CS/IS6T2

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Sixth Semester B.E. Degree Examination, July/August 2003

Computer Science / Information Science and Engineering

Software Engineering

Time: 3 hrs.] [Max.Marks : 100

Note: *Answer any FIVE full questions.*

1. (a) Describe any three software product attributes and any three software process attributes. **(6 Marks)**

   (b) Describe the system evolution and system decommissioning phases of the system engineering process. **(6 Marks)**

   (c) Briefly discuss the desirable characteristics and structure of a requirements document. **(8 Marks)**

2. (a) With an example, explain the use of viewpoint template and service template in the VORD method. **(6 Marks)**

   (b) What is a data dictionary? Discuss its structure and uses. **(6 Marks)**

   (c) Discuss the use of structured natural language for the specification of requirements. **(8 Marks)**

3. (a) Describe any two techniques for developing software prototypes. **(6 Marks)**

   (b) Explain the concepts of cohesion coupling and adaptability. **(8 Marks)**

   (c) With an example describe the repository model and discuss its advantages and disadvantages. **(6 Marks)**

4. (a) Describe the characteristics of an object oriented design, its advantages and explain the typical activities performed during the object oriented design process. **(8 Marks)**

   (b) With an example, describe the three process steps for transforming a data flow diagram to a structure chart. **(12 Marks)**

5. (a) What documents are to be generally delivered alongwith a software system? **(6 Marks)**

   (b) Describe any three software reliability metrics and discuss their applications. **(6 Marks)**

   (c) Describe the two popular approaches for providing software fault tolerance. **(8 Marks)**

6. (a) What are the advantages and problems of developing software with reusable components? **(8 Marks)**

   (b) Briefly describe the different stages in the testing process. **(6 Marks)**

   (c) What are the different types of interface errors that can occur and what are the general guidelines for interface testing? **(6 Marks)**

Contd.... 2

7. (a) Explain the technique of program inspections. **(6 Marks)**

(b) List the sections typically included in a project plan. **(4 Marks)**

(c) Describe the factors which affect communication in a group. **(6 Marks)**

(d) Describe any two program quality metrics. **(4 Marks)**

8. (a) Discuss the techniques for estimating project duration and determining the staffing pattern. **(8 Marks)**

(b) Describe the five levels defined in the SEI process maturity model. **(6 Marks)**

(c) Describe the functional classification of CASE tools. **(6 Marks)**

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CS/IS6T2

USN | | | | | | | | | | |

Sixth Semester B.E. Degree Examination, January/February 2004

Computer Science and Information Science Engineering

Software Engineering

Time: 3 hrs.] [Max.Marks : 100

Note: *Answer any FIVE full questions.*

1. (a) Briefly explain the software process characteristics. (7 Marks)
   (b) Describe the professional responsibilities of a software engineer. (5 Marks)
   (c) Explain the activities involved in the system design process. (8 Marks)

2. (a) What is requirement engineering ? Explain the principal activities of requirement engineering process. (8 Marks)
   (b) Explain the method based analysis for requirements analysis. (6 Marks)
   (c) What is non-functional requirements ? Explain the different types of non-functional requirements. (6 Marks)

3. (a) Describe the evolutionary prototyping of software process. (6 Marks)
   (b) How the understandability and adaptability enhance the quality of software design ? (6 Marks)
   (c) What features make client - server model attractive for system structuring ? (8 Marks)

4. (a) Write the features and advantages of menus for user interface design. (8 Marks)
   (b) How structured programming could be used to avoid faults in software process. (8 Marks)
   (c) Define POFOD and MTTF of software reliability metrics. (4 Marks)

5. (a) Describe the merits of software development with reuse. (8 Marks)
   (b) Mention different testing strategies of software. Explain any one of them. (7 Marks)
   (c) Explain the characteristics of clean room software development. (5 Marks)

6. (a) In the development of large, embedded real time systems, suggest five factors which are likely to have a significant effect on the productivity of the software development team. (10 Marks)
   (b) Explain the factors influencing the staff selection for a software project. (10 Marks)

7. (a) Explain the criteria used for software pricing. (7 Marks)
   (b) How the software standards assure software quality ? (6 Marks)
   (c) Describe the features considered for measuring program quality metrics. (7 Marks)

8. (a) Describe, with a block diagram SEI process maturity model. (10 Marks)
   (b) Explain the process of project planning. (10 Marks)

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Sixth Semester B.E. Degree Examination, July/August 2004

Computer Science and Information Science Engineering

Software Engineering

Time: 3 hrs.] [Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.

1. (a) Distinguish between a software product and a software process. (6 Marks)
   (b) Explain different process models along with their relative merits and demerits. (14 Marks)

2. (a) Describe system architecture modeling with the help of a neat diagram. (6 Marks)
   (b) What are the differences between requirements definition and requirements specification. (6 Marks)
   (c) Give a brief description of software prototyping and briefly discuss the various prototyping techniques. (8 Marks)

3. (a) Explain different software design startegies with proper illustrations. (8 Marks)
   (b) Explain the dynamic nature of software system using state machine model. (8 Marks)
   (c) Write a brief note on data - flow design principle. (4 Marks)

4. (a) Explain clearly the distinction between high level design and detailed design. (8 Marks)
   (b) Describe user interface design principles. (6 Marks)
   (c) What are the differences between coupling and cohesion. (6 Marks)

5. (a) Briefly discuss the various software reliability metrics. (8 Marks)
   (b) Bring out the differences between verification and validation. (6 Marks)
   (c) Explain the stages of testing process. (6 Marks)

6. (a) Distinguish between alpha and beta testing. (6 Marks)
   (b) Explain the advantages and disadvantages of reusing the software components. (6 Marks)
   (c) Briefly describe the following
      a) Defensive programming
      b) Clean room software development (2×4=8 Marks)

7. (a) Explain the importance of project staffing. (4 Marks)
   (b) What is COCOMO model ? Describe its apprroach to estimate person months. (8 Marks)
   (c) List and explain, briefly, the different types of documentation. (8 Marks)

8. Write short notes on :
   a) Data dictionary
   b) CASE tools
   c) Software quality assurance
   d) SEI capability maturity model (4×5=20 Marks)

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CS/IS6T2

USN | | | | | | | | | | |

Sixth Semester B.E. Degree Examination, January/February 2005

Computer Science/Information Science Engineering

Software Engineering

[Max.Marks : 100

Time: 3 hrs.]

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.

1. (a) What is software engineering ? Explain the various process characteristics. (6 Marks)

   (b) With the help of a diagram explain Boehm's spiral model of the software process. What are its advantages over water fall method? (8 Marks)

   (c) Describe five different types of functional components that might be part of large - scale software system (6 Marks)

2. (a) What is requirement definition and specification ? With the help of a diagram explain the requirement engineering process. (6 Marks)

   (b) A software system is to be developed to automate a library catalogue. This system will contain information about all the books in a library and will be usable by library staff and by book borrowers and readers. The system should support catalogue browsing, querying, and should provide facilities allowing users to send messages to library staff reserving a book that is on loan. Identify the principal viewpoints which might be taken into account in the specification of this system. Show their relationships using a view point hierarchy diagram. (8 Marks)

   (c) Develop an object model including a class hierarchy diagram and an aggregation diagram showing the principal components of a personal computer system and its system software. (6 Marks)

3. (a) Describe three different types of non-functional requirements which may be placed on a system. Give examples of each of these different types of requirement. (6 Marks)

   (b) Explain why, for large system development, it is recommended that prototypes should be "throw-away" prototypes. (8 Marks)

   (c) Explain why it is important to use different notations to describe software design. (6 Marks)

4. (a) Explain why maximizing cohesion and minimizing coupling leads to more maintainable systems. What other attributes of a design might influence system maintainbility ? (6 Marks)

   (b) What is system structuring ? Explain different models in system structuring (8 Marks)

   (c) Design an architecture for an automated ticket issuing system used by passengers at a railway station, based on your choice of model. (6 Marks)

5. (a) Develop the design of the weather station design in detail by writing interface descriptions of the identified objects. Express it in $C++$ programming language. (10 Marks)

   (b) Explain how data dictionaries may be used to supplement design information in data-flow diagrams and structure charts. (5 Marks)

Contd.... 2

(c) Suggest situations in which it is unwise or impossible to provide a consistent user interface. **(5 Marks)**

6. (a) Suggest six reasons why software reliability is important. Using an example explain the difficulties of describing what software reliability means. **(10 Marks)**

(b) Write a set of guidelines for *C++* programmers which give advice on how to make functions resuable. **(5 Marks)**

(c) Explain fault tolerance. **(5 Marks)**

7. (a) Explain how back-to-back testing may be used to test their own programs in an objective way. **(6 Marks)**

(b) Discuss the differences between black-box and structural testing and suggest how they can be used together in the defect testing process. **(8 Marks)**

(c) Using your knowledge of *C++* programming language, derive a checklist of common errors (not syntax errors) which could not be detected by a compiler but which might be detected in a program inspection. **(6 Marks)**

8. (a) Briefly explain the purpose of each of the sections in a software project plan. **(6 Marks)**

(b) What factors should be taken into account when selecting staff to work on a software development project? **(8 Marks)**

(c) In the development of large, embedded real time systems, suggest five factors which are likely to have a significant effect on the productivity of the software development team. **(6 Marks)**

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NEW SCHEME

CS/IS62

USN

Sixth Semester B.E. Degree Examination, July/August 2005

Computer Science / Information Science and Engineering

Software Engineering

Time: 3 hrs.] [Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. Answers to be specific and within the preview of subject matter.

1. (a) Explain how both the waterfall model and the protyping model can be accommodated in the spiral process model. **(4 Marks)**

(b) Mention the six specific design process activities. Give explanation for two of them. **(6 Marks)**

(c) Table 1.C gives the task duration for software project activities. Draw an activity chart. **(10 Marks)**

Task	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}
Duration in days	10	15	10	20	10	15	20	35	15	05	10	20	35	10	20
Dependencies	-	T_1	T_1, T_2	-	-	T_3, T_4	T_3	T_7	T_3, T_6	T_5, T_9	T_9	T_{10}	T_3, T_4	T_8, T_9	T_9, T_{14}

Table 1.C

2. (a) Give the IEEE standard format for requirement document. **(7 Marks)**

(b) Indicate the principle stages of VORD. **(7 Marks)**

(c) Highlight the importance of DFD in software engineering life cycle. **(6 Marks)**

3. (a) Mention four weaknesses of structured analysis methods. **(4 Marks)**

(b) Draw evaluationary prototyping flow diagram and mention its two main advantages. **(6 Marks)**

(c) Bring out the advantages and disadvantages of a shared repository. **(10 Marks)**

4. (a) What are the four parameters of a system which affects the system architecture? Explain. **(6 Marks)**

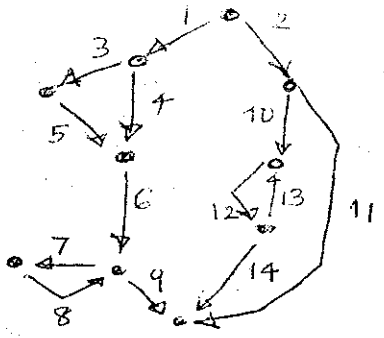
(b) Compare functional points and line of code with respect to a software life cycle. **(14 Marks)**

5. (a) Give the characteristics of GUI with description. **(4 Marks)**

(b) Distinguish between software verification and validation. **(6 Marks)**

Contd.... 2

(c) For the Figure5(c) shows a simple flow graph of a program. Indicate the minimal set of paths that satisfies white-box strategies. (10 Marks)



6. (a) Mention five levels in P-CMM model. Explain each of them. (8 Marks)

(b) Suggest meaningful names for the variables used in the program shown below and construct data dictionary entries for these names. (12 Marks)

```
routine BS(K,T,S,L)
T:=1
N × T : if S >= T go to CON
L=-1
go to STP
CON : L : =INTEGER (T/S)
L:=INTEGER(T+S)/2)
if T(L)=K then return
if T(L)>K then go to GRT
S:=L+1
go to N×T
GRT : S : = L-1
go to N×T
STP : end.
```

7. (a) For different forms of COCOMO give project complexity, formula and effort estimation plots. (10 Marks)

(b) Suppose that you are developing the software for a nuclear power plant control system. Select the most appropriate mode for the project and use the COCOMO model to give a crude estimate of the total number of person months required for the development, assuming that the estimated software size is 10,000 delivered source instructions. (10 Marks)

8. Write explanatory notes on :

(a) Ethnography

(b) Group cohesiveness

(c) Software equation

(d) Case Work benches. (4×5=20 Marks)

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CS62

NEW SCHEME

Reg. No. | | | | | | | | | | |

Sixth Semester B.E. Degree Examination, January/February 2006

Computer Science Information Science & Engineering

Software Engineering

Time: 3 hrs.) (Max.Marks : 100

Note: *Answer any FIVE full questions.*

1. (a) Software is a product. Justify this statement. **(4 Marks)**
   (b) Explain the different attributes of a good software. **(6 Marks)**
   (c) Describe the salient features of spiral model of software process with an illustrative diagram. **(10 Marks)**

2. (a) Explain the different stages in the testing process with a neat block diagram. **(8 Marks)**
   (b) What are various metrics for specifying non-functional requirements? **(4 Marks)**
   (c) Write the structure of a requirements document. **(8 Marks)**

3. (a) Describe the requirements elicitation and analysis process with a neat figure. **(8 Marks)**
   (b) Explain the various types of checks to be carried out during requirements validation. **(7 Marks)**
   (c) What are different types of volatile requirements? **(5 Marks)**

4. (a) Mention the several rapid prototyping techniques. Describe any one of them. **(6 Marks)**
   (b) Describe the suitability of interrupt - driven models for architectural design. **(6 Marks)**
   (c) Explain the guidelines to be observed while designing user interface. **(8 Marks)**

5. (a) How effectively could a colour be exploited in user interface design? **(8 Marks)**
   (b) Describe the user interface evaluation process. **(8 Marks)**
   (c) Define critical systems. Enumerate three types of critical systems. **(4 Marks)**

6. (a) Explain the various reliability metrics. **(8 Marks)**
   (b) Describe the characteristics of cleanroom software development. **(8 Marks)**
   (c) Briefly explain the top-down and bottom-up testing processes. **(4 Marks)**

7. (a) What types of plan are envisaged for project planning by management? **(8 Marks)**
   (b) Describe the cost estimation techniques for software development. **(8 Marks)**
   (c) Mention the various software product metrics. **(4 Marks)**

8. (a) Describe the components of legacy systems with a block diagram. **(10 Marks)**
   (b) Explain the activities involved in re-engineering process with an illustrative figure. **(10 Marks)**

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USN | | | | | | | | | | |

NEW SCHEME

Sixth Semester B.E. Degree Examination, July 2006
CS/IS
Software Engineering

Time: 3 hrs.] [Max. Marks:100

Note: *1. Answer any FIVE full questions.*

1 a. Highlight on essential attributes of a good software. **(06 Marks)**

b. Show how both waterfall model and prototyping model can be accounted in spiral model. **(07 Marks)**

c. What is software validation? Explain with an example. **(07 Marks)**

2 a. What are the various metrics for specifying non-functional requirements? Explain any one. **(04 Marks)**

b. Explain requirement elicitation and analysis process. **(06 Marks)**

c. Explain evolutionary prototyping. Justify that programs developed using evolutionary development are likely to be difficult to maintain. **(10 Marks)**

3 a. What is data dictionary? Discuss its structure and uses. **(06 Marks)**

b. Develop an aggregation diagram showing the components of a library system. **(06 Marks)**

c. Highlight on enduring and volatile requirements. Also give the classifications of volatile requirements. **(08 Marks)**

4 a. Illustrate with two examples for object and object class. **(06 Marks)**

b. With an example describe the repository model and give its advantages and disadvantages. **(06 Marks)**

c. Explain different types of user interaction styles. Give advantages, disadvantages and applications for each style. **(08 Marks)**

5 a. Compare black box testing with white box testing. **(04 Marks)**

b. Explain interface types and interface errors in interface testing. **(06 Marks)**

c. For a software project different activities and their durations are listed as below. Draw the activity chart and find critical path. **(10 Marks)**

Task	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9
Duration in days	10	15	10	20	10	15	20	35	15
10	-	T_1	T_1 T_2	-	-	T_3 T_4	T_3	T_7	T_6

T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}
5	10	20	35	10	20	10
T_5 T_9	T_9	T_{10}	T_3 T_4	T_8 T_9	T_{12} T_{14}	T_{15}

6 a. What do you mean by reliability metric? Explain any two metrics which helps in assessment of system performance. **(06 Marks)**

b. Explain various safety terminologies. **(06 Marks)**

c. Illustrate with an example how COCOMO model is used to estimate person months. **(08 Marks)**

7 a. What are the activities in project planning? **(04 Marks)**

b. Describe the components of a legacy system and give block diagram for the same. **(06 Marks)**

c. What is inspection process? Explain roles of inspection process and possible inspection checks. **(10 Marks)**

8 Write short notes on:

a. Product metric b. Case workbench

c. Reverse Engineering d. Centralized control model. **(20 Marks)**

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USN | | | | | | | | | | |

CS62

Sixth Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Software Engineering

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions.***

1 a. Explain the term software engineering. What are the key challenges that a software engineering is facing? **(05 Marks)**

b. What is software process model? Why is incremental model called hybrid model? Explain it with a neat diagram quoting its merits and demerits. **(10 Marks)**

c. Write a block diagram that illustrates classification of CASE from integration perspective. **(05 Marks)**

2 a. What is the objective of requirements engineering? Illustrate the various activities of requirements engineering with a neat diagram. **(06 Marks)**

b. Why is project planning an iterative activity? Briefly explain the purpose of each section in a project plan. **(08 Marks)**

c. From the evolution perspective classify the requirements of a software product **(06 Marks)**

3 a. Write the importance of requirements validation. List the various validation techniques and explain any one in detail. **(08 Marks)**

b. What are the problems in using natural language for specifying system requirements? Explain how structured natural language overcomes these problems with an example. **(10 Marks)**

c. What is the difference between milestone and deliverable? **(02 Marks)**

4 a. Based on your experience with a bank ATM draw a DFD modeling the processing involved when a customer withdraws cash from the machine. **(05 Marks)**

b. What are the benefits of developing a system prototype? Compare evolutionary prototyping with throwaway prototyping. **(10 Marks)**

c. What are control models? Write a brief note on call return control model. **(05 Marks)**

5 a. What are user interface design principles? **(06 Marks)**

b. Briefly outline the techniques for user interface evaluation. **(08 Marks)**

c. Define dependability of a computer system. What are the four principal dimensions of dependability? **(06 Marks)**

6 a. Which are the metrics available for specifying the reliability requirements quantitatively? **(04 Marks)**

b. What are the types of errors discovered through program inspection? **(06 Marks)**

c. Write the difference between black box testing and structural testing. With a suitable example explain black box testing approach. **(10 Marks)**

7 a. Explain the approach used by COCOMO model to estimate the person months for a software project. **(10 Marks)**

b. With a neat diagram explain the logical parts of a legacy system. **(10 Marks)**

8 Write short notes on :

a. Ethnography

b. Metrics for nonfunctional requirement

c. Stress testing

d. Clean room software development. **(20 Marks)**

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CS62

Sixth Semester B.E. Degree Examination, June/July 08
Software Engineering

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions.***

1 a. What is Software? What are the attributes of a good software? **(05 Marks)**
b. Explain the requirements engineering process with a neat block diagram. **(06 Marks)**
c. Explain Bohem's spiral model with a neat diagram and compare it with prototyping. **(09 Marks)**

2 a. Explain briefly the metrics for specifying non-functional requirements. **(04 Marks)**
b. Explain the form – based approach for specifying system requirements. **(06 Marks)**
c. Explain the use of view – point, service template and event scenarios in VORD method with suitable example. **(10 Marks)**

3 a. Explain the state machine model of a simple microwave oven. **(08 Marks)**
b. What is a CASE Workbench? Describe the tools used in analysis and design of workbench. **(06 Marks)**
c. Explain any two rapid – prototyping techniques. **(06 Marks)**

4 a. Write an object and DFD model for an invoice processing system. **(08 Marks)**
b. Draw and explain the sequence diagram and state diagram for a typical weather station. **(12 Marks)**

5 a. Describe the principles of user interface design. **(06 Marks)**
b. How is safety achieved in a safety – critical software? Explain. **(06 Marks)**
c. Explain the iterative process of hazard and risk analysis. **(08 Marks)**

6 a. Explain the structure of a software test plan **(07 Marks)**
b. Explain the clean – room software development process with a neat diagram. **(07 Marks)**
c. Explain interface testing. **(06 Marks)**

7 a. What are the possible software risks? Explain briefly the risk management process. **(10 Marks)**
b. Explain briefly the factors affecting software pricing and software engineering productivity. **(10 Marks)**

8 a. Explain software product metrics **(06 Marks)**
b. Write a note on Legacy system. **(06 Marks)**
c. Explain the re – engineering process with a neat diagram. **(08 Marks)**

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