Question Paper

Exam Date & Time: 01-Dec-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL INSTITUTE OF TECHNOLOGY
FIFTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/DEC 2022

SOFTWARE DESIGN TECHNOLOGY [ICT 3174]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1)		Can the specialized process models take on many of the characteristics of one or more traditional models? Justify your answer with suitable example of a specialized model	(5)
	A)		
	B)	For the given scenario, draw the swimlane diagram with the required and suitable model elements. Supermarket requires stock control system to void out of stock level for each product. A purchasing_admin will be able to process an order by entering product numbers and required quantities into the system. The system will display a description, price and available stock. In-stock products will normally be collected immediately by the customer from the store. If stock is not available, the purchasing_admin will be able to create a backorder for the product. The system will allow products to be paid by cash. Order details for in-stock products will be printed including the quantity, product number and description. The store manager will be able at any time to print a summary report of sales in the store for a given period, including assignment of sales to sales assistants in order to calculate weekly sales. The stock manager will be able to monitor stock levels and weekly run-rates in order to set minimum stock levels and requisition products which fall below the minimum stock levels or for which demand is anticipated. When the stock arrives, it will be booked in by the warehouse person. Stock that has been backordered for collection from the store is held in a separate area and the store manager advised of its arrival. The catalogue of available products will be maintained remotely	(3)
	C)	Effective software project management focuses on the four P's. What are these P's? Explain	(2)
2)		Draw use-case diagram for the following scenario and write complete use-case specifications for any one use-case.	(5)
	A)	The Online Television is a company which delivers both paid and free online broadcasting services to all TV fans. Members can watch both live and archived TV programs on OTS's website, anytime and anywhere. There are two kinds of members - general and premium. Visitors can register as general member, which is free of charge, to watch any archived TV programs, or as premium member, charge US $30 per month, for watching both archived and live programs. A general member can upgrade himself to premium member anytime. However premium member is not allowed to change himself back to a general member, unless he removes his account permanently by mailing us the account removal form. Besides watching TV programs, premium members can share their thoughts with each other, about the programs, by posting their opinion under the video panel as a discussion topic. Prizes will be given to the member who raised the most active discussion each month. Premium members will also receive monthly newsletters, which lists the recommended programs in the coming month. General members can give feedback for archived programs by filling the feedback questions. In order to maintain the system, administrator should have the rights to update the program schedule, update the program as well as to archive programs. Administrator should also help to monitor the delivery of newsletter to premium members. Administrator should keep the track of usage of live programs in case of premium members and calculate the TRP for each program based on number of viewers and their usage details. Administrator should be able to provide statistical report to company manager	
	B)	List and explain the areas in which process models may differ from one another	(3)
	C)	Given the following fragment of code, how many tests are required for 100% statement/condition coverage? Write the testcases. if width > length then biggest_dimension = width if height > width	(2)

```
then biggest_dimension = height
end_if
else
biggest_dimension = length
if
height > length
then
biggest_dimension = height
end_if
end_if
```

3) Design the test cases for the following code snippet using path testing. You are expected to follow the following steps to design an effective test case which have a high probability of revealing defects. (5)

A)

1. Draw the CFG (Control Flow Graph)
2. Find the Cyclomatic Complexity using three methods.
3. Identify the independent paths (Basic Path Set)
4. Derive test cases

```
int main()
{
int percentage;
char grade;
do {
printf("Enter an percentage :");
scanf("%d", &percentage);
if (percentage >=90)
grade='A';
else if (percentage >=80)
grade='B';
else if (percentage >=70)
grade='C';
else if (percentage >=60)
grade='D';
else if (percentage >=50)
grade='E';
else
grade = 'U';
printf("nnWant to check again (press Y/y for 'yes') :");
scanf(" %c", &choice);
} while (choice == 'Y' || choice == 'y');
printf("nYour grade is %c", grade);
return 0;
}
```

B)

B) Individuals on two different project teams record and categorize all errors that they find during the software process. Individual measures are then combined to develop team measures. Team A found 342 errors during the software process prior to release. Team B found 184 errors. All other things being equal, suggest two approaches to evaluate which team is more effective in uncovering errors throughout the process. Justify your answer (3)

C) Does "refactoring" mean that you modify the entire design iteratively? Explain (2)

4) Draw the activity on node network diagram for the following project. Find the slack time, critical path and maximum time for completion of the project. (5)

A)

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Preceded by	-	A	A	B	B	C	C	F	D	G, H	E	I
Duration (weeks)	10	9	7	6	12	6	8	8	4	11	5	7

B) The following SCR Mode Table describes the required behaviour of a car's cruise control system. Draw a UML state transition diagram to show the same information. (3)

Old Mode	Ignition	Cruise Switch	Running	Brake	Accelerator	Too Fast?	New Mode
Off	@T	-	-	-	-	-	Inactive
Inactive	@F	-	-	-	-	-	Off
	T	@T(cruise)	T	F	F	F	Cruise
Cruise	@F	-	-	-	-	-	Off
	-	-	-	-	-	@T	Inactive
	-	-	@F	-	-	-	Inactive
	-	-	-	@T	-	-	Override
	-	-	-	-	@T	-	Override
	-	@T(cancel)	-	-	-	-	Override
Override	@F	-	-	-	-	-	Off
	T	-	@F	-	-	-	Inactive
	T	@T(resume)	T	F	F	F	Cruise
	T	@T(cruise)	T	F	F	F	Cruise

.

C) An application developed has to be tested for the following computational errors. Which among the following errors can be identified using unit testing / integration testing? (2)

i. incorrect initialization

ii. precision inaccuracy

iii. incorrect symbolic representation of expression

iv. incompatible data types in comparisons

v. underflow, overflow and addressing exceptions

5) Draw a UML Class Diagram representing the following elements from the problem domain for a hockey league. A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. (5)

A)

A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses. Draw a class diagram for this information

B) Design the test cases for the below specification using any 2 appropriate black box testing techniques. (3)

The Mail service advertises overnight delivery anywhere in California and two-day delivery in the continental U.S. The delivery fee is fifty cents per ounce for letters in California (75 cents outside of CA), and sixty cents per ounce for parcels (one dollar outside of CA). The maximum weight they deliver is 16 ounces for a letter and ten pounds for a parcel.

The program should read the shipping class, weight (in ounces), and zipcode for the destination and output the fee. If the item weighs too much output "Item too heavy".

Note: 1 pound (lb) is equal to 16 Ounces

C) What are the usual work products produced as a consequence of requirements elicitation? How does the collaborative requirements gathering translate the needs of the customer into technical requirements? (2)

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