



Name :

Roll No. :

Invigilator's Signature :

CS/M.TECH(CSE)/SEM-3/CSEM-304/2012-13

2012

SOFTWARE ENGINEERING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) The worst type of coupling is
 - a) data coupling b) control coupling
 - c) stamp coupling d) content coupling.
- ii) One of the fault base testing techniques is
 - a) unit testing b) beta testing
 - c) stress testing d) mutation testing.
- iii) If every requirement stated in the Software Requirement Specification (SRS) has only one interpretation, SRS is said to be
 - a) correct b) unambiguous
 - c) consistent d) verifiable.



- iv) Which coupling is a function of fan-in and fan-out ?
 - a) Data and control flow coupling
 - b) Global coupling
 - c) Environmental coupling
 - d) None of these.
- v) Module X and Y operate on the same input and output data, then the cohesion is
 - a) sequential
 - b) communicational
 - c) procedural
 - d) logical.
- vi) In the spiral model 'risk analysis' is performed
 - a) in the first loop
 - b) in the first and second loop
 - c) in every loop
 - d) before using spiral model.
- vii) The feature of the object oriented paradigm which helps code reuse in
 - a) object
 - b) class
 - c) inheritance
 - d) aggregation.
- viii) Which of the following coding guidelines is desirable ?
 - a) An identifier should not be used for multiple purpose
 - b) The use of 'go to' statement should be avoided
 - c) Coding style that is too clever or cryptic should be avoided
 - d) All of these.



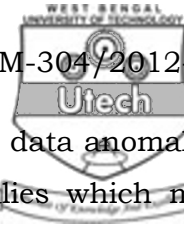
- xiv) Which statement is not applicable for a baseline version of software ?
- a) Tested and certified version of a software system representing milestones
 - b) Baseline + Approved changes = Current configuration
 - c) Modified only through well-controlled procedures
 - d) Cannot serve as the basis for further development.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. What is the difference between a DFD and a flowchart ? Are flows on a DFD restricted to just showing the movement of information ? Could they show the movement of anything else ? What happens to a store after data have moved from the store, along a flow, to a process ? What is the meaning of an unlabeled flow into or out of a store ? What is an infinite sink ? Why should it be considered an error in a typical DFD ? What are spontaneous generation bubbles in a DFD ? Why should they be avoided in a typical DFD ?
3. Define structure chart. Pictorially represent the notations used in structure chart with a short description. Represent a composite module using those notations. In a structure chart a top level module *A* calls three module *B*, *C* and *D*. In a situation, *A* is calling *B* and *C* repeatedly and other situation *A* is calling either *C* or *D* depending on a data value. Represent these two scenarios with suitable structure charts.



4. In static data flow testing what are the major data anomalies we generally encounter. Identify the anomalies which may cause potential bugs. While reviewing a program you have encountered two consecutive lines as $x = f(y); x = f(z);$ What type of anomaly is it ? Write down the interpretations you have drawn from this example. Why Static Data-flow testing is not enough ?
5. What is software metric ? What are the major types of matrices generally used ? Define Mean Time of Failure (MTTF) and the Mean Time to Repair (MTTR). How can you measure Availability based on these two parameters ? How can you measure Software Maturity Index (SMI) and Defect Density of a software product ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

6. What are the differences between COCOMO 81 and COCOMO II cost estimation model ? Write down the names of the sub-models suggested in of COCOMO-II. Which one is considered as an update of original COCOMO ? Write down the salient features of the sub-model.

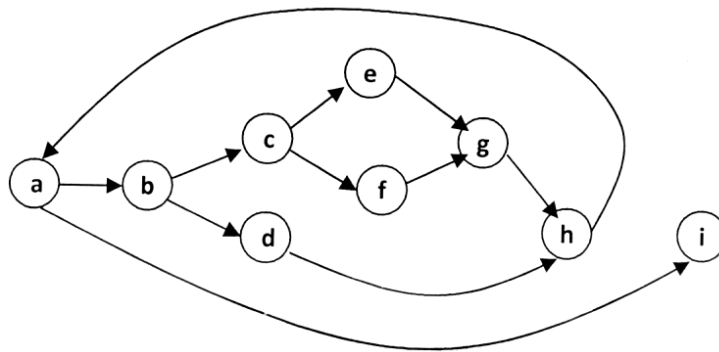
In COCOMO II nominal effort is calculated using formula $PM_{\text{nominal}} = A \times \text{Size}^B$, where $A = 2.5$. Write down the formula used for calculating the exponent B . In a project of size 100 KLOC, if the scale factors of three scale drivers are considered as 'Very Low' and scale factor of other two scale drivers are considered as 'Extra High', calculate the nominal effort of the project.

As per COCOMO II what are the factors need to be considered to adjust size of the project ?



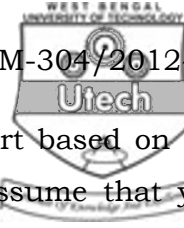
7. What is the basic difference between Static and Dynamic testing ? Which one will help you to ensure that coding standards and guidelines are followed ? What are the common types of defect found in a program ? Define Test Case and Test suit. Why 'Branch Coverage' criteria for selecting test case is not sufficient — explain it with an example.

Explain the step used in Basis Path Testing. In the control flow graph the execution starts at node *a* and ends at node *i*.



Calculate the 'Cyclomatic Complexity' of the program and find out the independent paths.

8. Define Software configuration management. If the changes of software are not controlled efficiency what are the issues we may face ? What are the four major steps/function of SCM ? Describe the change control process of a maintenance project with a suitable flow chart. Name two widely used configuration management tools.
9. What are the different activities of Project Manager must perform during planning stage of a software project ? Specify some essential attributes of good software engineers.



Develop a project schedule using Gantt Chart based on the data provided in the following table. You assume that you have two analysts for requirement analysis and design and two programmers to develop and test program. you have to use the programmer in such a way that one programmer cannot test his/her own program. Estimate the total duration for completion of the project.

No.	Activity Name	Duration in days	Relationship with other activity (Start after)
1.	Use case specification	10	Starting Activity
2.	Detail Design	8	After $\frac{1}{2}$ completion of activity 1
3.	Develop program-1	3	After 3 days of starting of activity 2
4.	Develop program-2	2	After completion of activity 2
5.	Develop program-3	4	After completion of activity 2
6.	Unit Testing program-1	1	After completion of activity 3
7.	Unit Test program-2	1	After completion of activity 4
8.	Unit Test program-3	2	After completion of activity 5

10. Write short notes on any *two* of the following :

- Class diagram
- Sequence diagram
- Cohesion and Coupling
- Transform analysis.

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