

## Software Engineering – November 2004

Time : 3 Hrs.]

[Marks : 100

**N.B.:** (1) Q. No. 1 is compulsory.

(2) Answer any **four** out of remaining **six** questions.

1. (a) Construct the data Model and functional Model for the following case study :

A leading travel agency has decided to develop application package to help its customers in planning tours. The agency provides services like air, railway, luxury coach, hotel booking etc. Many a times customers do not have idea of availability of transport services to a particular destination. The agency also gives advice regarding economical planning of vacation/tour. Given the tour constraints like number of days, affordable cost and places to visit the software should present alternative tour plans. Alternatively the software may be just used for querying to know availability of transport services, hotels etc. Besides these main objectives the software should also have facilities for billing and accounting for the agency. You are appointed as a consultant to develop implementation strategy for the automated tourist system. [10]

(b) Give the data and architecture design for the case study in 1.(a). [10]

2. (a) Compare the waterfall model and spiral model of software development. [10]

(b) Compute the function point for a railway reservation system. [10]

3. You are appointed as a consultant for the computerization of your university.

Consider a university database that keeps track of student and their majors, transcripts and registration and the university's courses. Several sections of each course are offered and each section is related to the instructor who is teaching. It also keeps track of the sponsored research project of faculty and graduate student of the academic departments of the particular collage. The database also keeps track of research grants and contracts awarded to the university. A grant is related to one principle investigator and to all researchers it supports.

(a) Use the COCOMO Model to determine overall cost and schedule estimates. [10]

(b) What type of coupling and cohesion techniques are required for the implementation of this case study?. Justify your answer with reason. [10]

4. (a) You are appointed as a consultant for the computerization of library system of your collage. Give the RMMM Plan for it. [10]

(b) Explain Task Set Selector with suitable example [10]

5. (a) Explain White Box Testing with suitable example. [10]

(b) Explain various Software Testing Strategies. [10]

6. About 300 journals are subscribed by National Center of information Technology, with periodicity varying from half yearly to monthly. Most journals are quarterly. The journals mostly come from abroad by surface mail and take approximately three months to reach NCIT from the date of dispatch. Not all journals are published on time and delay in publication is noticed. Loss of journals in the mail does take place. If journal is missed and a request for replacement is sent promptly publishers normally send a duplicate copy of free charge. If a request for replacement is not sent promptly, then it would be difficult to get a replacement copy free or even by paying its cost. Most journals are renewed in October as a volume begins with its first number in January. Subscription renewal has to be done promptly to avoid missing issues due to delayed payment. As foreign exchange payment is involved, renewal and payment take time and advance action is required.

(a) Give the behavioral model, transform mapping and transaction mapping for this case study [10]

(b) Give the test case design for black box testing for this case study. [10]

7. Write detailed note on the following: (**Any Two**) [20]

(a) Software Quality Assurance Plan

(b) Software Configuration Management

(c) Technical Metrics for the Software

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## Software Engineering – May 2005

Time : 3 Hrs.]

[Marks : 100

**N.B.:** (1) Question No. 1 is compulsory.

(2) Answer any **four** questions out of remaining **six** questions.

1. (a) Give the requirements specification document and structured analysis model for the following case study. [10]

You are appointed as a consultant for the computerization of your university. Consider a university database that keeps track of student and their majors, transcripts and registration and the university's courses. Several sections of each course are offered and each section is related to the instructor who is teaching. It also keeps track of the sponsored research projects of faculty and graduate students of the academic departments of the particular collage. The database also keeps track of research grants and contracts awarded to the university. A grant is related to one principle investigator and to all researchers it supports.

(b) Give the architecture design and procedural design for the case study in question 1(a). [10]

2. (a) Which of the development process models would you follow for the following projects. Give justifications. [10]
- (a) A simple data processing project
  - (b) A new system comparing finger prints
  - (c) An on line inventory management system for an automobile industry.
  - (d) A new missile tracking system.
- (b) Compute the LOC and function point for a E-commerce book ordering system. [10]
3. (a) Consider a project to develop a full screen editor. The major components identified are screen edit, command language interpreter, file input and output, cursor movement, screen movement. The sizes for these are estimated to be 4k, 2k, 1k, 2k, and 3k delivered source lines. Use COCOMO model to determine : [10]
- (a) Overall cost and schedule estimates.
  - (b) Cost and schedules for different phases.
- (b) Explain software availability, integrity and reliability in detail. [10]
4. (a) You are appointed as a consultant for the computerization of hostel admission system of your college. Give the RMMM plan for it. [10]
- (b) Explain the user interface design process for hostel admission system of your college. [10]
5. (a) Compute cyclomatic complexity for the following. [10]
- ```
void f ( ) {
while (!done) {
count ++
if (count > 10 {
fixed_count = fixed_count + count
done = 1
} else if(count >5) {
fixed_count ..      }
else {
fixed_count = count * 4  }
} // while
}
```
- (b) Explain various software Testing Strategies. [10]
6. The commonplace book is a collection of reference materials that ‘ABC Detective Agency’ constructed to supplement their prodigious memory for facts. The client for the commonplace book is the consulting private detective at the ‘ABC Detective Agency’. The clients would like to have the existing paper system accessible through computer searching within a year. The old system must continue to exist until the new system is up and running with equivalent information. The content of the system ranges from critical information about criminals and criminal events to “nice to have” information about vampires and vipers. Critical information includes biographical data about criminals and relevant people and organizations, case histories from ‘ABC Detective Agency’ and police files, and agony column entries (through this is fine old paper-based institution for advertising for assistance is now being superseded by Web/Internet chat rooms). Biographical information needs to be present in the first release for all criminals known to the agency.
- (a) Give the behavioral model, transform mapping and transaction mapping for this case study. [10]
  - (b) Give the test case design using black box testing for this case study. [10]
7. Write detailed note on the following : (Any Two) [20]
- (a) Software Quality Assurance Plan
  - (b) Project scheduling and Tracking
  - (c) Object Oriented analysis and design
  - (d) Reengineering

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## Software Engineering – December 2005

Time : 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No. 1 Compulsory.  
(2) Attempt any **four** questions out of remaining **six** questions.

1. (a) Explain McCall’s Software quality Factors. Prepare SQA plan for your dream project. [10]
- (b) Explain incremental Model for software development with suitable example. [10]
2. (a) Explain W5HH principle and critical practices in project management. [10]
- (b) Compute function point value for a project with following information domain characteristics. [10]
- |                          |    |
|--------------------------|----|
| No. of user inputs       | 32 |
| No. of user outputs      | 60 |
| No. of user in inquiries | 24 |
| No. of files             | 8  |
| No. of external inputs   | 2  |
- Assume that all complexity adjustment values are average.

3. (a) "Adding people to late software project can make it later". Explain. [10]  
 (b) Explain design heuristics for effective modularity. [10]
4. (a) Explain Organization of SRS document. [10]  
 (b) What do you mean by transform mapping ? Explain design steps which allow DFD to be mapped in specific architectural style. [10]
5. (a) Explain Smoke Testing. Compare Top-Down integration Testing Versus Bottom – up integration Testing. [10]  
 (b) What are software risks ? Compare reactive risk strategies versus proactive risk strategies. State typical RMMM plan. [10]
6. (a) State elements of computer based system and explain Requirement Engineering Process. [10]  
 (b) Explain interface design principles. Develop user Interface for Internet – based polling booth public election. [10]
7. Write short note (**any two**) [20]
  - (a) COCOMO
  - (b) Software Architectural Style
  - (c) CMM (Capability Maturity Model)
  - (d) Software Configuration Management.

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### Software Engineering – May 2006

Time : 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No. 1 is **compulsory**.  
 (2) Answer any **four** questions out of remaining **six** questions.

1. (a) Explain why the waterfall model of the software process is not an accurate reflection of software development activities ? [10]  
 (b) What are the different categories of software according to the COCOMO estimation model ? Also give examples of software products belonging to each category ? [10]
2. (a) Discuss the importance of standard template for SRS documents ? [10]  
 (b) Discuss the importance of software design in overall software design process ? [10]
3. (a) State the principals of coupling and cohesion ? [10]  
 (b) Explain design heuristics of effective modularity ? [10]
4. (a) What do you mean by a user interface ? What does it do ? [10]  
 (b) When is the role of software testing start in software life cycle ? [10]  
 When can planning for software testing start?
5. (a) What are the stages in software testing ? explain each ? [10]  
 (b) White box testing is complementary to black box testing, not alternative, why ? give an example to prove this statement ? [10]
6. (a) What are software risks ? Compare reactive risk strategies versus proactive risk strategies. State typical RIMM plan ? [10]  
 (b) Discuss the importance of software design in software engineering ? [10]
7. Write short note (any two) :- [20]
  - 1) Reengineering
  - 2) Software quality assurance plan
  - 3) Feasibility study.

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### Software Engineering – November 2006

Time : 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** out of remaining **six** questions.

1. (a) Explain W<sup>5</sup>HH Principal in detail. [5]  
 (b) Differentiate between program and software product. [5]  
 (c) Discuss the major goals of Software Engineering. [5]  
 (d) What is software process? Also enumerate the activities common to all software process. [5]
2. (a) (i) What are software risks and explain risk assessment? [5]  
 (ii) Explain feasibility study in SDLC. [5]  
 (b) (i) List the impact of Software Engineering on developing software. [5]  
 (ii) Enumerate the qualities of Good SRS Document. [5]

3. (a) (i) List the important activities performed by software project managers during project planning. [5]  
(ii) Can reengineering of existing system be performed independent of reverse engineering ? [5]  
(b) (i) How software Engineering is related to other areas of computer science? Explain. [5]  
(ii) List the major differences between the exploratory style and modern software development practices. [5]
4. (a) Explain COCOMO model in detail. [10]  
(b) (i) What are the potential uses of WBS? Explain. [5]  
(ii) Differentiate between tangible and intangible costs and benefits. [5]
5. (a) (i) Using COCOMO model to estimate the efforts required to build software for a simple ATM that produces 12 screens, 10 reports and will require approximate 80 software components. Assume average complexity and average developed environment maturity. [5]  
(ii) Distinguish interface design from software design. [5]  
(b) (i) Explain egoless programming / Democratic team structures. [5]  
(ii) What are the 5 levels of CMM? [5]
6. (a) (i) The values of size in KLOC and different cost driver's for a project are given below.  
Size = 200 KLOC  
Cost driver  
Software reliability = 1.15  
Use of software tools = 0.91  
Production complexity = 0.85  
Execution time constraint = 1.00  
Calculate the effort for three types of projects viz. organic, semidetached and embedded using COCOMO model. [5]  
(ii) What is the effect of designing a prototype on the overall cost of software product? Explain. [5]  
(b) (i) What is system testing? How it is carried out? What is the difference between  $\alpha$ ,  $\beta$  and acceptance testing? [5]  
(ii) A project size of 200 KLOC is to be developed software development team has average experience on similar type of projects. The projects schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project. [5]
7. (a) (i) Write short notes on: [5]  
(i) Software product Engineering and Software product.  
(ii) Team Structure  
(ii) Explain scheduling techniques in detail.  
(b) (i) Assume that the size of an organic software product has been estimated to be 32,000 lines of source code. Let's determine the effort required to develop the software product and the nominal development time. [5]  
(ii) How are the concepts of cohesion and coupling useful in arriving at good software design? [5]



## Software Engineering – May 2007

Time : 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No. 1 is compulsory.  
(2) Answer any **four** questions out of remaining **six** questions.

1. (a) Explain the concept of alpha and beta testing. [5]  
(b) What are the advantages and disadvantages of function point over LOC based estimation techniques ? [5]  
(c) Describe any one umbrella activity in brief. [5]  
(d) Describe the rapid Application Development model in brief. [5]
2. (a) Compare the waterfall model and spiral model of software development [10]  
(b) Compute FP for Library Management system. [10]
3. (a) Given a hospital management system that takes care of appointments with consulting doctors, admitting and allotting rooms to patients, depending on availability allocating OT's to patients, generating bills. Develop the SRS document for the same. [15]  
(b) Explain the term reliability and availability in brief. [5]
4. (a) What do you understand by the term risk?  
What is the difference between proactive and reactive risk strategies? Explain the steps involved in setting up or generating RMMM plan. [12]  
(b) Explain the concept of cohesion and coupling [8]

5. (a) Compute cyclomatic complexity and develop 2 test cases using basis path testing for following: [12]
- ```

While (1 done)
  { count ++
  If (count > 10)
    { fixed-count = fixed-count + count;
    done. = 1
    }
  else
    { f(count > 5)
    { fixed-count --
    }
    else
    { fixed-count = count* 4
    }
    }
  } // while ends

```
- (b) Explain SCM process in brief. [8]
6. (a) Explain various testing strategies. What do you understand by the term metrics? [10]  
 (b) What are different types of metrics? [10]  
 Explain with example difference between public and private metrics. How are metrics used in personal software process?
7. Write short notes on any two :- [20]
- (a) Reengineering. (b) COCOMO model.  
 (c) Component Based model. (d) CMMM.

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### Software Engineering – November 2007

Time : 3 Hrs.]

[Marks : 100

**N.B.:** (1) Question No. 1 is compulsory.

(2) Attempt any **four** questions out of remaining **six** questions.

1. (a) How would you collect requirements for small, medium and large scale software development? Mention some of the tools used for requirement elicitation. [10]  
 (b) Define product, process, project and the metrics associated with them. [10]
2. (a) What are the different methods of finding out the efforts required to develop the software? [10]  
 (b) Design an user interface for on-line bookstore. Assess risk factors. [10]
3. (a) What are the different components that are stored for each version of the software? How would you retrieve the required version? [10]  
 (b) SQA is an umbrella activity – Discuss [10]
4. (a) Draw the state transition diagram to calculate runs scored by a batsman in the cricket ground. [10]  
 (b) Give an example to explain the relationship between a CFD and DFD, PSPEC and CSPEC. [12]
5. (a) How would you reduce the maintenance cost of a software and increase reusability? [10]  
 (b) In a point of sale system customer can pay by cash or through credit card. Give the architectural design taking care of coupling and cohesion. [10]
6. (a) Draw the flowgraph, find the cc and give the test cases for the following logic. [10]
- ```

Begin
  int x, y, power ;
  float z ;
  input (x, y) ;
  if (y < 0) power = -y ;
  else power = y ;
  z = 1 ;
  while (power != 0) {
    z = z * X ;
    power = power - 1 ;
  }
  if (y < 0)
    z =  $\frac{1}{z}$  ;
  output (z) ;
end

```
- (b) Why is Boundary value analysis important? How is equivalence partitioning reduce the number of test cases? [10]

7. Write short notes on :
- (a) Project Scheduling and Tracking [10]
  - (b) Reverse Engineering and Re-engineering. [10]

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### Software Engineering – May 2008

Time : 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No. 1 is compulsory.  
(2) Attempt any **four** questions out of remaining **six** questions.
- 1. (a) On what basis a process model is chosen? Compare incremental model with evolutionary model. [10]  
(b) What do you understand by process maturity? Define CMMM levels. [10]
  - 2. (a) How would you validate and manage requirements ? [10]  
(b) Give the requirement specification for on-line book store [10]
  - 3. (a) Evaluate the risk involved when you change the existing system to "state of art" system. [10]  
(b) What are the activities involved in project scheduling ? [10]
  - 4. (a) Mention a few software configuration items. Name its type. How are software configuration objects identified? Why do you need an MIL ? [10]  
(b) Elaborate FP method for estimation of LOC. [10]
  - 5. (a) State design principles. Show examples of the following coupling high cohesion : [10]  
(i) Low coupling high cohesion  
(ii) High coupling low cohesion.  
Which one is preferred and why?  
(b) What kind of errors are detected during whitebox testing? How would you do specification testing ? [10]
  - 6. (a) What would you do when software maintenance become an issue ? [10]  
(b) Why is FTR necessary and what is done during auditing ? [10]
  - 7. Write short notes on any **two** :- [20]  
(a) Software Reliability  
(b) Architectural design  
(c) SQA

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### Software Engineering – May 2009

Time : 3 Hrs.]

[Marks : 100

- N.B.** (1) Question No. 1 is compulsory.  
(2) Attempt any **four** questions out of remaining **six** questions.
- 1. (a) Define process, project, product. State their relationship and mention the metrics associated with each of them. [10]  
(b) "Requirements have lot of ambiguity" – choose a proper process model and state the concern in design. [10]
  - 2. (a) "The problem is keeping track of inventory". Give solution to this problem. Suggest alternative design. Evaluate each of the design. Find the feasible one. [10]  
(b) "It is seen that the cost and schedule will overrun". — Suggest RMMM plan for this. [10]
  - 3. (a) What are the different models to find project size and cost ? When will you choose each one ? [10]  
(b) Enumerate the qualities of Good SRS document. [10]
  - 4. (a) Why do requirements change ? What are software configuration objects ? How would you identify them and assemble them for different versions? [10]  
(b) What are Umbrella activities ? Explain Software Quality Assurance. [10]
  - 5. (a) How are projects scheduled ? Define task set and milestones ? Assign responsibility and duration and find the total time estimate of the project. [10]  
(b) What are the advantages of evolutionary process model ? State the type of project that is evolved each time. [10]
  - 6. (a) Do you need both white box and black box testing ? What are the errors uncovered in each of them ? [10]  
(b) Explain the activities done during implementation. [10]

7. Write short notes on any two :
- (a) CMM Levels
  - (b) Formal Technical Review
  - (c) Software Reliability

[20]

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