

Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala
Department of Computer Science and Engineering

BE- COE (V Semester) EST
25 May 2022

UCS503: Software Engineering

Time: 2 Hrs.; MM: 35

Name of Faculty: IC, ASH, and TG

Note: Attempt all 5 questions.

Q1 (a) A project was estimated to be of 788 lines of code. For this project, calculate the Effort and Development Time for all the three modes: organic, semi-detached, and embedded mode. (3)

(b) Consider the following case

For streamlining the maintenance processes, Municipal Corporation has launched an APP. To lodge a complaint, the user needs to start the application, and the camera will be activated and ready to capture a photo of the faulty or damaged facility in public places. The user is also given an option to type text before sending it to Municipal Corporation. Using geo-tag technology and the Global Positioning System (GPS), accurate coordination of the facility will be obtained and embedded into the photo taken. Subsequently, the information will be sent to the system's server for processing. On the server side, information received will be processed with a grouping and merging algorithm based on the GPS coordination to avoid duplicate complaints. A ticket number will be generated for each complaint, and its status can be viewed under the notifications tab. Furthermore, the geotagging technology will map the damage report entries on the corresponding location on the map. An application is developed for the management and maintenance team to browse and manage the damage reports made by the public. The team can view the faulty and damaged facilities according to their locations.

- i. Draw the State Chart Diagram for the above given case (2.5)
- ii. Give appropriate steps to design GUI for the above given application (1.5)

Q2. Consider the following code:

```
1. Void test (Graphics g)
2. {
3.     int a = 10;
4.     int x = System.in.read();
5.     int y = System.in.read();
6.     if (x < 0)
7.     { x = 0; }
8.     if (y < 0)
9.     { y = 0; }
10.    while (y <= 210)
11.    { g.drawLine(8,x,a,y);
12.      y=y+25;
13.    }
14. }
```

PTO

- (a) Draw the flow graph of the above given code (2)
- (b) List all the existing linearly independent paths and comment on number of test cases (2)
- (c) Calculate the Cyclomatic complexity using all three expressions (3)

Q3. Calculate the Function Point Count for a project which has the following parameters:

- External Inputs: 14 with low complexity, 7 with average complexity, and 4 with high complexity
- External Outputs: 16 with low complexity, 3 with average complexity
- External Inquiries: 6 with average complexity, 2 with high complexity
- Internal Logical Files: 3 with average complexity and 2 with low complexity
- External Interfaces: 10 with average complexity
- In addition to above
 - System requires **average data communication**
 - Designed code may be **significantly reusable**.
 - Remaining **complexity adjustment factors** are treated as **moderate**.

(7)

Q4. Consider following data for construction of CPM Network

Activity	Immediate Predecessors	Completion Time
P		2
Q		9
R		4
S	P	5
T	S	8
U	T	3
V	Q	4
W	V and X	11
X	R	5
Y	R	7
Z	Y	5

- Draw the Network Diagram using Activity on Node (2.5)
- Calculate the Early Start (ES), Early Finish (EF), Late Start (LS) and Late Finish (LF), and Delay (D) (2.5)
- Calculate Critical Path. Also list Critical Activities and Critical Time for completing the project (2)

Q5 a) Explain with help of a suitable example

- Three Tier Software Architecture
- Model View Controller Architecture (3)

b) Differentiate between the following using suitable examples

- Regression Testing and Debugging
- Equivalence Partitioning and Boundary Value Analysis (4)