2012-13
M.TECH. (WINTER SEMESTER) EXAMINATION
COMPUTER SCIENCE AND ENGINEERING
SOFTWARE ENGINEERING-II
CO-603

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions. Assume suitable data if missing. Notations used have their usual meaning.

Students governed by old ordinances will be examined out of 75 marks and their obtained marks will be proportionately raised.

Q.No. | Question | M.M.
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1(a). | What is a process framework? Why is this framework needed during project planning? | [06]
1(b). | Explain the metrics that could be used to measure:
   (i) Correctness (ii) Maintainability (iii) Integrity | [06]

OR

1'(a). | Consider a project that has uncertain requirements and a deadline so tight that full functionality cannot be reasonably delivered. Which process model is best suited for such a project and why? | [06]
1'(b). | What do metrics applied during the analysis model indicate? Briefly explain some of these metrics. | [06]

2(a). | Draw a diagram explaining how SCIs are baselined within a project database. Are software tools also placed under configuration control? | [06]
2(b). | Discuss all tests that are carried out under unit testing. Which, out of stubs and drivers, are needed during unit testing, and why? | [06]

OR

2'(a). | Define risk projection. How does a risk table help a project manager in risk projection? | [06]

Contd……..
2' (b). Briefly explain the activities carried out under software quality assurance. List the basic tasks carried out by an SQA group during software quality assurance.

3(a). Draw a diagram mapping the elements of the analysis model to an object-oriented based design model. List the basic design principles that should be followed to realize modular architectures under object-oriented design.

OR

3' (a). Explain the various design steps carried out under the UML approach to object-oriented analysis and design. Draw a diagram showing the process flow through these design stages. Should the process flow be cyclic?

4(a). Consider a block handler as shown in figure below. Specify the states, the sequence(s) and data invariant conditions within this handler using a formal language specification.

4(b). What are CASE tools? Why are they needed? Draw a diagram depicting the building blocks for CASE tools.

5(a). Why does clear-box verification of a design produce better code than unit testing?

5(b). Draw the context diagram of an ATM controller. Make sure to label all signal exchanges and their attributes, if any.
Q.No. | Question | M.M.
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1(a) | Construct class diagram based upon following information – At railway reservation centre, there are three counters. There is separate queue for each counter. | [06]
1(b) | Write in brief about followings by taking suitable example - - Abstract Class - Ternary association | [06]
2(a) | Construct class diagram based upon following information – Two persons may be related based upon relation such as mother, father, cousin, son etc or may not be related. Some relations such as father are unidirectional while some relations such as friend are bidirectional. | [06]
2(b) | Differentiate between followings – - Bag and Sequence - Concrete class and Abstract class | [06]

OR

2'(a) | Construct a class diagram for a pack of playing cards (contains 52 cards of four kinds – spade, diamond, heart and club) | [06]
2'(b) | Give the followings – i) An example showing derived association ii) An example of reification. | [06]
3(a) A digital watch has two buttons – MODE and SET. Every time MODE button is pressed, it takes the watch into next mode (Possible modes are Normal, Set Hour, Set Minute. In Set Hour mode, if SET button is pressed, it increments hour by one. In Set Minute mode, if SET button is pressed, it increments minute by one. In Normal mode, pressing SET button has no effect. Construct state diagram for the watch.

3(b) Write in brief about followings -

- Guard Condition
- Completion Transition

OR

3'(a) Construct state diagram for a table fan which has following buttons –

OFF : Puts off fan
1-Speed : Fan runs at speed 1
2-Speed : Fan runs at speed 2
3-Speed : Fan runs at speed 3

ROTATE : Continuously rotates direction of the fan

3'(b) Give the followings –

- Diagram showing signal generalization
- Diagram showing concurrency within an object

4(a) Construct sequence diagram for purchasing an item from automatic vending machine.

4(b) Differentiate between followings –

- Scenario and Sequence Diagram
- Use Case Generalization and Class Generalization

5(a) A system may be broken into subsystem either horizontally, vertically or combination of both. Elaborate this using an example.

5(b) Write a short note on how to construct application class model.
2012-13
M.TECH. (WINTER SEMESTER) EXAMINATION
COMPUTER ENGINEERING
MODERN ARTIFICIAL INTELLIGENCE
CO - 621

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions. Assume suitable data if missing.
Notations used have their usual meaning.
"Students governed by the old ordinances will be examined out of 75 marks and their obtained marks shall be proportionately raised"

Q.No. Questions M.M.
1(a) Explain the difference between strong and weak methods in Artificial Intelligence (AI). Explain how this concept differs from strong and weak AI. [04]
1(b) Explain with example Semantic Net and Frame based representation. Explain how frames are useful to express the idea of inheritance? [08]

OR

1’ Design a suitable representation and draw the complete search tree for the following AI problem:

*Three missionaries and three cannibals are on one side of a river, with a canoe. They all want to get to the other side of the river. The canoe can only hold one or two people at a time. At no time should there be more cannibals than missionaries on either side of the river, as this would probably result in the missionaries being eaten.*

2(a) What is the difference between uninformed search and informed search strategies? [04]
How do we choose a good heuristic? Discuss.
2(b) Explain A* search using an example. Prove that A* is optimal if \( h(n) \) is an admissible heuristic. [08]

3(a) Why logic is used in Artificial Intelligence? List and explain at least five most useful rules of inference. [06]
3(b) Write a Program in PROLOG to show a typical family relation. How would you pose questions to PROLOG system about family relations? [06]

4(a) Explain Soundness and completeness in First Order predicate logic’ [06]
4(b) Describe Best-First Search Algorithm. Explain it through an example. [06]

Contd……..2
4'(a) Explain a simple machine learning algorithm that uses general to specific ordering of hypothesis. Explain how a system can learn by building decision trees, using the ID3 algorithm.


5 Answer any TWO of the following [06]x2

(a) What do you mean by non-monotonic reasoning? Explain default logic and abduction.

(b) What is Generalized Modus Ponens? Explain Max-min compositional rule of fuzzy inference.

(c) Briefly describe Genetic Algorithm? What is Roulette wheel selection in Genetic Algorithm?
Q.No.    Question               M.M.
1(a) Differentiate between Mealy and Moore machine. Write all steps of literal analysis [2+3] of Mealy and Moore machine.
1(b) Design a J-K flip-flop using D flip–flop. What do you mean by clock-skew? [3+2]
1(c) What is the behavior of the following circuit? (Use symbolic representation) [05]

2(a) Write the steps of sequential system design flow. What is metastability? [3+2]
2(b) What are the basic rules of state assignment? What is contamination delay? [3+2]
2(c) Design a control circuit for a binary multiplier. (Design must have corresponding [05] state diagram for add-shift control, excitation or truth table).

OR

2'(a) Design a sequence detector for “1110” using proper state diagram. [05]
2'(b) Describe the working procedure of a serial binary adder. [05]
2'(c) Design a control circuit for a binary serial adder using J-K flip flop. [05]

Contd……
3(a) Explain the different abstraction levels of system implementation? What are the different design-styles used in digital system?

3(b) Draw the flowchart of a simplified VLSI design process. Write the names of four CAD tools used for data entry.

3(c) Explain “Regularity”, “Modularity” and “Locality” concept in digital system design.

4(a) Differentiate between behavioral and structural modelling in VHDL with the help of a full-adder circuit design.

4(b) How will you define a package file in VHDL? Describe the use and scope of “use” clause in VHDL.

4(c) Explain the different port mode used in VHDL programming. Discuss about the different types of delay.

OR

4'(a) What are the basic features of VHDL? Write a short note on STD_LOGIC type.

4'(b) What are the differences between WHEN-ELSE and WITH-SELECT statement? Give example.

4'(c) What is the use of “GENERIEC” statement in VHDL? What are the differences between SIGNAL and VARIABLE?