

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/ Backlog), April-May 2016

B. Tech. in Computer Science & Engg. , Semester VI

Roll No.....

CSE 604: Software Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Attempt all questions (10 questions @ 1 mark)

10



- i. Software engineering is the application of
 - (a) Systematic approach of the development
 - (b) Quantifiable approach of the development
 - (c) Discipline approach of the development
 - (d) All of these
- ii. If you were a lead developer of a software company and you are asked to submit a project/ product within a stipulated time-frame with no cost barriers, which model would you select?
 - (a) Waterfall (b) Spiral (c) RAD (d) Incremental
- iii. Which of the following phase has the maximum effort distribution?
 - (a) Testing (b) Information gathering (c) Requirement Analysis (d) Coding
- iv. In a data flow diagram, data flows can not take place between
 - (a) Two data stores
 - (b) Two external entities
 - (c) A data store and an external entity
 - (d) Both (a) and (b)
- v. At the end of feasibility study the system analyst
 - (a) Meets the users for a discussion
 - (b) Gives system proposal to management
 - (c) Gives a feasibility report to management
 - (d) Gives a software requirement specification
- vi. Select the option that suits the Manifesto for Agile Software Development
 - (a) Individuals and interactions (b) Working software (c) Customer collaboration (d) Responding to change (e) All of the mentioned
- vii. Temporal cohesion means

- (a) Cohesion between temporary variables
 - (b) Cohesion between local variable
 - (c) Cohesion with respect to time
 - (d) Coincidental cohesion
- viii. Acceptance testing is
- (a) The manner in which each component functions with other component of the system are tested
 - (b) Running the system with given data by the actual user
 - (c) The process of testing the changes in an actual or an existing system
 - (d) None of these
- ix. A transaction processing system with fixed requirements for terminal hardware and database software belongs to one of the following modes (in basic COCOMO model):
- (a) Organic mode (b) Semi-detached mode (c) Embedded mode (d) None of these
- x. Grady Booch, James Rumbaugh, and Ivar Jacobson combined the best features of their individual object-oriented analysis into a new method for object oriented design known as
- (a) HTML
 - (b) XML
 - (c) UML
 - (d) SGML
- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- i. Describe agility (for software projects) in your own words.
 - ii. What is design? Discuss the reasons for improvement using object-oriented design.
 - iii. Requirements analysis is unquestionably the most communication intensive step in the software engineering process. Why does the communication path frequently break down?
 - iv. Discuss reverse engineering and re-engineering.
- Q.3A Define the term "software engineering". Write down the major characteristics of a software. Illustrate with a diagram that the software does not wear out. 05
- Q.3B Why is primary goal of software development now shifting from producing good quality software to good quality maintainable software? 05
- Q.4A What do you understand by the term Software Development Life Cycle (SDLC)? Explain the problems that might be faced by an organization if it does not follow any software life cycle model. 05
- Q.4B Sketch a neat diagram of spiral model of software life cycle. Identify at least two activities carried out during each phase of a spiral model. As we move outward 05

along with process flow path of the spiral model, what can we say about software that is being developed or maintained?

- Q.5A What is software requirement specification (SRS)? Identify three important parts of an SRS document. Without developing an SRS document an organization might face severe problems. Identify those problems. 05
- Q.5B What is the difference between a flow chart and a structure chart? Draw Structure chart for "Update the file". 05
- Q.6A What is meant by the term 'modularity' in the context of software design? Define module coupling and explain different types of coupling. 05
- Q.6B Write short notes on following: 05
- Verification and Validation
 - Integration testing and regression testing
- OR
- Q.6B What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why? 05
- Q.7A An application has the following: 05
- 10 low external inputs, 12 high external outputs, 20 low internal logical files, 15 high external interface files, 12 average external inquiries, and a value of complexity adjustment factor of 1.10.
- What are the unadjusted and adjusted function point counts?
- (Note: EI(low)=3, EO(high)=7, ILF(low)=7, EIF(high)=10, EQ(average)=4)
- Q.7B Discuss the various modes of software development that are considered in COCOMO model. Estimate the effort required, the nominal development time, total number of people and productivity to develop the software product, where the size is 33,200 lines of code. (Note: $a_b = 2.4$, $b_b = 1.05$, $c_b = 2.5$, $d_b = .38$) 05
- OR
- Q.7B Make a list of "risk" that would be likely during the development of a new e-commerce application that is designed to sell mobile phones and service directly over the web. 05
- Q.8A Define the steps to analyze and design Object Oriented System. Consider the problem of "railway reservation system" and design the following: 10
- Problem statement
 - Context diagram
 - Data flow diagram
 - ER diagram



- Use case diagram
- Sequence diagrams
- SRS as per IEEE std. 830-1993

Q.9A Suppose a system for office automation is to be designed. It is clear from requirements that there will be five modules of size 0.5 KLOC, 1.5 KLOC, 2.0 KLOC, 1.0 KLOC and 2.0 KLOC respectively. Complexity and reliability requirements are high. Programmer's capability and programming language experience is low. All other factors are of nominal rating. 10

Use COCOMO model to determine overall cost and schedule estimates. Also calculate the cost and schedule estimates for different phases.

(Note: **Coefficients:** $a_i = 3.2$, $b_i = 1.05$, $c_i = 2.5$, $d_i = .38$

Given significant cost drivers are as: i. Complexity is high i.e. 1.15 ii. Reliability is high i.e. 1.15 iii. Programmer's capability is low i.e. 1.17 iv. Programming language experience is low i.e. 1.07 v. All other drivers are nominal)

Table: Effort and schedule fractions occurring in each phase of the lifecycle

Mode & code size	System Design	Detail Design	Module code & test	Integration and test
	μ_p			
Organic Small $S \approx 2$	0.16	0.26	0.42	0.16
Organic medium $S \approx 32$	0.16	0.24	0.38	0.22
	τ_p			
Organic Small $S \approx 2$	0.19	0.24	0.39	0.18
Organic medium $S \approx 32$	0.19	0.21	0.34	0.26

Q.9B Consider the program for the determination of Previous date in a calendar. 10
Its input is a triple of day, month and year with the following range

$1 \leq \text{month} \leq 12$

$1 \leq \text{day} \leq 31$

$1900 \leq \text{year} \leq 2025$

The possible outputs would be Previous date or invalid date. Design boundary value and equivalence class test cases for this program.

OR

Q.9B (i) Consider a program given below for the selection of the largest of numbers: 10

Line No.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

Code

main()

{

float A, B, C;

printf("Enter three values\n");

scanf("%f%f%f", &A, &B, &C);

printf("\n Largest value is");

if (A>B)

{

if (A>C)

printf ("%f\n", A);

else

printf ("%f\n", C);

}

else

{

if (C>B)

printf ("%f\n", C);

else

printf ("%f\n", B);

}

}



(a) Draw the control flow graph for the above program

(b) Find out all independent paths that will guarantee that all statements in the program have been tested

(ii) Consider following flow graph, calculate the Cyclomatic complexity by all methods and draw the graph and connection matrices:

