

BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR

B. E. 7th SEMESTER (IT) FINAL EXAMINATIONS 2011

Software Engineering (IT-701)

Full Marks: 70

Duration: 3 Hours

Answer any seven questions. Write to the point answer.

1. 4+2+4
- a) What is phase containment of errors? Why it is important and how it can be achieved?
- b) Give an example of a software product development project for which the iterative waterfall model is not suitable.
- c) We do testing of a software product at the end of the development. Why all three different level of testing, integration testing and system testing necessary? What is the main purpose of each of these different levels of testing?

2. 3+3+4
- a) What problems would you face if you are developing several versions of the same product according to a client's request, and you are not using any configuration management?
- b) Why is it necessary for a software project manager to decompose the tasks for a project using Work Breakdown Structure (WBS)? To what granularity level are the tasks decomposed?
- c) Consider the following table of tasks, their duration and dependencies.

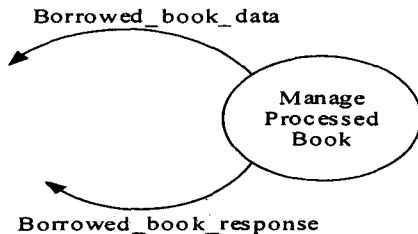
| Task ID | Duration | Dependencies |
|---------|----------|--------------|
| A | 7 | |
| B | 3 | |
| C | 6 | A |
| D | 3 | B |
| E | 3 | D, F |
| F | 2 | B |
| G | 3 | C |
| H | 2 | E, G |

Determine earliest finish (EF) time for each of the tasks.

3. 3+3+4
- a) Give an example of an inconsistent functional requirement. Explain why do you think that the requirement is inconsistent?
- b) Explain the likely consequences of starting a larger project development effort without accurately understanding and documenting the customer requirement?
- c) Who are the different categories of users of SRS document? What are their expectations from the SRS document?

4. 3+4+3
- a) How would you improve a software design that displays very low cohesion and high coupling?
- b) Enumerate different types of coupling that might exist between two modules. Give examples of each.
- c) What advantages you will get when a software design technique is based on ADTs?

5. 4+2+4
- a) Show with one small example how the software architecture specifies the structure of software, specifies component communication and addresses non-functional requirements only.
- b) You are required to review a SA/SD document, make a list of items that can be used as a checklist of carrying out the review?
- c) Write the data dictionary for the data items for following part of the DFD.



6. 4+3+3
- The local newspaper and magazine delivery agency has asked you to develop a software for him to automate various clerical activities associated with his business.
- a) Write four functional requirements of the software in proper format.
- b) Draw DFD up to level 2 (including context diagram)
- c) Draw structure chart from level 1 DFD by showing the different analysis parts.

7. 6+4
- a) For the following segment of code draw a control flow graph by clearly labeling each node to its corresponding statement. Calculate its cyclomatic complexity. How can you use this value as a measure of testability? Describe how a tester could use the cyclomatic complexity and the control flow graph to design a set of white box tests for the given code that would at least cover all its branches.

```

module nonsense()
/* a[] and b[] are global variables*/
begin
  int i,x;
  i=1;
  read (x);
  while ( i <x ) do begin
    a[i]= b[i] *x;
    if (a[i] > 50) then
      print ("Array a is cover the limit");
    else
      print("OK");
    i =i +1
  end
  print ("End of nonsense");
end
  
```

- b) A programmer using a mutation analysis tool finds that a total of 35 mutants have been generated for a program module A. Using a test set has developed she finds after running the tests the number of dead mutants is 29 and the number of equivalent mutants is 2. What is the mutation score (MS) for the module A? Is her test set for module A mutation adequate? Should she develop additional test cases? Why?

8. 3+3+4
a) Why is it important for a software development organization to obtain ISO 9001 certification?

b) What is Key Process Area (KPA) in the context of SEI CMM? Would any organization encounter any problem if it tries to implement higher level SEI CMM KPAs before achieving the lower level KPAs? Justify your answer using suitable example.

c) Define three metrics to measure software reliability. Do you consider these metrics' entirely satisfactory to provide measure of the reliability of a system? Justify your answer.

9. 3+3+2+2
a) Why is it important for an organization to undertake an effective reuse program?

b) Why is reuse of software components much more difficult than hardware components?

c) Identify the stages through which a reuse domain progress?

d) Identify the reasons why reuse of mathematical software is so useful?

10. Write short notes on any two of the followings 5 x 2

a) Halstead Software Science – Analytical approach for cost estimation

b) Web Engineering

c) User Interface Design