National Institute of Technology Rourkela

Computer Science and Engineering

Software Engineering (CS3004), Mid-Term Exam

Date: February 22, 2023

Time: 120 Minutes **Max. Marks: 30**

Instruction: ***1. In case of any doubt, write your assumptions, write it clearly and continue.***

2. There are 6 questions printed on both side of the paper. Attempt all the questions.

Q1. Answer the following with respect to software development life cycle models:

A. What do you understand by the exploratory (also known as the build and fix) style of software development? Graphically depict the activities that a programmer typically carries out while developing a programming solution using the exploratory style. In your diagram also show the order in which the activities are carried out. What are the shortcomings of this style of program development? **[3]**

B. Consider that a software development project that is beset with many risks. But, assume that it is not possible to anticipate all the risks in the project at the start of the project and some of the risks can only be identified much after the development is underway. As the project manager of this project, would you recommend the use of the prototyping or the spiral model? Explain your answer. **[3]**

C. Briefly explain any two characteristics of the software development projects that indicate its suitability to RAD style of development. **[2]**

Q2. Answer the following for the project management: **[3]**

A. For the following C program estimate the Halstead's length and volume measures. Compare Halstead's length and volume measures of size with the LOC measures.

```
/* num is the number the function searches in a presorted integer arrary arr */
    int bin_search (int num) {
        int min=0, max=100;
        while(min != max) {
            if( arr[(min+max)/2] > num)
            max = (min+max) / 2;
            else if (arr[(min+max)/2] < num)
            min = (min+max)/2;
            else return((min+max)/2);
            }
            Return (-1);
    }
```

B. What does Halstead's volume metric represent conceptually? How according to Halstead is the effort dependent on program volume? **[2]**

Q3. Suppose you are the project manager of a software project requiring the following activities.

Activity No.	Activity Name	Duration (weeks)	Immediate Predecessor
1.	Obtain requirements	4	–
2.	Analyse operations	4	-
3.	Define subsystems	2	1
4.	Develop database	4	1
5.	Make decision analysis	3	2
6.	Identify constraints	2	5
7.	Build module 1	18	3,4,6
8	Build module 2	12	3,4,6
9.	Build module 3	18	3,4,6
10.	Write report	10	6
11.	Integration and test	8	7,8,9
12.	Implementation	2	10,11

A. Draw the activity network representation of the project. **[2]**
B. Determine ES, EF and LS, LF for every task and identify the critical Path. **[2]**
C. Draw the Gantt chart representation of the project. **[2]**

Q4. With respect to requirement engineering, answer the following
A. What are the good characteristics of a SRS document? **[2]**
B. List the contents of SRS Document as per the IEEE 830-1998 standard? **[2]**

Q5. For the given case study,
Case study: A large trading house wants us to develop a software to automate book keeping activities associated with its business. It has many regular customers. They place orders for various kinds of commodities. The trading house maintains names and addresses of its regular customers. Each customer is assigned a unique customer identification number (CIN).

As per current practice when a customer places order, the accounts department first checks the credit-worthiness of the customer. The credit worthiness of a customer is determined by analyzing the history of his payments to the bills sent to him in the past. If a customer is not credit-worthy, his orders are not processed any further and an appropriate order rejection message is generated for the customer. If a customer is credit-worthy, items he/she has ordered are checked against the list of items the trading house deals with.

The items that the trading house does not deal with are not processed any further and an appropriate message for the customer for these items is generated. The items in a customer's order that the trading house deals with are checked for availability in inventory. If the items are available in the inventory in desired quantities, a bill with the forwarding address of the customer is printed. If an ordered item is not available in the inventory in sufficient quantity, a material issue slip is printed and details are stored in a "pending-order" file containing the out-of-stock items along with quantity ordered and customer identification number. The customer can produce the material issue slip at the store house and take delivery of the items. Inventory data is adjusted to reflect the sale to the customer.

The purchase department would periodically issue commands to generate indents. When generate indents command is issued, the system should examine the "pending-order" file, determine the orders that are pending and total quantity required for each of the items. TAS should find out the addresses of the vendors who supply the required items, Examine the file containing vendor details (their address, items they supply etc.) and print out indents to those vendors. TAS should also answers managerial queries regarding the statistics of different items sold over any given period of time and corresponding quantity sold and the price realized.

A. Draw the context diagram, Level-1, level-2 DFD for any one bubble obtained from Level-1 DFD. **[3]**
B. Develop the detailed data dictionary for the DFD model created for the same problem. **[2]**

Q6. Explain the all classes of cohesion in module chart. **[2]**