

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2017

B.Tech 5th Semester

COURSE CODE: 10B1WCI515

MAX. MARKS: 25

COURSE NAME: SOFTWARE TESTING AND DEBUGGING

COURSE CREDITS: 04

MAX. TIME: 1Hr. 30Min.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1.

- a) How would you define a software unit? In terms of your definition, what constitutes a software unit for procedural code and for object – oriented code? [2]
- b) Consider an expression with 36 inputs. How much time would it take to execute all of the test cases required for multiple condition coverage (exhaustive testing) of this expression if you could run 100 test cases per second? [2]

Q2.

- a) Consider the following claim: [2]
If the number of simple conditions in a decision is n , then the number of tests required to cover all conditions is 2^n . If possible, construct a program to show that in general this claim is not true.
- b) The statement "Structural testing compares test program behaviour against the apparent intention of the source code." can also be restated as "Functional testing compares test program behaviour against the apparent intention of the source code." Do you agree with these statements? Explain your answer. [2]

Q3.

- a) While booking a room in a hotel, guest searches for availability of rooms in the hotel and confirms the booking if available, and system decrement the room count in that hotel. In case, if room is not available then the requested for room is put into the waiting list maintained by the system. Depending upon the status of waiting list a customer can either give up the room or if waiting status gets confirm the room is allocated and the total available room count gets decremented. Guest can also cancel the confirmed room if he/she is unable to make the visit. All type of cancellation will increment the room count. Customer pays the amount once he/she reaches at the hotel and utilizes his/her booking. Once the customer has paid the bills and leaves the hotel, this will increment the total room count and a record file related to that customer gets archived.
 - Design the State transition diagram showing all the transitions between states and events responsible for the transitions. [3]
 - Design state transition table that cover the key state transitions. Be sure to describe the exact sequence of inputs, as well as the expected sequence of state changes and actions in the table. [2]

Q4.

```
int bicycleRentalFee(int rentalProgram, int initTime, int endTime, int nRentals){
    int unitRate = 2;
    int rentals = nRentals % 10;
    int time = endTime - initTime;
    int fee = 0;
    if (rentalProgram == 1){
        return time * unitRate;
    }
    else if (rentalProgram == 2 && rentals != 0){
        if (time <= 10)
            { fee = unitRate * time;
              return fee; }
        if (time <= 100)
            { fee = 10 * unitRate + (time - 10) * unitRate / 2;
              return fee; }
    }
    return 0;
}
```

For the above given function answer the following:

- Design the control flow graph [2]
- Define test cases to obtain the highest possible (100%) node coverage, edge coverage, and multiple condition coverage. [2]
- Discuss the feasibility of path coverage. [1]
- For the test cases, write only the input value. [1]
- Design the du – paths and find all definition clear paths. [3]

Q5.

Consider the following program P as shown below:

[3]

```
r = 1;
for (i = 2, i <= 3; ++i) {
    if (a[i] > a[r])
        r = i;
}
```

- Derive a set of mutants for the above program code.
- Also derive test cases which are adequate enough to kill your derived mutants.