



VIT
Vellore Institute of Technology

Final Assessment Test – May 2024

Course: BITE307L - Software Engineering

Class NBR(s): 3914 / 3930 / 3936 / 3990

Time: Three Hours

Slot: A1+TA1

Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer any TEN Questions**(10 X 10 = 100 Marks)**

1. a) Indicate most essential attributes that all professional software should have. [5]
Suggest four other attributes that may sometimes be significant.
- b) Apart from the challenges of heterogeneity, business and social change and trust and security, identify other problems and challenges that software engineering is likely to face in the 21st century. [5]
2. a) Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process. [5]
- b) Describe, why change is inevitable in complex systems and give examples of software process activities that help predict changes and make the software being developed more resilient to change. [5]
3. Assume that based on your experience with a bank ATM, illustrate a sequence diagram that models the data processing involved when a customer withdraws cash from the machine.
4. **Problem Statement 1:** Consider a blood bank management system. This system helps in managing various blood bank operations effectively. The project consists of a central depository containing various blood deposits available along with associated details. These details include blood type, storage area, and date of storage. Maintenance and the monitoring of blood deposits become easy with the help of this system. The project is an online system that provides an option to check the availability of the required blood group within the blood bank. Moreover, the system also has added features such as patient name and contacts, blood booking and requirement of blood group is posted on the website to find available donors for a blood emergency. Answer the following question using above-mentioned problem statement. Design an activity diagram for "blood deposit" use case scenario with help of fork & join and swim line concepts.
5. Consider the given below code and determine the following things.
 - Control flow graph.
 - Identification of independent paths.
 - Cyclomatic complexity value.
 - Design of test cases

```

1 #include <stdio.h>
2 void main()
3 {
4     int m,n;
5     printf("Input the value of m :");
6     scanf("%d",&m);
7     if(m!=0)
8     {
9         if(m>0)
10            n=1;
11        else
12            n=-1;
13    }
14    else
15        n=0;
16    printf("The value of m = %d \n",m);
17    printf("The value of n = %d \n",n);
18 }

```

6. Perform equivalence class partitioning and boundary value analysis techniques for the following scenarios:

Scenario1: Username should be minimum 5 to maximum 10 characters, first character cannot be a special character.

Scenario2: Password should be minimum 4 to maximum 15 characters and combinations of alphabets & numbers. The first character must be a letter.

7. Consider the problem statement1 from question no. 4 "A blood bank management system" and describe and apply various activities involved in software evolution with a neat sketch.

8. Briefly describe the three main types of software maintenance. Why is it sometimes difficult to distinguish between them? Under what circumstances might an organization decide to scrap a system when the system assessment suggests that it is of high quality and high business value?

9. Develop the risk table for the problem statement1 from question no. 4 "A blood bank management system" and explain how the risk impact is assessed with an example from given scenario.

10. A safety-critical software system for treating cancer patients has two principal components:

Component 1: A radiation therapy machine that delivers controlled doses of radiation to tumour sites. This machine is controlled by an embedded software system.

Component 2: A treatment database that includes details of the treatment given to each patient. Treatment requirements are entered in this database and are automatically downloaded to the radiation therapy machine. Identify three hazards that may arise in this system. For each hazard, suggest a defensive requirement that will reduce the probability that these hazards will result in an accident. Explain why your suggested defense is likely to reduce the risk associated with the hazard.

11. Assume that you wanted to start a "Recruitment Agency" to provide suitable employees across different industries, clients. Following is the few supports you are planning to provide; Screening a prospective candidate, conduct background and academic checks of the candidates and are kept in the database; Whenever any company ask for a particular candidate, look for a suitable candidate from the database; In case the recruitment agency doesn't find the appropriate find, conduct searches for finding the right one. Compare and contrast the functional and non-functional requirements. Shows and prepare one possible organization for a requirements document that is based on an IEEE standard for requirements documents for above given scenarios.
12. Consider an embedded system, this is a system where the software controls some hardware device and is embedded in that device. Issues in embedded systems typically include physical size, responsiveness, and power management, etc. Describe, how an embedded system that we can use is a software system to control an insulin pump for people who have diabetes with suitable sketch.

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