BITS, PILANI – DUBAI
Academic City, Dubai

BE (Hons) CS IV Year - 1st Sem

BITS UC461 - Software Engineering (SE)
Test 1 (Closed Book)

Date: 21 Oct 2007
Time: 50 min **Max Marks: 20**

Answer all questions

1. Name the five different generic activities. How do these activities achieve high quality and productivity, when it seems that we are doing more tasks as compared to an ad-hoc approach. 4 mks

2. Distinguish between incremental and iterative process models 2mks

3. What is the relationship between modularity and cost of building the software 2 mks

4. What is coupling? It is harder to make changes to a design if it has high coupling. Justify your answer 2 mks

5. Name the type of association that is being captured in the following cases. Depict with the help of a diagram 2 mks

   (a) A file is an ordinary file or a directory file
   (b) Files contain records

6. Assume we want to build a system that (among other things) can solve linear equations. The coefficients of the equation system are represented as an nxn – matrix. In the process of solving the linear system we have to perform the following tasks: find the row with the largest element in the diagonal; exchange two rows; exchange two columns; add two rows; etc. How would you like to model the situation using structured oriented approach and object oriented approach. Choose an appropriate diagram in each approach to represent the information. Briefly explain your answer. 4 mks

7. With the help of an example explain what is the difference between a sequence diagram and a collaboration diagram. In what context would you use each. 4 mks

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Test 2 (Open Book)

Date: 06 Dec 2007
Time: 50 min
Max Marks: 20

Answer all questions

1. A banking information system can include a host of different clients, such as a Web browser interface for home users, an Automated Teller Machine, and an application client for bank employees. Suggest an architecture for the Banking Information System that among other things should enable a range of different presentation clients in the application, while reusing some of the presentation objects across clients. 6 mks

2. Consider a method that returns the number of days in a month, given the month and year. The month and year are specified as integers. 1 represents the month January, 2 the month February and so on. The range of valid inputs for the year is 1 to maxInt. Define the equivalence classes for each of the inputs and give all the test cases. 7 mks

3. The change management process involves the following things: 7 mks
   a. The change, identifying a fault or a new feature, is requested. This can be done by anyone, including a user or a developer.
   b. The request is assessed against project goal. In large projects this is done by a control board. In smaller projects, this is done by the project manager. This may include a cost benefit analysis and an evaluation of the impact of the change on the rest of the system.
   c. Following the assessment, the request is either accepted or rejected.
   d. If it is accepted, the change is planned, prioritised, and assigned to a developer and implemented
   e. The implemented change is audited. This is done by the quality control team or whoever is responsible for managing releases.

   Draw the UML activity diagram to illustrate the change management process.

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SOFTWARE ENGINEERING – BITS UC461
COMPREHENSIVE EXAMINATION (Closed Book)

Date: 2 Jan 2008
Time: 3 hrs **Max Marks: 80**

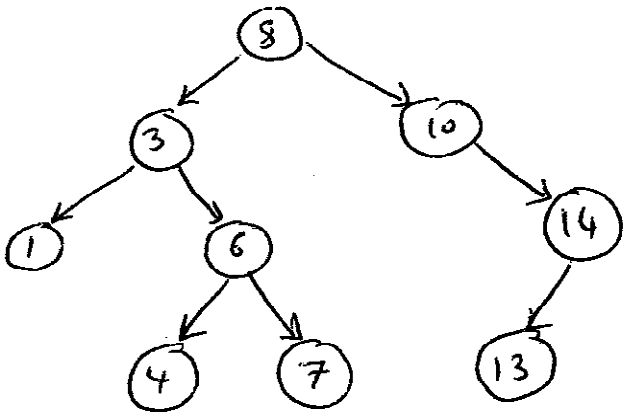
Answer all questions

1. a. List the five CMM levels and describe what aspect of process maturity each level is intended to capture. List some key activities that occur in a software development shop at the various maturity levels. 5mks

   b. What are the different framework activities. In what order are these activities carried out in a RAD model. What are the advantages and disadvantages of this approach 5 mks

2. a. Define coupling. What are the different kinds of coupling. Explain with help of examples. It is harder to make changes to a design if it has high coupling. 4 mks

   b. In the context of a binary search tree, draw a DFD, to search for a particular value. Convert the DFD in to a structure chart. A binary search tree is a binary tree data structure which has the following properties: 6 mks
   - each node has a value;
   - the left subtree of a node contains only values less than the node's value;
   - the right subtree of a node contains only values greater than or equal to the node's value.



An example binary search tree.

3. a. What is integration testing? What are the different ways in which it can be tackled? Describe each of the strategies. Why is integration testing harder than unit testing? 5 mks

b. Consider a simple program to classify a triangle. Its input is a triple of positive integers (say x, y, z) and the data type for input parameters ensures that these will be integers greater than 0 and less than or equal to 200. The program output maybe one of the following words: {Scalene, Isosceles, Equilateral, Not a triangle}. It is desired to construct a decision table to identify the test cases. Develop the decision table for this simple program. Verify if the decision table tests for all the paths 5 mks

4. a. Software quality measurement generally starts with high level quality goals, and then identifies metrics that can be used to indicate satisfaction of the quality goals. For each of the following quality goals, explain why the goal is important, and identify a metric that could be used to measure it: 6 mks
   i) Functionality
   ii) Reliability
   iii) Maintainability

b. What is usability. What facilities will you provide a user for achieving the following goals while editing a file: Saving changes to the document and Create a copy of the existing document 4 mks

5. a. Discuss the different architectural styles, with help of an example application for each of them. 5 mks

b. Architect a system that is needed to count the frequency of different words in a text file using a pipe and filler architecture and a call and return architecture 5mks

6. a. How does UML handle the concept of inheritance? Define classes to completely model. 6 mks
   i) members of the library
   ii) the material available in a library for issue
   For full credit take care to apply OOPs concepts and mention that as a justification for your design

b.) An activity diagram is given in figure 1. Describe the activity diagram in words. To get full credit, indicate what are all the activities that need to be completed prior to carrying out each of the activities and in what order. 4 mks

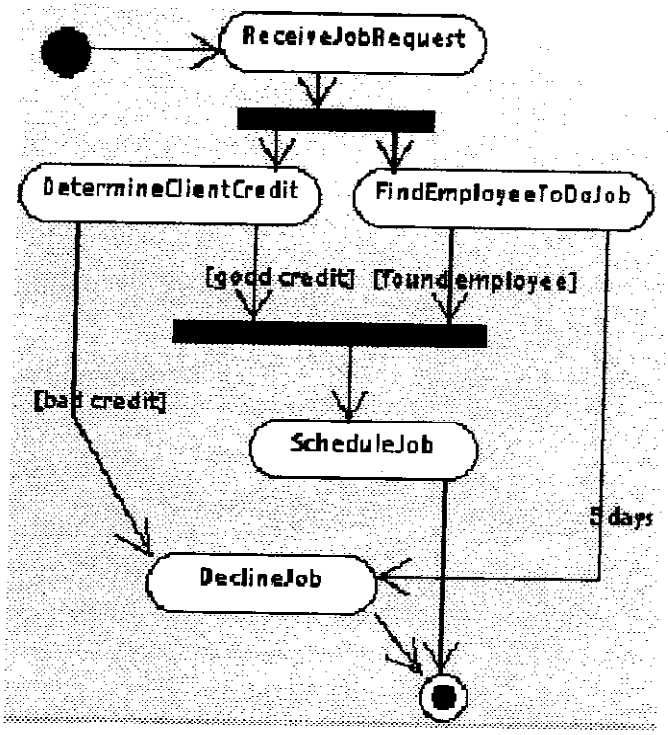


Figure 1 : Activity Diagram

7. What is the purpose of Configuration Management? Describe the activities involved in software configuration management 10 mks

8. Write short notes on:
   a. Debugging 3 mks
   b. Interaction Diagrams 4 mks
   c. COCOMO 3 mks