Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (W), Mumbai : 400058, India
(Autonomous College of Affiliated to University of Mumbai)

End Semester Examination

December 2022

Maxi Marks : 100 | Duration : 3 hours
Class : TE Comp/IT | Semester : V
Course code: CS/IT 302 | Branch : CS/IT
Name of the course : Software Engineering

Note: 1. Make suitable assumptions wherever necessary
2.All questions are compulsory.
3.Draw neat diagrams.

Q No		Max Marks	CO	BL
Q1)	a) What are the fundamental activities common to all process models? b) Teenagers who run a lawn mowing(cutting) service tend to struggle with administration tasks such as writing quotes and collecting payments. Aruna, who runs a mowing service, currently spends approximately two hours extra each week, besides mowing, on administration. The system that will be developed is expected to save Aruna's time. Additionally, approximately 5% of existing customers are unsatisfied as, for example, their lawn was not mowed as originally arranged. A new system needs to be developed, that supports quotes, cash and card payments, reminders, scheduling, and maps for directions for a teenager's mowing service. You are to implement the system using database and APIs. Currently there are only few team members available to work on the project. Choose the best process model that has minimum cost and maximum flexibility for this system. Describe how the model is applied to the project. Justify why it is better than other models. **OR** a) Differentiate between incremental and iterative model b) A local airport decides to build an Air Traffic Control(ATC) Assistant system , a high risk project , to manage 20M aircraft in vicinity of airport. The ATC Assistant has several functions. Using the system it is possible to track location of aircraft on ground or in air, and keep track of who is controlling the aircraft. It provides a decision support system for tracking and altering the states of aircraft in designated air traffic zones.There is a module that is used to train air traffic controllers through ATC simulation. A display of weather sensors is also provided. Aircrafts are identified whenever they enter a controlled air space either through a TRACON. Aircraft leaving the control space are assigned to an en route center and removed from the list. Choose the best process model for this system. Describe how the model is applied to the project. Justify why it is better than other models.	4+6	CO1	4

Q2a)	What are design patterns? What are the advantages of using design patterns? Explain any two design patterns.	10	CO3	4
Q2b)	List 2 differences between software architecture and software design. If you were asked to follow Test Driven Development to develop Linux kernel, explain the steps to be followed.	5	CO1	3

Q3a)	Draw control flow graph for the given graph ?
	Calculate cyclomatic complexity using no. of nodes and edges.
	Can cyclomatic complexity become equal to zero? Justify
	(1) { int i, j, k;
	(2) for (i=0 ; i<=N ; i++)
	(3) p[i] = 1;
	(4) for (i=2 ; i<=N ; i++)
	(5) {
	(6) k = p[i]; j=1;
	(7) while (a[p[j-1]] > a[k] {
	(8) p[j] = p[j-1];
	(9) j--;
	(10) }
	(11) p[j]=k;
	(12) }
		4+4+
		2
			CO4	3

Q3b)	List 2 difference between QA and QC? Mark each statement as True or False? Justify. 1. Test cases may contain multiple valid conditions 2. Test cases may contain multiple invalid conditions 3. Test cases may contain both valid and invalid conditions 4. Test cases may contain more than 1 step.	3+2	CO4	3
Q.4a)	Develop the SRS document for the Railway Reservation System. OR Briefly explain the role of an SRS in context of a software development project. State any five characteristics of a good SRS explaining the respective benefits in short. Outline the structure of an SRS according to the IEEE standard.	10	CO1	3
Q.4b)	Suppose you are the project manager of a software project requiring the following activities	6+4	CO3	3

Task Number	Task	Duration	Dependent on Task
1	Specification	15	-
2	Design database	45	1
3	Design GUI	30	1
4	Code database	105	2
5	Code GUI part	45	3
6	Integrate and test	120	4 and 5
7	Write user manual	60	1

a) Determine Earliest Start (ES), Earliest Finish time (EF), Latest start time (LS), Latest finish (LF) for every task
b) Compute Slack time (ST) for each task.

Q.5 a)	What do you understand by balancing a DFD? Illustrate your answer with a suitable example	2+3	CO1	2
Q.5b)	Let us consider a satellite based mobile communication product. Classify the risks into Project risk, Technical risk and Business risk. a)What if the project cost escalates and overshoots what was estimated? b) What if the mobile phones that are developed become too bulky in size to conveniently carry? c) What if it is later found out that level of radiation coming from the phone is harmful to human being? d) What if call hand-off between satellites becomes too difficult to implement? e) What if the key person leave in between the development?	5	CO3	3
Q. 5c)	What is swimlanes? Using swimlanes draw activity diagram for examination software.	10	CO3	2
Q.6 a)	**Illustrate a method of constructing a class diagram. Draw a class diagram for the following case study.** **Case Study** A new school district operates a fleet of 40 buses that serves approximately 1000 students in grades KG to 12 std. The bus operation involves 30 regular routes plus special routes for activities, athletic events and summer session, the district employs 12 full time drivers and 25 to 30 part time drivers. A dispatcher co-ordinates the staffing and routes and relays messages to drivers regarding students and parents who call about pick up and drop-off arrangements.	4+6	CO2	3
Q.6b)	Draw a state diagram for the online order delivery system. You must include the following: i) The states that must be included in the diagram are: checking, dispatching, waiting, cancelled and delivered (Additionally) you may include more states) ii) Check whether all the items are available or not. iii) Include whether all the items are checked or not. iv) Include if some items are not in the stock. Show appropriate transitions from a given state. Use the concept of Superstate	10	CO2	3

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