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Question Paper Code : 80101

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Computer Science and Engineering

CS 8494 — SOFTWARE ENGINEERING

(Common to Computer and Communication Engineering)

(Regulation 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define: Software Engineering.

2. List any two agile process models.

3. Differentiate: Functional and Non-functional requirements.

4. State two advantages of using Petri Nets.

5. How does the Data Flow diagram help in design of software system?

6. List the levels of testing.

7. Define : Reverse Engineering.

8. List two advantages of using COCOMO model.

9. Compare: Project Risk vs Business Risk.

10. List CASE tools for the following phases of SDLC : Design, Testing.

PART B — (5 × 13 = 65 marks)

11. (a) Compare the Waterfall, Prototyping and Spiral model. List the features of each model, advantages and disadvantages and a type of application where the model will be acceptable. (13)

Or

(b) (i) Define Agility. List any five principles of agility. (5)

(ii) Explain the phases in Extreme Programming process. (8)

12. (a) Develop the Software requirements document for the following requirement. A Coffee Vending Machine serves coffee to customers. A customer can choose a type of coffee among a list often options, supply the amount required and get served. Each coffee is prepared by adding units of hot water, coffee powder, milk and sugar. The recipe for each coffee is stored. (13)

Or

(b) List any two techniques used for eliciting requirements. Compare the two techniques and list where each is applicable. (13)

13. (a) List and explain any five fundamental software design concepts. (13)

Or

(b) (i) Define Software Architecture. (2)

(ii) Explain and compare the following architectural styles :

(1) Call and return architecture (4)

(2) Object-oriented architecture (4)

(3) Layered architecture. (3)

14. (a) (i) Compare white box and black box testing. (4)

(ii) Write a procedure for the following: Given three sides of a triangle, return the type of triangle i.e. equilateral, isosceles and scalene triangle. Draw the Control Flow Graph and calculate cyclomatic complexity to calculate the minimum number of paths. Enumerate the paths to be tested. (9)

Or

(b) (i) Define : Refactoring. (2)

(ii) List the phases in software reengineering process model and explain each phase. (11)

15. (a) List the features of LOC and FP based estimation models. Compare the two models and list the advantages of one over other. (7 + 6)

Or

(b) (i) Define: Risk. (2)

(ii) List the types of risk and give examples for each. (5)

(iii) List and explain the phases in risk management. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Given the requirements for an Automated Teller Machine (ATM) system (see below), design the following :

(i) Use case diagram. (4)

(ii) Activity diagram detailing each use case. (6)

(iii) List test cases for any one functionality from your Use Case diagram. (5)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions.

The ATM must be able to provide the following services to the customer:

A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of $20.00. Approval must be obtained from the bank before cash is dispensed.

A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.

A customer must be able to make a transfer of money between any two accounts linked to the card.

A customer must be able to make a balance inquiry of any account linked to the card.

Or

(b) (i) Draw the Level 0 and Level 1 Data Flow diagram for the following system. (8)

(ii) Identify entities in the system and draw a diagram showing the relationship between entities. (7)

The Chocolate Vending Machine (CVM) system requirements are as follows: The CVM dispenses chocolates: (1) very large chocolates (VC) at Rs. 15, (2) large chocolates (LC) at Rs. 10, and (3) a small chocolates (SC) at Rs. 5. The vending machine only deals in coins. The CVM gives the proper change after the product selection is made. The CVM must check the amount deposited by the customer. The vending machine operates in the following way. (A) The CVM remains idle until a customer or owner begins to interact with the machine. When a selection button is pressed the VCM indicates the required amount (Rs. 15/Rs. 10/Rs. 5). (B) If the full amount needed has been deposited then dispense the proper chocolate and display: Thank You!. (C) If an insufficient amount (possibly zero) has been deposited then display: remaining amount needed. (D) If an over amount has been deposited then dispense the proper candy and change and display: Thank You!.