

MANIPAL UNIVERSITY JAIPUR
SCHOOL OF COMPUTING AND IT
V Semester B.Tech – End Semester Examination : 2018-19
Branch: CSE
CS 1502- Software Engineering
(OPEN BOOK)

Duration: 3 Hours

Max. Marks: 80

Instructions:

- Answer any five full questions
- Missing data, if any, may be assumed suitably.
- Two books (or their spiral bounded copies) and one hand written notes are allowed

1. a) Assume that you are a project manager of three projects with the following characteristics: [12]

- Project 1. A complex real-time system whose requirements can be relatively easily identified and are stable.
- Project 2. A web-site for a local library. Requirements are vague and are likely to change in the future.
- Project 3. An order processing system with a web-site for a local business. Requirements are vague but stable (i.e. unlikely to change in the near future).

Consider also the following software development approaches/models:

waterfall, incremental, evolutionary prototyping, component-based development and Agile. Which of the above models would you choose for each of your projects? Your choices should be properly justified.

b) Both the evolutionary prototyping and the spiral development model greedily choose tasks by highest risk. How do they differ with respect to what risks they prioritize? [4]

2. a) You are starting an outdoor services business. In the summer your employees will be mowing lawns and in the winter they will be clearing snow. All year round they will be trimming trees. Some employees can do all three tasks; however since trimming trees requires specialized training, not all employees will be able to do it. Customers will be signing contracts with your company for each of the tasks. For snow clearing you will be charging \$1 per square meter of snow cleared per visit, and for lawn mowing you will charge 5 cents per square meter. You give a 50% discount for people willing to sign up for regular snow clearing or lawn mowing for an entire season. Each day you dispatch crews to do the required work. Employees have to sign out snow plow trucks, snow blowers, shovels, lawn mowers and tree trimming kits. Tree trimming is always done in crews of two people; snow clearing is always done individually. [10]

Identify classes from the given scenario and Draw a Class Diagram depicting the above scenario.

b) Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing systems: [6]

An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

3. a) When designing a system, why is it typically unwise to express designs in terms of code? Give reasons that are as different as possible. [8]
- b) Develop a sequence diagram showing the interactions involved when a student registers a course in a university. Courses may have limited enrolment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalog to find out about available courses. [8]
4. a) Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be Rs. 15,000/- per month. Determine the effort required to develop the software product and the nominal development time. [4]
- b) Consider a program to find largest among three numbers all numbers may be any value between 1 to 1000. [12]
Design boundary value and equivalence class test cases [For minimum number of test cases]
5. a) Draw program's Flow Graph for the following code fragment and Find minimal number of test cases for the following coverage types: [8]
1. Statement Coverage
 2. Branch Coverage
 3. Condition coverage
- ```

public void foo(int a, int b, int x)
{
 if (a>1 && b==0) {
 x=x/a;
 }
 if (a==2 || x>1) {
 x=x+1;
 }
}

```
- b) From the code fragment given in 5. a design the following [8]
1. Draw the control flow graph for the program
  2. Calculate the cyclomatic complexity of the program using all methods.
6. a) Under what circumstances might an organization decide to scrap a system when the system assessment suggests that it is of high quality and of high business value? [5]
- b) For physical objects, maintenance is required to repair the effects of wear and tear. For non-buggy software, what is the most frequent cause that requires "maintenance"? [5]
- c) Suppose an organization mentions in its job advertisement that it has been assessed at level 3 of SEI CMM, what can you infer the about the current quality practices at the organization? What does this organization have to do to reach SEI CMM level 4? [6]