Prof. Ramanpreet kaur

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2016

B.Tech VI Semester

COURSE CODE: 16B22CI621 MAX. MARKS: 25

COURSE NAME: Data Analysis and Simulation Techniques

COURSE CREDITS: 04 MAX. TIME: 1Hr 30 Min

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

Q. 1 a) (3 marks) The manager of a commercial mortgage department of a large bank has collected data during the past two years concerning the number of commercial mortgages approved per week. The results from these two years (104 weeks) indicated the following:

NUMBER OF COMMERCIAL MORTGAGES APPROVED	0	1	2	3	4	5	6	7
Frequency	13	25	32	17	9	6	1	1

Does the distribution of commercial mortgages approved per week follow a Poisson distribution? (Use the 0.01 level of significance.)

$(\chi 2_{.010})$ (df = 5) = 15.086, $(\chi 2_{.010})$ (df = 6) = 16.812, $(\chi 2_{.010})$ (df = 7) = 18.475

b) (1 Mark) Differentiate between Chi square and kolmorgorov-Smirnov goodness of fit test.

c) (1 Mark) What do you mean by Bernoulli trials? In a sequence of Bernoulli trials with probability p of success, determine the probability that r successes will occur before a failure.

Q. 2 a) (3 marks) Describe reasons for using each of the following graphical quality improvement tools. What information each graph best represents?

a) Fishbone Diagram

b) Pareto Chart

b) (2 marks) Draw a fishbone chart to identify the causes of poor lab performance of the university students.

Q. 3 (5 marks) Create an activity cycle abstract representation for a healthcare system of a single specialty, for which the model domain is specified below.

- There will be a receptionist to give an appointment to the patient and receive payment from the patient. One of the three things happens at the receptionist desk:
  - The patient is a new patient, and then receptionist will do the registration and give an appointment.

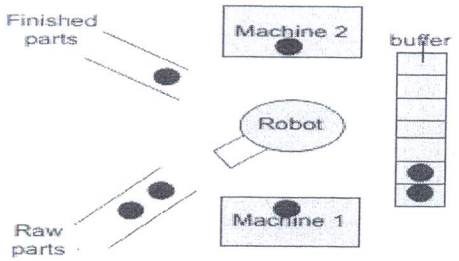
P.T.O

- If he is a regular patient, receptionist will check the records and confirm the appointment.
- In case of emergency, immediate registration and patient will be admitted (get a bed).

- The doctors will perform the regular checkup and in case of emergency, they will immediately serve the patient.
- The nurses will serve the patient and assist the doctor during checkups.
- The patient or their care takers will be asked to get the medicine from pharmacy department by nurses.
- Pharmacy department will get the payment; deliver medicines along with their bills.
- Finally , the patients or their care takers has to fulfill all the discharge related formalities to the receptionist and they can leave the hospital

List out all the entities, design individual closed cycles for each entity and the final design after merging.

Q. 4 (5 Marks) We consider a segment of a factory with two conveyor belts, two machines, one robot and one buffer (see Figure below). Raw parts arrive through a first conveyor belt, called the raw line. The robot moves each part from the raw line into machine M1, then into the the buffer, then into machine M2 and finally to the second conveyor belt (called the finished line). M1 can hold at most one part at a time, and the same applies for M2 .The robot can only move one part a time. The buffer can hold at most 7 parts. The conveyor belts can hold any number of parts. The following figure shows the case where the raw line holds 2 parts, M1 and M2 hold one part each, the buffer holds two parts, and the finished line holds one part.



a) Represent this initial state with the help of a Petri net.
b) Modify the above Petri net in order to incorporate the following requirement :

"A raw part can only be moved to machine M1, if there is at least one available slot either in buffer or in M2. This constraint is intended to avoid the situation where machine M1 finishes processing a part and the robot is not able to take away the processed part from M1."

Q.5 a. (2 Marks) Explain the different ways to study a system a along with the scenario's in which they are suitable.

b. (3 Marks) Explain in detail the main factors that influence the modeling of queues.