

Department of Computer Applications
20mx25 – Software Engineering Methodologies- Test-2

Note: Answer all the questions

Duration: 90 minutes

Recommended to use pencil for drawing models.

1. a) Write an example for a Bad User Interface with proper justification. [3]

b) Depict Tea - Coffee - Milk - Sugar - Problem using Multiple Decision Tables [7]

c) i)

A) Salesmen in a company are paid commission for the products sold by them.

The procedure is as follows. Depict this logic using NS Model.

Shady sellers operates a graded commission policy for their salesmen. The company makes a distinction between products sold for more than Rs.5000 and the number of items sold under 300.

✓ Sales value of the items above Rs. 5000 is subjected to commission of 10%; if more than 300 items are sold and the salesman's salary is below Rs. 20000. Salesmen getting salaries in the range between Rs. 20000 & Rs. 25000 gain of 8% commission and those getting salaries above Rs. 25000 gain of 7% commission. If less than or equal to 300 items are sold, then the commission is 8%, 7% and 6% for the same classification of salesmen.

✓ For sales value of the items less than or equal to Rs. 5000 and number of items sold more than 300 give a flat commission of 8%, to all categories of salesmen. [10]

B) Draw a neat Activity Diagram to depict "Check-in" process in the Airport.

[5]

[OR]

ii)

Depict Sequence and Collaboration Diagrams to depict the Counseling Process [only] for PG Courses Admission to colleges affiliated to Anna University, Chennai through TANCET. [15]

[PTO]

2) a) What is the Principle of Pareto and how is it applied in Software Testing? [3]

b) In a private bank, interest rate is calculated based on the amount deposited and the period of deposit. It has been decided by the bank authority that, minimum deposit amount as Rs. 10000 & the period of deposit as 1 year and the maximum as Rs. 250000 and 5 years respectively. If the deposit amount is Rs. 50000 & above and the period of deposit is more than 3 years, the interest rate is 12 %.; for the same deposit and the period of deposit less than or equal to 3 years, the interest rate is 10 %. If the deposit amount is below Rs. 50000, the interest rate is 8%, whatever the period of deposit. List the suitable number of test cases to check this specification and present the same in a neat report using Black Box Approach. [No need for Pseuo Code / CFG etc.] [7]

c) A) Draw the control flow graph for the following function named "findmaximum". Determine its cyclomatic complexity, test the code and report the results. [10]

```
int findmaximum (int i, int j, int k)
{
    int max;
    if (i>j) then
        if (i>k) then max = i;
        else max=k;
    ← else if (j>k) then max = j;
        else max=k;
    return (max);
}
```

B) Design suitable test cases using Black Box testing for a function "QuadraticSolver". It asks for three values a, b & c and solve the quadratic equation $ax^2+bx+c = 0$. Start the answer with a short description to explain the logic to find roots of a quadratic equation. [5]

Roll No: 22MXW9
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE 641 004

SEMESTER EXAMINATIONS, JUNE 2023

MCA Semester: 2

20MX25 SOFTWARE ENGINEERING METHODOLOGIES

Time : 3 Hours

Maximum Marks: 100

INSTRUCTIONS:

1. Answer ALL questions. Each question carries 25 Marks.
2. Subdivision (a) carries 3 marks each, subdivision (b) carries 7 marks each and subdivision (c) carries 15 marks each.
3. Students are permitted to use COCOMO table
4. Course Outcome :

Table	Qn.1	CO1
-------	------	-----

Qn.2	CO2
------	-----

Qn.3	CO3
------	-----

Qn.4	CO4
------	-----

1. a) What are the four key characteristics of Agile Methodology?
- b) What are the prime factors that influence the choice of SDLC Models? Suggest and depict a suitable software development life cycle model with proper justification for the following scenario: If a company has already experienced in developing payroll software for different organizations is assigned for developing a similar software to an organization with few changes in the functionalities
- c) i) Consider an Organic project and it is decomposed into 7 distinct functions. Apply Decomposition techniques to compute total number of lines of code, cost required and effort required to complete the project. Use the following empirical equation to propose the LOC values: $C_1 + C_2F$, where C_1 and C_2 are constants and F is the function number. Use the following constant table to propose three LOC values. Assume that 2% of m will be paid as \$/Loc. and 7% of b will be used to propose number of lines per month. [10]

LOC Constants	a	m	b
C_1	35	37	45
C_2	62	69	73

- ii) Tabulate the functional and non-functional requirements for an online train ticket booking system. [5]
2. a) What is the significance of 'Scope of effect' and 'Scope of control' of a module in the software design?
- b) Depict the NS Model for the TEA – COFFEE – MILK – SUGAR problem.
- c) i) A) Write Data Dictionary entries for a Train Ticket. [5]
B) Consider the following problem, express the logic using Decision Table [10]

A private bank has introduced a special scheme to promote its customers to invest in the bank's fixed deposit (FD) schemes. The bank intends to have a different interest scheme for different account types, duration of the fixed deposit and the account balance of their bank accounts.

If the account is a current account and the account balance is Rs.50000 or more, the bank pays 10% interest for a 3 months FD, 12% interest for a 6 months FD, 14% interest for a 12 months FD and 16% for a 24 months FD. If the account is a current account and the account balance less than Rs.50000, the bank pays 10% interest for a 6 months FD, 12% interest for a 12 months FD and 14% for a 24 months FD.

No of Pages : 2

If the account is a savings account and the account balance is Rs.25000 or more, the bank pays 11% interest for a 6 months FD, 13% interest for a 12 months FD and 15% for a 24 months FD. If the account is a savings account and the account balance less than Rs.25000, the bank pays 10% interest for a 12 months FD and 12% for a 24 months FD.

If the account is a NRFC account and the account balance is US \$1000 or more, the bank pays 16% interest for a 24 months FD and 18% for a 36 months FD. If the account is a NRFC account and the account balance less than US \$1000, the bank pays 14% interest for a 24 months FD, 16% interest for a 36 months FD.

(OR)

- ii) A) Depict a neat CAD to explain the purchase of products using an online shopping portal. [9]
- B) Design a suitable User Interface to book a train ticket by the customer. [6]
3. a) Why coding standards matter?
- b) Write a complete Use Case story to depict Cancellation of the booked train ticket using Railway Ticket Vending Machine System. Use the standard template meant for writing Use Case story.
- c) i) Depict the working of "Issue Book" and "Return Book" in our OPAC Library Management software using Sequence & Collaboration Diagrams

(OR)

- ii) Design a neat Use Case Model to depict Lending Library Management Software [LLMS] considering the following processes – Member Registration, Member Authentication, Search Book, Lend Books, Return Books, Payment and Query Answering. Make your own assumptions to design the system. Also, write a detailed Use Case story to explain "Member Authentication" using the standard template.
4. a) What is the significance of Cyclomatic Complexity Constant?
- b) Justify the following statements: i) "Exhaustive Testing is practically impossible" ii) "Develop test cases using the black box method and then develop supplementary test cases as necessary by using the white box method"
- c) Write a complete pseudo code for the following problem and test the same using Basis PATH testing.

An Organization maintains record of their Employee details like Employee Id, Name of the employee, monthly salary and years of experience. Now, the management decides to increase the salary of each of the employees as per the following norms.

- ✓ If the monthly salary is Rs. 55000 and above and the years of experience is 10 years and above, decided to increase 24%.
- ✓ For the employee of same salary category and the years of experience is less than 10 years, decided to increase 20%.
- ✓ If the monthly salary is less than Rs. 55000 and the years of experience is 10 years and above, decided to increase 18%
- ✓ Otherwise, for all other employees, management decided to increase 15% regardless of monthly salary or years of experience.

/END/

FD/RL

Page No. : 2

DEPARTMENT OF COMPUTER APPLICATIONS
20MX25 – SOFTWARE ENGINEERING METHODOLOGIES
COCOMO TABLES

COST DRIVERS	VERY LOW	LOW	NOMINAL	HIGH	VERY HIGH	EXTRA HIGH
Software Reliability	0.75	0.88	1.00	1.15	1.40	
Data Base Size		0.94	1.00	1.08	1.16	
Product Complexity	0.70	0.85	1.00	1.15	1.30	1.65
Execution Time Constraint			1.00	1.11	1.30	1.66
Main Storage Constraint			1.00	1.06	1.21	1.56
Virtual Machine Constraint		0.87	1.00	1.15	1.30	
Computer Turnaround Time		0.87	1.00	1.07	1.15	
Analyst Capability	1.46	1.19	1.00	0.86	0.71	
Applications Experience	1.29	1.13	1.00	0.91	0.82	
Programmer Capability	1.42	1.17	1.00	0.86	0.70	
Virtual Machine Experience	1.21	1.10	1.00	0.90		
Programming Language Experience	1.14	1.07	1.00	0.95		
Use Of Modern Programming Practices	1.24	1.10	1.00	0.91	0.82	
Use Of Software Tools	1.24	1.10	1.00	0.91	0.83	
Required Development Schedule	1.23	1.08	1.00	1.04	1.10	

Prepared by: Dr.A.Sankar

COCOMO EFFORT DISTRIBUTION TABLE

MODE	PHASE	2 KLOC	8 KLOC	32 KLOC	128 KLOC	512 KLOC
ORGANIC	ANALYSIS	6	6	6	6	
	DESIGN	16	16	16	16	
	CODING	68	65	62	59	
	TESTING	16	19	22	25	
SEMI-DETACHED	ANALYSIS	7	7	7	7	7
	DESIGN	17	17	17	17	17
	CODING	64	61	58	55	52
	TESTING	19	22	25	28	31
EMBEDDED	ANALYSIS	8	8	8	8	8
	DESIGN	18	18	18	18	18
	CODING	60	57	54	51	48
	TESTING	22	25	28	31	34

COCOMO SCHEDULE DISTRIBUTION TABLE

MODE	PHASE	2 KLOC	8 KLOC	32 KLOC	128 KLOC	512 KLOC
ORGANIC	ANALYSIS	10	11	12	13	
	DESIGN	19	19	19	19	
	CODING	63	59	55	51	
	TESTING	18	22	26	30	
SEMI-DETACHED	ANALYSIS	16	18	20	22	24
	DESIGN	24	25	26	27	28
	CODING	56	52	48	44	40
	TESTING	20	23	26	29	32
EMBEDDED	ANALYSIS	24	28	32	35	40
	DESIGN	30	32	34	35	38
	CODING	48	44	40	35	32
	TESTING	22	24	26	30	30

Prepared by: Dr.A.Sankar

11

Department of Computer Applications
20MX25 – SEM – Software Testing Tutorial

Apply Basis Path Testing for the following Pseudo code meant for Bank - Deposit - Interest Rate - Problem

Do {

 100: Read Deposit Amount

 If (Deposit Amount < Rs. 1000)

 Goto 100

 If (Deposit Amount > Rs. 25000)

 Goto 100

 200: Read Period of Deposit

 If (Period of Deposit < 1 year)

 Goto 200

 If (Period of Deposit > 5 years)

 Goto 200

 If (Deposit Amount > Rs. 5000)

 If (Period of Deposit > 3 Years)

 Interest Rate = 12 %

 Else

 Interest Rate = 10 %

 Else

 Interest Rate = 8 %

 Display Deposit Amount, Period of Deposit

 Display "Interest Rate = ", Interest Rate

 Display "Do you want to continue (y/n)"

 Read Choice

} Choice = "y"

END

Department of Computer Applications
20mx25 – Software Engineering Methodologies- Test-1

Note: Answer all the questions
COCOMO table is permitted to use
Recommended to use pencil for drawing models.

Duration: 90 minutes

Co 1 – Introduction, SDLC Models, Estimation Techniques

1. a) Draw Quality triangle that depicts the quality attributes required for a software product. [3]
- b) i) Suggest a suitable software development life cycle model (no need to draw the model) with proper justification for the following scenario: If a company has already experienced in developing payroll software for different organizations is assigned for developing a similar software to an organization with few changes in the functionalities. [3]
ii) Write a short introduction for Agile Methodology. List the benefits of using agile approach in software development. [4]
- c) i) Tabulate the functional and non-functional requirements for an online food delivery system [like Zomato]. [5]
ii) A new project with estimated size of 40,000 LOC embedded system has to be developed. Project Manager of this project has a choice of hiring from two groups of developers A & B. **Group A:** Very high application experience, very little experience in the programming Language and very high skilled Analysts. **Group B:** Very low application experience, very high experience in the programming Language and very low skilled Analysts. Analyze and suggest to Project Manager with evidence, the impact of hiring the developers either from Group A or B. $a=2.8$, $b=1.20$, $c=2.4$, $d=0.32$. [10]

Co 2 – Analysis Models-CAD, DFD, DD, Use Case Models & Stories

2. a) Write DD entries for a Train Ticket [3]
- b) Depict the PG Admission System through Tamil Nadu Common Entrance Test [TANCET] using a neat Use Case Model. [7]
- c) A) Depict DFDs [5 Marks for CAD and 10 marks for DFD Level-1] to explain our college Library Management System [OPAC] limited to the following processes – Student Authentication, Search Book, Issue Book, Return Book, Reserve Book and Late fee Payment. [15]

[OR]

- B) Depict USE CASE Model [5 Marks] for a Banking Software without ATM and write a Suitable USE CASE Story [10 Marks] to illustrate the Withdrawal of cash. [15]

Dr.AS – 20mx25 – Co1 & Co2 – Test 1 – 24th March, 2023

Department of Computer Applications
20MX25-Software Engineering Methodologies-Tutorial - 2

Read the following Pseudo Code and answer the following questions

- a) Convert this Pseudo code into its equivalent NS Diagram [10]
b) Apply Path Testing for this and prepare a neat test case report [30]

```
1. Repeat
{
2.   Display "Enter Employee ID and Name"
3.   Read Employee ID, Gross Salary
4.   While (Gross Salary > 0)
{
5.     if (Gross Salary <= Rs. 15,000)
6.       increase in salary [%] = 15
    else
7.     if (Gross salary <= Rs. 22,000)
8.       increase in salary [%] = 10
    else
9.       increase in salary [%] = 5
10.  New Gross Salary = Gross Salary + (increase in salary / 100)* Gross
      Salary
11. Write "Employee Id = ", Employee Id
12. Write "Gross Salary =", Gross Salary
13. Write "Revised Gross Salary", New Gross Salary
    } /*end of while*/
14. Write "Do you want to continue [y/n]"
15. Read Choice
16. } until (Choice = "y")
17. Display "Thank You"
```

20MX25 – SEM – Cost Estimation Problem Sheet

1. Consider an Organic project and it is decomposed into 7 distinct functions. Apply decomposition techniques to compute total number of lines of code and cost required to complete the project. Use the following empirical equation to propose the LOC values: $C_1 + C_2F$, where C_1 and C_2 are constants and F is the Function number. Use the following table to propose three LOC values

Constants/LOCs	a	m	b
C_1	351	373	450
C_2	624	692	737

Using the above LOC value, apply COCOMO method to compute other estimates by assuming the following cost drivers. Very high skilled programmer and analyst; High - Data Base size; Low product complexity; High - application experience.

2. Assume that the size of an organic product has been estimated to be 32,000 lines of source code. Assume that the average salary of a software developer is Rs. 15,000 per month. Determine the effort required to develop the software product, the nominal development time, and the cost to develop the product.
3. Suppose that a certain software product for business application costs Rs. 50,000 to buy off-the-shelf and that its size is 40 KLOC. Assuming that in-house developers cost Rs. 6000 per programmer-month (including overheads), would it be more cost-effective to buy the product or build it?

ready-made
software

OTS

OTS - custom

4. Suppose that a certain software product for business application costs Rs. 50,000 to buy off-the-shelf and that its size is 40 KLOC. Assuming that in-house developers cost Rs. 6000 per programmer-month (including overheads), would it be more cost-effective to buy the product or build it?

ILIOE

5. If a software product of size S takes m months to develop, then according to the COCOMO estimation model, how long (in months) will it take to develop a product of size $2 \times s$?

- a. Greater than $2 \times m$ months
- b) Greater than $3 \times m$ months
- c) Less than $2 \times m$ months
- d) Greater than $4 \times m$ months

Important 6. A new project with estimated size of **400 KLOC** embedded system has to be developed. Project Manager of this project has a choice of hiring from two groups of **developers A & B**: **Group A:** Very high application experience, very little experience in the programming Language and very high skilled Analysts. **Group B:** Very low application experience, very high experience in the programming Language and very low skilled Analysts. Analyze and suggest to Project Manager, the impact of hiring the developers either from Group A or B. **Use $a=2.8$, $b=1.20$, $c=2.4$ and $d=0.32$.** Justify your suggestion to Project Manager with evidence.

1. [Co1] What are the problems expected, if software engineering approach is not applied in the software development process? [3]
2. [Co2] Draw CAD to withdraw money from a bank, without ATM facility. [3]
3. [Co1] Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of a software developer is Rs. 15,000 per month. Determine the effort required to develop the software product, the nominal development time, and the cost to develop the product. Use $a=3.2$, $b=1.05$, $c=2.5$ and $d=0.38$ for organic project. [5]
4. [Co2] Write DD entries for Indian Railways (IR) card. [5]
5. [Co1] Assume that, there is a software development request from a customer. They are ready to give complete requirements in the beginning itself; assured for not changing requirements in between. Only condition is that, they need to have the completed software at the earliest and no budget constraints. Is it possible to use hybrid approach for SDLC? If yes, suggest SDLC Models can be combined to meet the customer requirements. If no, suggest a SDLC model to meet the customer expectations. Draw the respective model(s) and justify your answer. [7]

[PTO]

6. [Co2] In the existing online booking for movie tickets, once tickets are booked, no provision to cancel the tickets at any cost. If you are asked to include "**cancellation of booked tickets**", explain using a CAD Model to implement this facility in the proposed system. [7]
7. [Co1] Apply **COCOMO** technique to compute all the estimates required for an embedded project having 4 modules of size **12.34 KLOC, 12,345 LOC, 33.125 KLOC and 23,678 LOC** respectively. Consider the following cost drivers: High Skilled Programmer and Analyst, High Database Size and Very High Use of Software Tools. Use **a=2.8, b=1.20, c=2.4 and d=0.32 for Embedded Systems project.** [10]
8. [Co2] Design DFDs to depict Lending Library Management Software [**LLMS**] considering the following processes – **Member Registration, Member Authentication, Search Book, Lend Books, Return Books, Payment and Query Answering**. Make your own assumptions to design the system. [10]

DrAS – 20mx25 – SEM – Co1 and Co2 – 50 Minutes – Answer for 25 Marks

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, JUNE 2022

MCA Semester: 2

20MX25 SOFTWARE ENGINEERING METHODOLOGIES

Time : 3 Hours

Maximum Marks: 100

INSTRUCTIONS:

1. Answer ALL questions. Each question carries 25 Marks.
2. Subdivision (a) carries 3 marks each, subdivision (b) carries 7 marks each and subdivision (c) carries 15 marks each.
3. Students are permitted to use COCOMO table.
4. Course Outcome Table:

Qn.1	CO1	Qn.2	CO2	Qn.3	CO3	Qn.4	CO4
------	-----	------	-----	------	-----	------	-----

1. a) What are the objectives of Software Engineering? Write one important guideline to achieve these goals?
b) Draw and briefly discuss RAD Model and write one suitable scenario to select this SDLC model.
c) i) Apply COCOMO technique to compute all the estimates required for an embedded project having 4 modules of size 12.34 KLOC, 12,345 LOC, 33.125 KLOC and 23,678 LOC respectively. [10]
ii) Suppose that a certain software product for business application costs Rs. 50,000 to buy off-the-shelf and that its size is 40 KLOC. Assuming that in-house developers cost Rs. 6000 per programmer month (including overheads), would it be more cost-effective to buy the product or build it? Justify your answer. [5]
2. a) Write DD entries for the Railway Card issued in our Railway Ticket Vending machine System.
b) Write a suitable USE CASE STORY to depict Customer Authentication in an ATM Banking System.
c) Design DFDs to depict our college Library Management System [OPAC] limited to the following processes – Student Authentication, Search Book, Issue Book, Return Book, Reserve Book and Late fee Payment. Make your own assumptions to design the system.
3. a) What are the consequences expected, if a system is designed with more number of highly coupled modules.
b) Draw a neat HIPO diagram to depict MCA admission system through TANCET.
c) i) Consider the following problem, express the logic using Multiple Decision Table

ANEX Bank has introduced a special scheme to promote its customers to invest in the bank's fixed deposit (FD) schemes. The bank intends to have a different interest scheme for different account types, duration of the fixed deposit and the account balance of their bank accounts.

If the account is a current account and the account balance is Rs.25,000/- or more, the bank pays 10% interest for a 3 months FD, 12% interest for a 6 months FD, 14% interest for a 12 months FD and 16% for a 24 months FD. If the account is a current account and the account balance less than Rs.25,000/-, the bank pays 10% interest for a 6 months FD, 12% interest for a 12 months FD and 14% for a 24 months FD.

If the account is a savings account and the account balance is Rs.15,000/- or more, the bank pays 11% interest for a 6 months FD, 13% interest for a 12 months FD and 15% for a 24 months FD. If the account is a savings account and the account balance less than Rs.15,000/-, the bank pays 10% interest for a 12 months FD and 12% for a 24 months FD.

If the account is a NRFC account and the account balance is US \$500 or more, the bank pays 16% interest for a 24 months FD and 18% for a 36 months FD. If the account is a NRFC account and the account balance less than US \$500, the bank pays 14% interest for a 24 months FD, 16% interest for a 36 months FD.

(OR)

- ii) Depict the user authentication process of a Banking Software using neat Sequence and Collaboration Diagrams. Consider stringent authentication followed in bank, before permitting the user to proceed with any services offered by the bank
4. a) Identify the problems that might occur if the engineers of an organization do not adhere to any coding standard?
- b) Define the following terms: Black Box Testing and White Box Testing. Recommended approach for testing is that "apply Black Box testing first and then White Box testing" – write your comments on this statement
- c) i) Write a Pseudo code for a problem of finding the smallest among the given three numbers and to also display "The given three numbers are Equal", if the given numbers are all equal. Apply Basis Path Testing to test this code.

(OR)

- ii) Discuss the different test cases required to test the following module "Withdrawal of Cash from ATM" thoroughly using Black Box Testing.

FD/JU

/END/

Page No. : 2

o o
D

21MX222

Sathish Kumar S

Department of Computer Applications 20MX25 - Software Engineering Methodologies Self-Assessment Tutorial

1. Apply COCOMO technique to compute all the estimates required for an embedded project having 4 modules of size 12.34 KLOC, 12,345 LOC, 33.125 KLOC and 23,678 LOC respectively. Consider the following cost drivers: High Skilled Programmer and Analyst, High Database Size and Very High Use of Software Tools. Use $a=2.8$, $b=1.20$, $c=2.4$ and $d=0.32$ for Embedded Systems project.
2. A new project with estimated size of 400 KLOC embedded system has to be developed. Project Manager of this project has a choice of hiring from two groups of developers A & B.

Group A: Very high application experience, very little experience in the programming Language and very high skilled Analysts.

Group B: Very low application experience, very high experience in the programming Language and very low skilled Analysts.

[PTO]

Analyze and suggest to Project Manager, the impact of hiring the developers either from Group A or B.

Justify your suggestion to Project Manager with evidence.

3. Suppose you are developing a software product of organic type. You have estimated the size of the product to be about 100,000 lines of code. Compute the nominal effort and the development time. Use $a=3.2$, $b=1.05$, $c=2.5$ and $d=0.38$ for Organic Systems project.

DRAS-20mx25-SEM-Self-Assessment Tutorial – 23rd April 2022

(21Mx222)

Department of Computer Applications
20MX25 - Software Engineering Methodologies Sathish Kumar.S
Self-Assessment Tutorial - I

40000
1000

1. A new project with estimated size of 40000 LOC embedded system has to be developed. Project Manager of this project has a choice of hiring from two groups of developers A & B.

Group A: Very high Programmer capability, very less experience in the programming Language and high skilled Analysts}

Group B: Low Programmer capability, very high experience in the Applications and nominal skilled Analysts.

Analyze and suggest to Project Manager, the impact of hiring the developers either from Group A or B. Justify your suggestion to Project Manager with evidence.

2. Draw CAD for cancellation of Train tickets booked using Railway Ticket Vending Machine System.
3. Draw CAD for Authentication of Customers in ATM Banking Software
4. Write DD entries for a train ticket

DRAS-20mx25-SEM-Tutorial 1 - 9th May 2022

(21Mx222)

Department of Computer Applications
20mx25 - Software Engineering Methodologies- Test-1

Note: Answer all the questions

Duration: 90 minutes

COCOMO table is permitted to use

Use Pencil for drawing models and pen for writings.

Co 1 – Introduction, SDLC Models, Estimation Techniques

1. a) What are the consequences of developing a software product without following any systematic approach? [3 Marks]
- b) It is recommended that in some scenarios, hybrid of more than one SDLC Models for a project. To exercise this, consider the following case study and answer for the question given below.

Waterfall and R&D
Case Study: Assume that, there is a software development request from a customer. They are ready to give complete requirements in the beginning itself; assured for not changing requirements in between. Only condition is that, they need to have the completed software at the earliest and no budget constraints.

Question: Which SDLC models can be combined to meet this customer expectation? Justify your choices of SDLC models.

Design and depict the suggested new SDLC model by combining suitable SDLC models. [7 Marks]

$$Time = \left(12 L^3 / CK^3 F\right)^{1/4} \quad (b^{\text{root}})(1000^n)(1200)$$

- c) Consider an Organic project and it is decomposed into 5 distinct functions. Apply Decomposition Techniques to compute total number of lines of code and cost required to complete the project. Use the following empirical equation to propose the LOC values: $C_1 + C_2 F$, where C_1 and C_2 are constants and F is the Function number. Use the following table to propose three LOC values. To compute the cost required to complete the project, assume that 3% of m will be paid as \$/loc.

Duration
=
 $C_f \text{ Time } F$

man power
=
 $\frac{\text{EFFORT}}{\text{Duration}}$

	a	b
organic	3.2	1.05
sd	3.0	1.12
f	2.8	1.20

LOCs Constants	a	m	b
C_1	35	37	45
C_2	62	69	73

$L_c = \frac{a + b}{m}$

$a = 0$
 $b = \text{most optimistic}$
 $m = \text{most likely}$

Using the above LOC value, apply COCOMO method to compute other estimates by assuming the following cost drivers. Very high

	c	d
Organ	2.5	0.38
sd	2.5	0.35
f	2.4	0.32

$Cost = L_c \times \$/loc$

$Effort = \frac{L_c}{\text{No. of lines}}$

$$Ld = (b - a) / 6$$



skilled programmer and analyst; high data base size; low product complexity; high application experience. [15 Marks]

Co 2 – Requirements Elicitation, Analysis Models

2. a) What are the likely consequences, if the requirements are elucidated [Elicitation] by more than one customers? [3 Marks]
- b) Let us assume that, you are assigned to design the Railway Card issued to customer after successfully completing "Customer Registration" process identified in our Railway Ticket Vending Machine (RTVM) System. For that, you need the contents to be printed in the railway card; you have decided to Use Data Dictionary tool to design the suitable Railway Card with necessary details.

Write DD entries identified for the card according to the conventions discussed. [7 Marks]

- c) Depict DFDs [5 Marks for CAD and 10 marks for DFD Level-1] to explain our college Library Management System [OPAC] limited to the following processes - Student Authentication, Search Book, Issue Book, Return Book, Reserve Book and Late fee Payment.

[15 Marks]

[OR]

- c) Depict USE CASE Model [5 Marks] for the above system and write a suitable USE CASE Story [10 Marks] to illustrate the Student Authentication using the template discussed in the class.

[15 Marks]

Dr.AS - 20mx25 - Co1 & Co2 - Test 1 - May 18, 2022

Department of Computer Applications
20MX25 - Software Engineering Methodologies - Test 2

Note: Answer all the questions

Duration - 90 Minutes

In each question, sub division a) carries 3, b) carries 7 and c) carries 15 marks.

In question No. 1, answer either c-i) or c-ii).

C03: Software Design and Tools

1. a) Write your brief comments on the following: A) Loosely Coupled and Strongly Cohesive Modules B) High Fan-in and Low Fan-out.
- b) Following paragraph depicts the logic used to compute the interest to be paid to the customer based on the deposit amount and period of deposit as mentioned below.

In a private bank, interest rate is calculated based on the amount deposited and the period of deposit. It has been decided by the bank authority that, minimum deposit amount as Rs.1000 & the period of deposit as 1 year and the maximum as Rs.25,000 and 5 years respectively. If the deposit amount is above Rs. 5000 and the period of deposit is more than 3 years, the interest rate is 12%; for the same deposit and the period of deposit less than or equal to 3 years, the interest rate is 10%. If the deposit amount is below or equal to Rs. 5000, the interest rate is 8%, whatever the period of deposit.

Depict this logic using a neat ~~NS Model~~ Pseudo code.

- c)-i) Draw Sequence & Collaboration Diagrams for Railway Ticket Reservation Vending Machine System. The Railway Ticket Vending Machine "- similar to ATM for money transaction.

It is explained as follows: Customer register with Indian Railways (IR) - IR issues a Railway card after a verification - The card is like a credit card, but used only for booking train tickets - customer inserts card in the Railway Ticket Vending Machine - enters PIN - if PIN is correct, menu displayed - customer chooses an option to reserve - enters his/her travel plan - check the availability - book the ticket - payment using the same card - ticket is issued from the machine. For cancellation : Insert the card and PIN - enter PNR number - ticket details are displayed - select the passenger to cancel - confirm the cancellation - a slip generated for the cancelled tickets with refund details - new ticket issued from the machine. For any Query: Insert the card & PIN - select the query - enter the relevant inputs for the query - get the result.

PTO

[OR]

- c)-ii) Consider the following problem, express the logic using
Multiple Decision Table

ANEX Bank has introduced a special scheme to promote its customers to invest in the bank's fixed deposit (FD) schemes. The bank intends to have a different interest scheme for different account types, duration of the fixed deposit and the account balance of their bank accounts.

If the account is a current account and the account balance is Rs.25,000/- or more, the bank pays 10% interest for a 3 months FD, 12% interest for a 6 months FD, 14% interest for a 12 months FD and 16% for a 24 months FD. If the account is a current account and the account balance less than s.25,000/-, the bank pays 10% interest for a 6 months FD, 12% interest for a 12 months FD and 14% for a 24 months FD.

If the account is a savings account and the account balance is Rs.15,000/- or more, the bank pays 11% interest for a 6 months FD, 13% interest for a 12 months FD and 15% for a 24 months FD. If the account is a savings account and the account balance less than Rs.15,000/-, the bank pays 10% interest for a 12 months FD and 12% for a 24 months FD.

If the account is a NRFC account and the account balance is US \$500 or more, the bank pays 16% interest for a 24 months FD and 18% for a 36 months FD. If the account is a NRFC account and the account balance less than US \$500, the bank pays 14% interest for a 24 months FD, 16% interest for a 36 months FD.

C04 - Software Testing

2. a) Exhaustive Testing is impractical - Why?
- b) Apply Black BOX testing to test a module which is meant for customer authentication in an ATM Banking System.
- c) Write a complete pseudo code to read a number and to display the input number is positive or negative or zero. Repeat the reading of numbers from the user till their response is NO; Output the count on positive, negative and zeros read.

Apply BASIS PATH testing for this code and present the test case report in the standard template.

DRAS - 20MX25 - SEM - Test-2 - 22nd June, 2022



Fan in value of $m \in \{5\}$

Fan out value of $m \in \{2\}$

Department of Computer Applications
20mx25 - Software Engineering Methodologies
Tutorial-2

1. Depict Banking software using **Structured Chart**, assuming that the bank is not providing ATM card facility.
2. An Organization maintains record of their Employee details like Employee Id, Name of the employee, salary, years of experience etc. Now, management decides to increase the salary of each of the employees as per the following norms.
 - ✓ If the monthly salary is Rs. 55000 and above and the years of experience is 10 years and above, decided to increase 24%.
 - ✓ For the employee of same salary category and the years of experience is less than 10 years, decided to increase 20%.
 - ✓ If the monthly salary is less than Rs. 55000 and the years of experience is 10 years and above, decided to increase 18%
 - ✓ Otherwise, for all other employees, management decided to increase 15% regardless of salary or years of experience.

Depict this logic using appropriate **Decision Table**.

3. Depict the following logic using **NS diagram** to compute the interest to be paid to the customer based on the account balance and period of deposit.

In a private bank, interest rate is calculated based on the amount deposited and the period of deposit. It has been decided by the bank authority that, minimum deposit amount as Rs.1000 & the period of deposit as 1 year and the maximum as Rs.25,000 and 5 years respectively. If the deposit amount is above Rs. 5000 and the period of deposit is more than 3 years, the interest rate is 12%; for the same deposit and the period of deposit less than or equal to 3 years, the interest rate is 10%. If the deposit amount is below or equal to Rs. 5000, the interest rate is 8%, whatever the period of deposit.

When to use waterfall
Requirements are very well known, New version of an existing product, porting existing product to a new platform.

When to use incremental
When need to get basic functionality to the market early on project with lengthy development schedules. On a project with new technology

When to use rad

Time box approach. Well known requirements, user throughout lifecycle involved, and user customer needs product at the earliest with no cost constraint.

Prototype

In this prototype is developed before software development both customer and developer has no idea - collecting requirements. Reduced time and cost.

V model

It is an extension of waterfall model and is based on association testing on each stages. Next phase starts only after completion of previous.

Hospital patient control system requires high reliability solution and technology are known.