Roll Number:

Thapar Institute of Engineering and Technology, Patiala

Computer Science & Engineering Department

BE Second Year – CSBS - (I Semester)
EST- 25 January 2021
Time: 2 hours
MM: 50

Course Code: UCT 305
Course Name: Software Engineering
Name of Faculty: Dr. Inderveer Chana

Note: *(i) Attempt any 5 questions*
(ii) Attempt all parts of a question together
(iii) Answers should be precise and legible

Q1 A software is required to be developed for a Visitors Registration System for an office so that whenever a visitor wants to meet any staff member in the office, the system should record the name of the visitor, name of the staff, time of entry, purpose of visit and time of exit. The system should also display the names of all visitors to a staff member day wise, should display the time spent by a particular visitor in the office and should display the names of all visitors who are in office at a particular time.

(a) Make a DFD for this problem (Take assumptions, if required).
(b) Write down the functional and non-functional requirements of this application.

(6,4)

Q2 A clinical-record-keeping system is to be designed for dentists. For this system:

(a) Suggest a suitable process model for development with reasons for your choice.
(b) Draw a Use Case Diagram depicting the above problem (Take assumptions, if required).
(c) How can this Use Case diagram be used in Design model? (3,4,3)

Q3 (a) Explain how both the waterfall model and the prototyping model can be accomplished in the spiral process model.

(b) Compute the function point value for a project with the following information, for size estimation:
Number of user inputs = 50; Number of user outputs = 40; Number of user enquiries = 35;
Number of files = 06; Number of external interfaces = 04
Assume all complexity adjustment values as moderate and weights also have average values.

(6,4)

Q4 (a) Consider the requirement statement, "User should be able to check the status of his flight". Translate this customer requirement into technical requirement statement.
(b) What are the characteristics of a well formed Design Class? (4,6)

Q5 Consider the following fragment of code

```
if width > length
        then biggest_dimension = width
if height > width
        then biggest_dimension = height
end_if
else biggest_dimension = length
if height > length
        then biggest_dimension = height
end_if
end_if
```

(a) Draw a flow-graph for the above given code

(b) Determine the cyclomatic complexity and what does it indicate?
(c) Write down all the independent paths required to test this code? (3,3,4)

Q6 Answer the following questions briefly:
(a) How is software design different from coding?
(b) Define functional, behavioral and information domains of any software project.
(c) What does system testing ensure, explain with a suitable example. (3,3,4)

Q7 A software has to be developed for an ATM system. The system involves three kinds of users: Operator, Customer and Bank. It should be designed to provide different functionalities for different users. Functionalities of operator include to start the system, shutdown and maintenance. The customer can start a session and perform transactions (involving withdrawal, deposit, transfer and inquiry). Bank is interested in maintaining a common database. The ATM system should also generate an error when user enters wrong pin.
(a) What type of architectural style would be the best option for designing this problem? Give justification.
(b) Draw a class diagram to clearly show the design of this system. (4,6)