Question Paper

Exam Date & Time: 02-Jan-2023 (02:30 PM - 05:30 PM)



Department of Information & Communication Technology, MIT, Manipal FIFTH SEMESTER B.TECH(IT) MAKE-UP EXAMINATIONS -JAN-2023

SOFTWARE ENGINEERING [ICT 3159]

Marks: 50

Duration: 180 mins.

(2)

Answer all the questions.

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

- 1) Can the specialized software process models take on many of the characteristics of one or more (5) traditional models? Justify your answer with suitable example of a specialized model.
 - A)
 - B) Individuals on two different project teams record and categorize all errors that they find during the (3) 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
 - C) What is a risk? list the categories of risk with an example for each.
- 2) Draw use-case diagram for the following scenario and write complete use-case specifications for (5) any one use-case.
 - 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) An extension ladder has a rope, pulley, and latch for raising, lowering, and locking the extension. (3) When the latch is locked, the extension is mechanically supported and you may safely climb the ladder. To release the latch, you raise the extension slightly with the rope. You may then freely raise or lower the extension. The latch produces clapping sound as it passes over the steps of the ladder. The latch may be reengaged while raising the extension by reversing the direction just as

the latch is passing a step. Prepare a state diagram of an extension ladder.

C) Given the following fragment of code, how many tests are required for 100% statement/condition (2) coverage? Write the testcases.

if a > c then biggest = a if b > a then biggest = b end_if else biggest = c if b > c then biggest = b end_if end_if

A)

3)

the following steps to design an effective test case which have a high probability of revealing defects.

Design the test cases for the following code snippet using path testing. You are expected to follow

- 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

(5)

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) Compare and contrast the following:
 - i. PERT & GANTT CHART
 - ii. Sequence diagram & Activity diagram
- C) An application developed has to be tested for the following computational errors. Which among the (2) following errors can be identified using unit testing / integration testing?
 - i. incorrect initialization
 - ii. precision inaccuracy
 - iii. incorrect symbolic representation of expression
 - iv. incompatible data types in comparisons
 - v. underflow, overflow and addressing exceptions

Draw the activity network representation for the project given in Table Q.4A and compute the (5) following:

A)

4)

5)

A)

- i. Identify the critical path and its duration for the given project.
- ii. Compute slack time.

Table Q.4A

Activity	А	В	С	D	Е	F	G	Н	Ι	J	K	L
Preceded by	-	A	A	В	В	С	С	F	D	G, H	Е	I
Duration (weeks)	10	9	7	6	12	6	8	8	4	11	5	7

B) Construct an activity diagram for the following situation using swimlanes:

(3)

(3)

A customer wants to draw money from his bank account. He enters his card into an ATM (automated teller machine). The ATM machine prompts "Enter PIN". The customer enters his PIN. The ATM (internally) retrieves the bank account number from the card. The ATM encrypts the PIN and the account number and sends it over to the bank. The bank verifies the encrypted Account and PIN number. If the PIN number is correct, the ATM displays "Enter Amount", draws money from the bank account and pays out the amount.

- C) Mention the types of software requirements with an example for each. (2)
- Write the class diagram(with methods and attributes, if available in the description) to model the (5) system described below.
 - A kho-kho league is made up of at least four hockey teams. Each kho-kho team is composed of twelve players, and one player captains the team.

A team has a name and a record. Players have a number and a position. The teams play games against each other. Each game has a score. 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 specification given below using any 2 appropriate black box testing (3) techniques.

The Mail service advertises overnight delivery anywhere in Karnataka and two-day delivery in the other part INDIA. The delivery fee is INR 50 per 100gms for letters in karnataka (INR 75 outside of Karnataka), and INR 60 per 100 gms for parcels (INR 100 outside of karnataka). The maximum weight they deliver is 1 kg for a letter and 10 kgs for a parcel. The program should read the shipping class, weight (in grams), and zipcode for the destination and output the fee. If the item weighs too much then output "Item too heavy".

- C) Classify the following into generalization (G), association (A), aggregation (AG) and represent each (2) statement using class diagram representations:
 - i. A dining philosopher uses a fork
 - ii. A student takes a course from a professor.
 - iii. Modems and keyboards are input / output devices
 - iv. Cupboard contains book

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