groups, anonymous functions

An object is an elementary object in object-oriented design, and it is an object in the physical world. Typically, Java programmes have a large number of items, and make use methods to communicate between them. Objects have form and colour. When an entity represents a state, it is said to be stateful. Often describes an object's properties. Behaviour is defined by a set of techniques used on an individual. objects to draw on each other objects Name makes an item one in a kind.

3.1.9 Access Modifiers

Using access modifiers limits the range, constructors, variables, and methods and data members of a class. Java has the following control modifiers: Private, Protected, and Public, which have four different levels of access.

3.1.10 Inheritance

A class's feature set (field or method) can be inherited by another.

Syntax:

```
class sub-class extends main-class
{
    //member variables,constructor,member functions
}
```

Types of Inheritance in Java:

Within one base level, subclasses inherit one element from their parent class. Class A is the common ancestor of the classes B and C.

It would be used in multiple inheritance, but the base class will serve as a superclass to its derived class. Inheritance, one class acts as a parent (base class) for two or three child classes.

Multiple inheritance allows a class to use input from different parent groups, but multiple classes may have just one parent.

That is a combination of two or more modes of inheritance.

3.1.11 Constructors

Constructors are used to set the state of an entity. A constructor, like methods, includes a set of statements that are implemented when an Object is formed.

At least one constructor, it may be the default constructor, is invoked each time an entity is generated using the new keyword to allocate control parameters to the associated data of the same class. When an entity or object is created, the constructor is called.

Constructors are divided into two categories:

1. Default constructor- A constructor with no parameters is referred to as a no-argument constructor.
2. Parameterized Constructor- A parameterized constructor is a function constructor(params) that has parameters.

3.1.12 Interfaces

Class methods, while the variables declared inside an implementation are by concrete, by design. A class interface defines what it must do, but not how. This is the class's strategy. An interface consists of capabilities such as an interface-capable. It indicates what procedures the class would adhere to. Complete abstraction is best realised with music. Multiple inheritance is not possible in Java, but having an implementation achieves it. In addition, it is utilised to facilitate loose coupling. Art is used to approximate truth.

As a result, again, then, why do we use class hierarchies if we are not using concrete ones? Cloaking the particular structure, but hiding the functionality from the public. The fact that abstract classes represent the concept of showing/hiding.

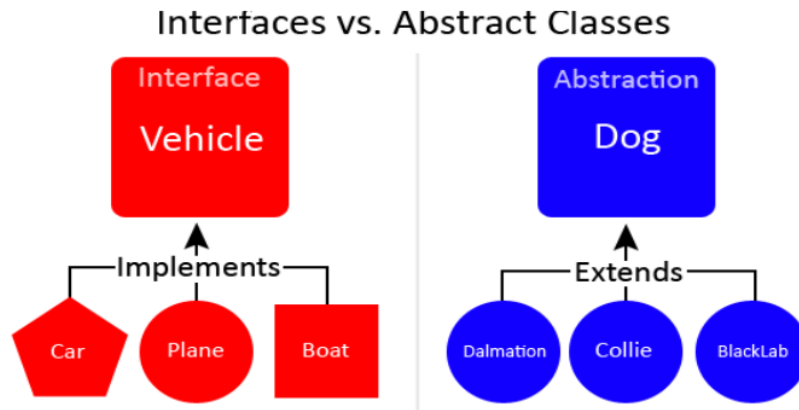


Fig 3.5 Difference between Interface and Abstract

3.1.13 Abstraction

Data Abstraction leaves out the unnecessary information such that only the important facts appear to the viewer. The marginal or the non-essentials units are never shown to the customer. Ex: A car is regarded as an automobile rather than its particular components.

Hide-and-and-polymorph groups and Polymorph-only approaches An arbitrary class is created with the superclass. An abstract method must be formulated without defining any concrete data and must be defined without describing the code..

3.1.14 Encapsulation

The packing up of data into a single device is known as encapsulation. It's the glue that holds coding and the information it tries to manipulate together.

Encapsulation's Benefits:

1. Hiding Data
2. Greater adaptability
3. Adaptability
4. It's simple to test code.

3.1.15 Runtime Polymorphism

Polymorphism is one of the aspects that Java embraces the notion of method overriding. Java looks up the instance method to call when an overridden method is invoked from a superclass reference. To conclude, this is all decided on the fly. Method execution relies on the form of the object being invoked.

Overloading makes methods have the same name, but various parameter types and different numbers of input parameters, while boxing restricts methods to just have the same name.

In any object-oriented language, a function which allows an existing method to be overridden is referred to as "overriding".

The single unit of every set of items is defined as the collection.,the collection classes are specified in a separate "Collections Framework" module. A framework is a set of pre-built classes and protocols which supplies a basic design.

3.2 Week-3

3.2.1 Collections

All items that are seen as a single entity are classified as an array. The "Collection Framework" was used as a separate project, holding all of the collections groups and their associated interfaces.A program is a system of pre-made classes and objects that makes an architecture easier to design.

The below are some of the benefits of the Collection Framework:

1. API that is consistent
2. Increases software pace and consistency thus reducing programming commitment.
3. The Object Interface expands the iterable interface which is enforced by all of the collection new framework classes. This gui includes many of the simple methods that any database has, such as applying data to the collection, extracting data from the collection, removing data, and so on.

3.2.2 Iterators

In the Collection system, iterators are used to go over a list and extract items one at a time. Each of the three ideas is an iterator

EnumerationThis is used to retrieve items from existing collections . It works for every Collection object; it's an iterator in all collections. Use Iterator, they can read and delete operations at the same time. This is an enhanced variant of Enumeration that provides the feature of having an aspect that can be removed. List Iterators like ArrayList are just to be used for list, LinkedList and several other collections. With bi-directional possibilities In applications where we need to walk the elements of a List, we must use a ListIterator. This cursor offers a greater variety of features than the iterator. This is similar to the Java collection framework which is an implementation of the Collection interface. This list is used to provide a skeletal application of the List interface, using a database as the underlying data warehouse . AbstractSequentialList should be preferred to this type of associative list for linked list results.

3.2.3 ArrayList

A List is a built-in component of the Java programming interface which exists in the `java.util` kit. Dynamically generated arrays in Java is a great thing. Though that may be faster than regular arrays, such arrays may be extremely helpful in highly dynamic software programmes, particularly when quite a lot of simulation is involved. In the `java.util.concurrent` bundle, this class is located.

3.2.4 HashMap

The `HashMap` class is a member of the set APIs. In the `java.util.concurrent` bundle, this class is located. It implements the basics of the Java Map interface. The dataset may be accessed through two types of indexes: (Key and Value) and a user defined sequence number. Concepts refer to other concepts; one concept refers to another; an idea points to ideas. If you attempt to repeat the key, the variable is automatically replaced. Unsynchronized Hash function is somewhat close to the Hash Map.

3.2.5 Sets

The `java.util.Set` interfaces provide an attribute type where duplicate values are not allowed to be kept. It consists of a mathematical series. Providing the `java.util.Set` implementation

Since the `HashSet` class is a part of the code, it is efficient at implementing a hash table. `EnumSet` class, which is available on the collection's API, has been one of the enumeration types using the set protocol.

3.2.6 Exception Handling

An anomaly is an unnecessary or accidental occurrence, which happens during the program's operation, such as a run-time failure, which is usually considered an exception in all applications.

Since it supports exceptions such as `ClassNotFoundException`, `IOException`, `SQLException`, and others, exception management is needed for programmes to be robust.

Exception management preserves natural system behavior. For error management, an exception usually interferes with the usual flow of the programme.

3.2.7 File Handling

With the aid of the `java.io` kit, you can do virtually every operation involving endpoints in Java. all these things go to or have come from an input or an output system As part of the `java.io` kit, the stream offers numerous built-in data types including primitives, objects, localizable strings, and more

It is a series of data represented as a river. Streams may be divided into two classes:

clearly noxious and harmless.

Source – To interpret metadata, use the Source. To write data to a target, use the Output Stream.

The aim of the Byte Streams in Java is to transfer ASCII characters and to and display 8-bit bytes. While there are several file input/output stream-related classes, the most commonly encountered ones are those that are subclasses of class `java.io.InputStream`. `READ`, `WRITE` the whole files

A stream is a flow of data. The origin stream reads data and the target is where it is written.

3.3 Week-4

3.3.1 JDBC

Java Database Connectivity. A query API connects and queries the database, and JDBC enables you to do so with Java. An essential feature of Java SE . A JDBC API connects to a JDBC database using drivers.

There is little to stop one from using JDBC to get tabular data from every database system. We have been able to successfully save, modify, delete, and fetch our game data with JDBC API. This is as if Microsoft had invented Open Database Connectivity .Everyone who will use JDBC.

By implementing a common series of interfaces, JDBC allows for easy access to involvement with the study on different platforms. a Java could be used to compose executables that perform various functions, including

1. Applications written in Java
2. Applets in Java
3. Servlets in Java
4. Pages for Java Server (JSPs)
5. JavaBeans for Company (EJBs).

Architecture of JDBC

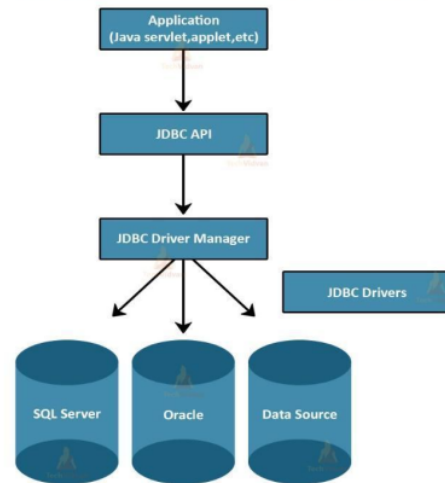


Fig 3.6 Architecture of JAVA DATABASE CONNECT

Both of these various programmes have access to the records with a JDBC engine, and may even use storage data. JAVA DATABASE CONNECT is, in short, has the same functionality as JDBC, thereby enabling non-database-specific applications to run on any and all Java programmes.

Chapter 4: Web User Interface And DATASOURCE

4.1 Week 6

We just have to do two things this week: accept the Udemy courses that are offered by the company, complete the hands-on project, and the combined Skill Exam.

I took the learning to the next level and doing the on-the-the-job assessments are now needed.

It is absolutely essential to know html and xml and xpath from scratch while working on new projects.

4.1.1 HTML

The World Wide Web Consortium's standard, or ¹¹ Cascading Style Sheets and scripting languages, such as JavaScript, can be used to modify the look and feel of the web pages. Both web browsers act as an HTML document to a router, or retrieve documents from local or remote storage and generate multimedia websites, based on such documents. Semantics defines a web page layout which is historically used as an aid in visual appearance design as well.

The basic elements of web pages are made up of HTML components. In HTML, there are artefacts such as photos and links that can be placed inside the made document. Structured documents are created using HTML's designation of headings, tables, articles, and hyperlinks. html components are identified by tags, written using braces and published using angle brackets attributes like "IMG " and "INPUT" explicitly contribute to the page material. tags such as <p> enclose and include additional knowledge regarding text and other elements.</tagss> A browser interprets the text, but doesn't show any HTML tags.

Many of today's Web pages are created using HTML, which is the dominant language for the Web's markup

1. It tells you how the structure of a web page is defined by HTML
2. HTML is made up of several parts
3. HTML components are coded instructions for the browser on how to view the material



Fig 4.1:HTML Page Structure

Table 4.1: Basic HTML Tag

Tag	Description
<u><!DOCTYPE></u>	Defines the document type
<u><html></u>	Defines an HTML document
<u><head></u>	Contains metadata/information for the document
<u><title></u>	Defines a title for the document
<u><body></u>	Defines the document's body
<u><h1> to <h6></u>	Defines HTML headings
<u><p></u>	Defines a paragraph
<u>
</u>	Inserts a single line break
<u><hr></u>	Defines a thematic change in the content
<u><!--...--></u>	Defines a comment

Table 4.2:Input And Form Tags

Tag	Description
<code><form></code>	Defines an HTML form for user input
<code><input></code>	Defines an input control
<code><textarea></code>	Defines a multiline input control (text area)
<code><button></code>	Defines a clickable button
<code><select></code>	Defines a drop-down list
<code><optgroup></code>	Defines a group of related options in a drop-down list
<code><option></code>	Defines an option in a drop-down list
<code><label></code>	Defines a label for an <code><input></code> element
<code><fieldset></code>	Groups related elements in a form
<code><legend></code>	Defines a caption for a <code><fieldset></code> element
<code><datalist></code>	Specifies a list of pre-defined options for input controls
<code><output></code>	Defines the result of a calculation

Table 4.3: Table Tags

Tag	Description
<code><table></code>	Defines a table
<code><caption></code>	Defines a table caption
<code><th></code>	Defines a header cell in a table
<code><tr></code>	Defines a row in a table
<code><td></code>	Defines a cell in a table
<code><thead></code>	Groups the header content in a table
<code><tbody></code>	Groups the body content in a table
<code><tfoot></code>	Groups the footer content in a table
<code><col></code>	Specifies column properties for each column within a <code><colgroup></code> element
<code><colgroup></code>	Specifies a group of one or more columns in a table for formatting

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>TravelClient</title>
  <base href="/">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="icon" type="image/x-icon" href="favicon.ico">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta3/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-e
```

Fig 4.2: Sample of HTML code

4.1.2 XML

It is a mark - up language in which no predefined tags can be used. Instead, you describe your desires so you can choose your own tags. This is a more efficient means of data storage, since it is searchable, and shareable. Additionally, because the XML format is structured, whether you send or distribute XML over the web, the receiver would be able to read the data with no problems because of the standardised XML notation.

XML isn't a suffix, it's a declarative. The Hypertext Transfer Protocol (HTTP) is commonly used for the transport of report information..

```
<?xml version="1.0" encoding="UTF-8"?>
```

Fig 4.3 XML versioning And Encoding

A small business has one department. That department has one employee. The employee details is given in the table below.

Parent Element is "Department"

Employee

empid	name	salary	email	phoneno
1001	Tom	20000	tom@gmail.com	9874563210

```
<Department>
  <Employee>
    <empid>1001</empid>
    <name>Tom</name>
    <salary>20000</salary>
    <email>tom@gmail.com</email>
    <phoneno>9874563210</phoneno>
  </Employee>
</Department>
```

Fig 4.4 XML Document For Employee and Department

Table 4.4 Table of XML Entities

Entity	Character	Description
<	<	Less than sign
>	>	Greater than sign
&	&	Ampersand
"	"	One double-quotation mark
'	'	One apostrophe (or single-quotation mark)

4.1.3 JSON

JSON is a language-agnostic way of expressing data that uses a text format built on JavaScript object syntax. This is often seen in the context of "the technique used to convey data around the internet in websites" you may encounter it often, so here we offer it all to you in plain text form, along with both how to access data and how to create it

More details can be found in the block above: JSON syntax is pretty much like the JavaScript entity literal style. The same simple data types can be used in JSON documents, as you can in normal JavaScript objects.

There will only be text in the exchange between a browser and a server.

As discussed above, JSON is essentially text, every JavaScript entity may be converted to JSON and sent to the server.

A JSON from the server may also be converted into JavaScript artefacts.

Such that we don't have to have to do some difficult-to-to-debug decoding with no localization.

```
{
  "squadName": "Super hero squad",
  "homeTown": "Metro City",
  "formed": 2016,
  "secretBase": "Super tower",
  "active": true,
  "members": [
    {
      "name": "Molecule Man",
      "age": 29,
      "secretIdentity": "Dan Jukes",
      "powers": [
        "Radiation resistance",
        "Turning tiny",
        "Radiation blast"
      ]
    },
    {
      "name": "Madame Uppercut",
      "age": 39,
      "secretIdentity": "Jane Wilson",
      "powers": [
        "Million tonne punch",
        "Damage resistance",
        "Superhuman reflexes"
      ]
    },
    {
      "name": "Eternal Flame",
      "age": 1000000,
      "secretIdentity": "Unknown",
      "powers": [
        "Immortality",
        "Heat Immunity",
        "Inferno",
        "Teleportation",
        "Interdimensional travel"
      ]
    }
  ]
}
```

Fig 4.5 Sample of JSON

At the end of this week, everybody would have to take online Udemy courses offered by Cognizant to finish the hands-on, in-person assignments and get an online evaluation. At the end of week 7, we discovered how to script JavaScript. Since we finished the online Udemy courses, our intern and test takers had to execute their final project tasks. Lately, the most significant task this week was learning Javascript from scratch. And it integrated HTML with JavaScript to provide advanced functionality

4.2.1 Javascript

JavaScript is the lightweight, translated, or just-in-time compiled code, depending on the definition of class, is a general-purpose or high-feature language. Although it is most commonly recognised as the language for Web sites, a lot of people use it for writing Perl scripts as well.

In browser-based environments, CouchDB, Adobe Acrobat, and Node.js are among the prime examples. prototype-based, multi-paradject, multi-structured, JavaScript; prototype-based, single-threaded, object-oriented, interactive Learn more about the JavaScript language.

This segment describes the JavaScript language in its entirety, not host environment specifics. For more regarding the WAPs, please see the DOM API site.

JavaScript programming specifications are and the internationalisation API ECMA-402) All in MDN is focused on the current proposed standards ECMA-262 and ECMA-402 draughts. Features from ECMAScript that have already exist in the current MDN docs/tutorials will still be included in new proposals

Table 4.6 : Javascript Data Types

Variable	Explanation	Example
String	This is a sequence of text known as a string. To signify that the value is a string, enclose it in single quote marks.	let myVariable = 'Bob';
Number	This is a number. Numbers don't have quotes around them.	let myVariable = 10;
Boolean	This is a True/False value. The words true and false are special keywords that don't need quote marks.	let myVariable = true;
Array	This is a structure that allows you to store multiple values in a single reference.	let myVariable = [1, 'Bob', 'Steve', 10]; Refer to each member of the array like this: myVariable[0], myVariable[1], etc.
Object	This can be anything. Everything in JavaScript is an object and can be stored in a variable. Keep this in mind as you learn.	let myVariable = document.querySelector('h1'); All of the above examples too.

JavaScript supports four essential data structures: arrays, known as "one-dimensional arrays" in the language, but called 'one-dimensional sets' or one-dimensional arrays' in JavaScript, which are called 'dynamic collections' or one-arrays'

records are special JS objects, such as {firstName:"Tomhh",lastName:"Sgggmith"}; similarly, data are rather simple JS objects, such as {"twkho":1, "three":{}} such as seen here:

```
// program to format the date
// get current date
let currentDate = new Date();

// get the day from the date
let day = currentDate.getDate();

// get the month from the date
// + 1 because month starts from 0
let month = currentDate.getMonth() + 1;

// get the year from the date
let year = currentDate.getFullYear();

// If day is less than 10, add 0 to make consistent format
if (day < 10) {
    day = '0' + day;
}

// If month is less than 10, add 0
if (month < 10) {
    month = '0' + month;
}

// display in various formats
const formattedDate1 = month + '/' + day + '/' + year;
console.log(formattedDate1);

const formattedDate2 = month + '-' + day + '-' + year;
```

Fig 4.7 Sample Javascript Code.

4.3 Week 8

We just have to do two things this week: accept the Udemy courses that are offered

by the company, complete the hands-on project, and the combined Skill Exam. Once we finished the Udemy courses, we completed all assignments and projects, as well, to calculate final results. There is no way to overestimate the significance of HTML, CSS, CSS and Bootstrap week in web design. Web design includes web page design as well.

4.3.1 CSS

³ CSS (Cascading Style Sheets) is the code that styles web content.³ Like HTML, CSS is not a programming language. It's not a markup language either. CSS is a style sheet language. CSS is what you use to selectively style HTML elements.



Fig 4.8 Ruleset for CSS

To date, SGML has existed since the beginning of the nineties, and Stylesheet was created to include stylesheets for the World Wide Web. For a web style book language, style books were needed from various sources on the internet. DSS and FOSI just weren't adequate. Using CSS, you can apply styles to different documents using the same selector. As HTML expanded, a broader range of design skills were created to satisfy the needs of web designers.

Because of this, the architecture of the web has increased in sophistication, albeit at the expense of using complicated HTML. Due to the diversity of browser configurations, such as ViolaWW and client controls, the web material was inconsistently presented in several ways and less flexible. The browser/editor created by Berners had difficult style sheets. This combination of fonts may not be

associated with any documents on the internet

6
Table 4.7 Different Selectors in CSS

Selector name	What does it select	Example
Element selector (sometimes called a tag or type selector)	All HTML elements of the specified type.	p selects <p>
ID selector	The element on the page with the specified ID. On a given HTML page, each id value should be unique.	#my-id selects <p id="my-id"> or
Class selector	The element(s) on the page with the specified class. Multiple instances of the same class can appear on a page.	.my-class selects <p class="my-class"> and
Attribute selector	The element(s) on the page with the specified attribute.	img[src] selects but not
Pseudo-class selector	The specified element(s), but only when in the specified state. (For example, when a cursor hovers over a link.)	a:hover selects <a>, but only when the mouse pointer is hovering over the link.

CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes.

```
body {  
  background-color: lightblue;  
}  
  
h1 {  
  color: white;  
  text-align: center;  
}  
  
p {  
  font-family: verdana;  
  font-size: 20px;  
}
```

Fig 4.9 CSS Code

4.3.2 Bootstrap

This intuitive and mobile-first CSS platform is free and open source. It includes concept templates in the form of CSS and JavaScript.

sites by making it work the same across all different platforms, including desktops, tablets, smartphones, and TVs (as opposed to web apps). It's to use Bootstrap's paint, scale, font, and style options to your web project. For that purpose, the most important thing is to evaluate the designers. Both HTML items in the project are styled with Bootstrap after they have been applied to a Bootstrap project. They

produce a more-or-less monotonous appearance for prose, tables, and heterogeneous appearance for type elements through web browsers. It is also possible for developers to use Bootstrap classes to modify their content further by taking advantage of them. Bootstrap has headings in either light or dark colours, bigger text, different pull quotations, and bold headings, and some text with a standout. Many of the Bootstrap features are those that impact the whole website. The component element is referred to as "Container", as all other page elements are attached to it. Either a fixed-width container or a fluid-width container is accessible. On the width of the web page, always. But, based on the height of the computer, the width of the web page can vary.

not quite one millimetre in size

1. measuring 576–768 pixels
2. Custom width=10%d, custom length=20%h
3. from ~m 992–1200 pixels
4. Over 12 inches wide and big.

Along with other JavaScript libraries such as jQuery plugins, Bootstrap often provides JavaScript components in the form of plugins. Any jQuery UI plugins have extra configuration elements such as boxes, tooltips, carousels, and rollovers. To know what Bootstrap's components are, you should use the official documentation. The fields also get additional features, for example, auto-completion.

You'll still use our regular grid structure while using Bootstrap containers. Containers have three important functions: they are used to store, pad, and sometimes to divide up the material. In the vast majority of cases, however, a nested container is not needed.

Three separate flavours of Bootstrap containers are installed with Bootstrap: responding to breakpoint (which limits the maximum widths of devices)

CSS "container-fluid" sets all widths to be the same percentage of the viewport regardless of the resolution size of the browser.

Limit the distance of no matter what width you are up to, before you reach 100%, and then split.

Table 4.5: Illustrates how each container's max-widths width corresponds to the width of its parent.

	Extra small <576px	Small ≥576px	Medium ≥768px	Large ≥992px	X-Large ≥1200px	XX-Large ≥1400px
<code>.container</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-sm</code>	100%	540px	720px	960px	1140px	1320px
<code>.container-md</code>	100%	100%	720px	960px	1140px	1320px
<code>.container-lg</code>	100%	100%	100%	960px	1140px	1320px
<code>.container-xl</code>	100%	100%	100%	100%	1140px	1320px
<code>.container-xxl</code>	100%	100%	100%	100%	100%	1320px
<code>.container-fluid</code>	100%	100%	100%	100%	100%	100%

See the efficient mobile-first grid created using our twelve-column method, six available variables, and hundreds of predefined groups to handle different screen sizes and widths.

Grid consists of horizontally and vertically blocks, horizontal and vertical patterns, in which our design elements can be set. Components help to ensure that our website templates are consistent across different pages.

A grid would normally be composed of columns, rows, and then spaces in each column.

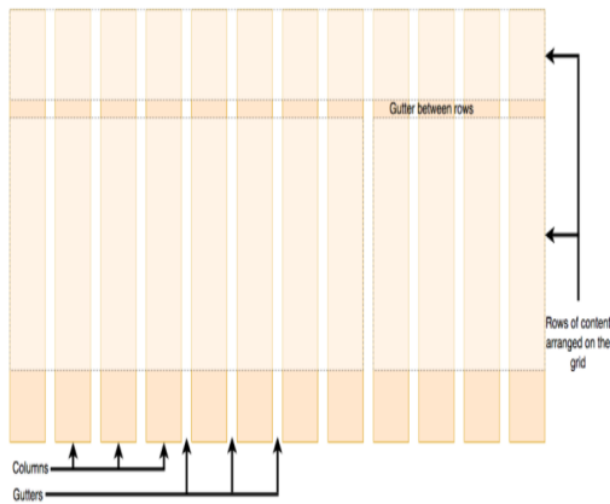


Fig 4.10 Grid System

4.4 Week 9 and Week 10

This week only, you have to submit udemy courses offered by the company as well as complete the exercises and the comprehensive skills exam. It was on our own as well as we had to learn how to use the database using Mysql and SQL. Since completing the online Udemey modules, we did the hands-on and then the on-the-the-the-job assessments. It was crucial to be able to explain more of the basics of the database this week so we covered the different facets of the database, including the structure, querying, and syntax with MySQL. in addition, it used html and css to design a functional web page

It was created by Microsoft in conjunction with the idea of the relational database management framework, known as Microsoft SQL Server. As a database simply stores and retrieves the data that other programmes request—on the same or other computers (including the Internet). We believe there are at least a dozen distinct flavours of Microsoft SQL Server marketed to different audiences and consumers, with varying requirements, with up to tens of thousands of concurrently used systems in mind.

It is divided into various subcomponents such as clauses, blocks, definitions, functions, commands, procedures, and clauses, including

1. the individual components of sentences and questions (Depending on the application, some of these are not required.)
2. Counts and variables, which may yield countable or table expressions of data
3. Predicates that restrict the results of statements and requests, and may also be used to make statements Valid or Incorrect based on them, for values of True/False (TRUE/FALSE).
4. the basic conditions for obtaining the data In essence, this is an essential feature of SQL.
5. empirical statements, which may impact schemas, contracts, conferences, protocols, and D&Cs, or diagnostics.

4.4.1 SQL Manipulation

The laws that apply to the values of individual columns are known as column constraints:

1. The PRIMARY KEY restriction may be used to define a row uniquely.

2. Per row has a numerical significance for UNIQUE columns.
3. Columns that are NOT NULL should have a value.
4. When no value is defined for a column, DEFAULT assigns a data type.
5. Each table may only have one PRIMARY KEY column and several UNIQUE columns.

When you execute the CreateTABLE expression, the new table is created in the database. You will easily tell the table name and the column names when using it.

```
CREATE TABLE student (  
  id INTEGER PRIMARY KEY,  
  name TEXT UNIQUE,  
  grade INTEGER NOT NULL,  
  age INTEGER DEFAULT 10  
);
```

Fig 4.12 create table example

2 To add a new record (row) to a table, use the INSERT INTO argument.

It comes in two varieties, as shown:

1. Fill in the blanks in the columns in the same order.
2. Fill in the blanks in the columns by name.

```
-- Insert into columns in order:  
INSERT INTO table_name  
VALUES (value1, value2);  
  
-- Insert into columns by name:  
INSERT INTO table_name (column1, column2)  
VALUES (value1, value2);
```

Fig 4.13 insert table syntax

To change the current table, use the ALTER TABLE expression. The ADD COLUMN function is most often is used to create a new columns, but it may also be used to join together existing ones.

```
ALTER TABLE table_name
ADD column_name datatype;
```

Fig 4.14 Alter table syntax

To remove rows from a table, use the DLE expression. This statement uses a WHERE clause to find the documents to be erased. By default, all documents would be discarded if the WHERE clause is removed.

```
DELETE FROM table_name
WHERE some_column = some_value;
```

Fig 4. 15 Delete Rows in a table

4.4.2 Queries

In all cases, the SELECT * expression returns all columns. You will use the given utility to find all the columns and rows in the movies table.

```
SELECT *
FROM movies;
```

Fig 4.16 Select Statement

The WHERE clause is used to filter (reows) that match a certain condition.

```
SELECT title
FROM library
WHERE pub_year = 2017;
```

Fig 4.17 Where Statement

The BETWEEN operator will filter matches any value between two endpoints. Values may be represented in text, numeric details, or date format

```
SELECT *
FROM movies
WHERE year BETWEEN 1980 AND 1990;
```

Fig 4.18 Select Query

The result set may be sorted either in an ascending or descending order according to a specific column. You may position your order either before it arrives, or after. Sorting the data by default is referred to as "descending."ASC is a term used to describe the sort order of the data (default)

```
SELECT *
FROM contacts
ORDER BY birth_date DESC;
```

Fig 4.19 ORDER BY query in SQL

You may use several AND operators, such as two, three, in the search to get multiple results. Two requirements must be met in order for a record to be included in the set; otherwise, it is irrelevant.

```
SELECT model
FROM cars
WHERE color = 'blue'
AND year > 2014;
```

Fig 4.20 AND Query in SQL

Several factors may be mixed using the OR operator. Records with any meeting either criterion are returned in the collection or do not

```
SELECT name
FROM customers
WHERE state = 'CA'
OR state = 'NY';
```

Fig 4.21 OR Operator in SQL

4.4.3 Aggregate Functions

The Category BY clause will category documents in a result set based on the values of one or more columns that are similar. It's sometimes used in conjunction with aggregate functions to query data from related documents. The GROUP BY clause may be placed after the FROM or WHERE clauses, but must come before any ORDER BY or LIMIT clauses.

```
SELECT rating,  
       COUNT(*)  
FROM movies  
GROUP BY rating;
```

Fig 4.22 GROUP By Clause example

The HAVING clause is used to better sort the Category Through clause's outcome set classes. HAVING is often used in conjunction with logical operators to filter outcome sets into categories dependent on aggregate properties. Only records (rows) from years of more than 5 movies published each year will be returned by the specified question.

```
SELECT year,  
       COUNT(*)  
FROM movies  
GROUP BY year  
HAVING COUNT(*) > 5;
```

Fig 4.23 Having Clause Example

8

Aggregate functions perform a calculation on a set of values and return a single value:

- COUNT()
- SUM()
- MAX()
- MIN()
- AVG()

4.4.4 Multiple Tables

In a SQL table, the primary main column is used to uniquely classify each document. It is impossible for a primary key to be NULL. Customer id is the unique

identifier in this case. In a primary main column, the same attribute cannot appear twice. In JOIN operations, data types are often used.

customer_id	f_name	l_name
1	Abby	Caren
2	Aaron	Paul
3	Gratian	Joseph

Fig4.24 Primary Key in a Relational DBMS Table

A foreign key is a connection to the table that contains in the records of one table. The use of a foreign key is important for maintaining several records for a single row. For example, a foreign key may be used in the table order to monitor all of a customer's orders.

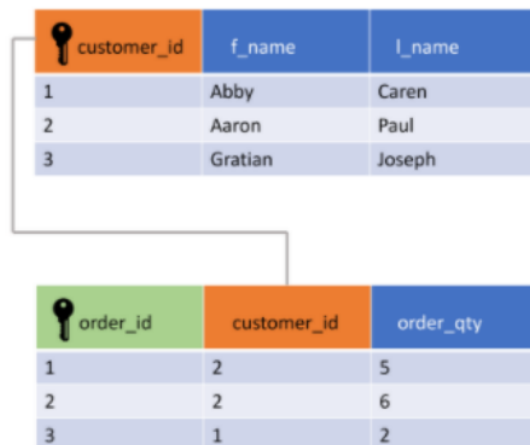


Fig 4.25 Foreign Key in Relational DBMS Table

The UNION agreement is used to merge and filter duplicate outcomes from different SELECT sentences.

```
SELECT name
FROM first_names
UNION
SELECT name
FROM last_names
```

Fig 4.26 UNION of Two Tables

In the result collection, the Crossed JOIN clause can be used to merge each row from one panel with each cell from another. This JOIN is useful for generating all potential variations for two tables' records (rows).

```
SELECT shirts.shirt_color,  
       pants.pants_color  
FROM shirts  
CROSS JOIN pants;
```

Fig 4.27 Cross Join Between Two Tables

The JOIN clause allows for the return of results from more than one table by joining them together with other results based on common column values specified using an ON clause. INNER JOIN is the default JOIN and it will only return results matching the condition specified by ON.

```
SELECT *  
FROM books  
JOIN authors  
ON books.author_id = authors.id;
```

Fig 4.28 Inner JOIN between two tables

And if the join requirement is not satisfied, an OUTER join will merge rows from separate tables. In an LEFT JOIN, any row from the left table is returned in the result collection, and NULL values are used to fill in the columns from the right table if the join requirement is not satisfied.

```
SELECT column_name(s)  
FROM table1  
LEFT JOIN table2  
ON table1.column_name = table2.column_name;
```

Fig 4. 29 Outer Join between two tables

The WITH clause uses an alias to store the output of a question in a temporary table (temporary movies). With only one instance of the WITH keyword, you may build several temporary tables.

Chapter 5 Conclusion

5.1 Conclusion

I'm currently doing my intern with cognizant, and I've grown a lot through it. It's helped me shape my personality and equip me with the understanding of these innovations.

My last internship assignment is still with cognizant internship, and I will try my very utmost to complete it.

I'd like to express my gratitude in advance to the cognizant mentors, SME, tutor, and teacher who led me through my internship at cognizant and answered all of my questions. Coaches, Sme, Mentor, and Tutor were all pleasant people who assisted me if I made a mistake and influenced me during my internship.

My instructor, in particular, put in extra energy and during intern and forwarded all of our questions to the company's higher authorities, whether they were relevant to retaking the evaluation, logistical issues encountered during the assessment, or having more time to complete the project.

Since cognizant is a top fortune organisation in the technology industry, I would strongly advise my juniors to plan well for the offer and get the internship opportunity from the cognizant.

I'd like to express my gratitude to my TNP officer, Mr. Pankaj Kumar, and faculty member, Dr. Nafis.U Khan , for their assistance and dedication during entire placement period, as I understand how difficult it is to handle a placement drive.

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