School of Computer Science Engineering and Information Systems (SCORE)
FALL 2023-2024
Continuous Assessment Test (CAT – I)
Programme Name & Branch: MCA
Course Name & Code: PMCA506L Cloud Computing

Slot: C1   Class Number: VL2023240106196,VL2023240106198,VL2023240106200

Faculty Name: Dr. DAPHNE LOPEZ, Dr. SUBHASHINI R, Dr. NADESH R.K

Exam Duration: 90 Mins   Maximum Marks: 50

Answer all the Questions (5 *10 = 50 Marks)

1. Elucidate the Distributed Computing Paradigms that include the challenges in computing complex applications and data.

2. With an illustration, explain why Cloud Computing is referred to as an "On-Demand Computing". Elaborate how cloud service providers provide the on-demand functionality for their computing resources.

3. Identify the need for Service Oriented Architecture; explicate the components needed to build the architecture with an appropriate example.

4. "Many Enterprises are moving towards cloud for their business process", Justify with the service model, deployment model provided by the cloud service provider.

5. Imagine you to be a cloud architect, and if you have the responsibility of constructing a data center, what type of topology would you choose and why? Elaborate.

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VIT
Vellore Institute of Technology

School of Computer Science Engineering and Information Systems
Fall Semester 2023-2024
Continuous Assessment Test – I

Programme Name & Branch MCA

Course Name & code: Data Structures and Algorithms , PMCA501L

Class Number (s):   VL2023240106168, VL2023240106164, VL2023240106145

Faculty Name (s) Dr.N.Mythili, Dr.R.Seetha, Dr.M.Iyapparaja

Exam Duration: 90 Min.   Maximum Marks: 50

General instruction(s): Answer all questions (5*10 = 50 Marks)

1. a) Consider an array of size 10 with four elements stored in it If each data takes 4 bytes to store , then compute the memory requirement of the array. If a linked list requires 4 bytes to store the address, then what is the memory requirement of a linked list? Compare both the cases and justify which data structure is better in the given scenario. Also differentiate them(6)

b) Elaborate the role of stack frames in function calls.(4)

2. Assume that patients arrive at a hospital at random intervals. At times emergency cases do arrive. Suggest a suitable ADT to simulate the order in which the patients are treated. Discuss an pseudocode for this simulation (10)

3. . In several applications, more than one stack may be required together. Some stacks overflow whereas others are nearly empty. Suppose an application requires two stacks X and Y (as below figure). One can define an array A with N_x elements for stack X and another array B with N_y elements for stack Y. Now instead of defining two separate arrays A and B, we can define a single array, say AB, with $N = N_x + N_y$ elements for X and Y together. Let us define the starting locations of items for stack X and Y as AB[0] and AB[N-1] respectively and X grows to the right whereas Y grows to the left.
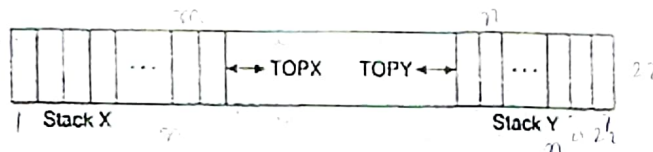
With this scenario, overflow will occur only when X and Y together have more than N elements. This technique will usually decrease the number of situations of occurrence of overflow even though we have not increased the total amount of space reserved for the two stacks.

Write algorithm for PUSH_X, PUSH_Y, POP_X, POP_Y and STATUS_AB (to be defined to test the state of empty or full, percentage of space occupied by X and Y) by considering the above said scenario. (10)

4. a) Perform the following for the given code.

```
struct node
{ char data;
struct node *next;
};
main( ) {
struct node *n1, *n2, *n3,*temp;
n1= (struct node*) malloc(sizeof (struct node));
n2= (struct node*) malloc(sizeof (struct node));
n3= (struct node*) malloc(sizeof (struct node));
n1->next=n2;
n2->next=n1;
n3->next=n2;
temp=n3->next,
}
```

(i)Mention the successor node for each of the nodes created in the above program. [1]

(ii)Which node is the successor for 2 nodes? [1]

(iii)Which is the node pointed to by "(temp->next)->next" [1]

(iv)From which node if you start, you will be able to visit (display) all the three nodes, by following the links? [2]

(b) Write a code snippet to count the number of nodes in a singly linked list and illustrate it. [5]

5. a) Write the pseudocode to perform deletion of a node specified by the user from a circular singly linked list. Trace the execution of the algorithm (6)

b) What is an ADT? (2)

c) Mention the disadvantages of circular and singly linked lists(2)

School of Computer Science Engineering and Information Systems
Fall Semester 2023-2024

Continuous Assessment Test – I

Programme Name & Branch: MCA

Course Name & code: Java Programming – PMCA502L

Class Number (s): VL2023240106170, 6179, 6174

Faculty Name (s): Prof. Mareeswari V, Prof. Vijayarani A, Prof. Thilagavathi M

Exam Duration: 90 Min.
Maximum Marks: 50

Answer ALL Questions (5 * 10 = 50 Marks)

1. a) Java is a portable and a robust programming language. Justify your answer. **(4 Marks)**

   b) Specify when you will consider using a constructor. Also list and explain the different types of constructors with example code fragments. **(6 Marks)**

2. a) State the different uses of 'final' keyword with example code fragments. **(3 Marks)**

   b) Create a class by name SumOfNumbers with members – overloaded method by name sum() having two versions of it. The first version takes one argument of type integer – 'n' and returns the sum of first 'n' natural numbers The second version takes two arguments, an integer that represent the value of 'n' and a character. If the passed character is 'E', the method should return the sum of even numbers between 1 and 'n' and if the character is 'O' it should return the sum of odd numbers between 1 and 'n'. In case of any other character, it should return zero.

   Create a main class to test the overloaded functions of the above class. **(7 Marks)**

3. The government of every country takes effective initiatives to conserve rare plants for future generations. They conduct periodic assessments to determine and store the count of each species and their habitat. Create a class by name ConservePlants and include the following members.

   Instance Variables

       Species Name, Count, and Habitat

   Methods

       i) A getData() method to read input details for the instance variables.

       ii) A display() method to display the details of a plant.

       iii) A static method specificHabitat( ) that takes an array of objects of type ConservePlants, the number of objects, and the habitat as arguments and display the details of those species whose habitat matches with the name of the habitat passed as argument and the count is <50.

   Create a main class to test the above class for an array of 'n' objects.

4. Create a class by name FacultyPublication with the following instance Variables - Faculty ID, Name, Number of Publications and Number of Citations. The class should include a parameterized constructor that initializes instance variables with the values specified by the user and a display() method.

Create an interface by name Calculate. The interface should include a method determinePoints(). Create another class FacultyPublicationPoint that extends FacultyPublication class and implements the Calculate interface. The class should include a parameterized constructor that invokes the parameterized constructor of the base class explicitly. The class also should override the determinePoints() method where the points scored by the faculty for citations is determined and displayed. Use the following criteria to determine the points.

- <25 citations – 3 points
- 25 – 50 citations : 5 Points
- 51 – 75 citations : 7.5 Points
- 76 – 100 citations : 10 Points
- For every additional 50 citation – 2.5 points

Create a main class to test the above class hierarchy.

5. Write a program to read 'n' numbers through command-line arguments and store it in an integer array. Display the square of each element in the integer array (use enhanced for loop). Include appropriate exception handling mechanisms to handle NumberFormatException and ArrayIndexOutOfBoundsException.

School of Advanced Sciences
Department of Mathematics
Continuous Assessment Test –I
Fall Semester 2023-24

Programme Name & Branch: M.C.A
Slot: D1+TD1   Semester: I
Course Code: PMAT501L
Faculty Name: M. Gowsalya, M.Nalliah, G. Mokeshrayalu

Exam Duration: 90 mins
Maximum Marks: 50
Course Title: Probability and Statistics
Class Number: 6405

General instructions: Answer all the questions (5X10=50 Marks)

1. (a). The probability that a regularly scheduled flight departs on time is $P(D) = 0.83$; the probability that it arrives on time is $P(A) = 0.82$; and the probability that it departs and arrives on time is $P(D \cap A) = 0.78$. Find the probability that a plane (i) arrives on time given that it departed on time, and (ii) departed on time given that it has arrived on time. **(5M)**

   (b). Suppose that we have a fuse box containing 20 fuses, of which 5 are defective. If 2 fuses are selected at random and removed from the box in succession without replacing the first, what is the probability that both fuses are defective? **(5M)**

2. A manufacturing firm employs three analytical plans for the design and development of a particular product. For cost reasons, all three are used at varying times. In fact, plans 1, 2, and 3 are used for 30%, 20% and 50% of the products respectively. The "defect rate" is different for the three procedures as follows: $P(D/P_1) = 0.01$, $P(D/P_2) = 0.03$, $P(D/P_3) = 0.02$, where $P(D/P_j)$ is the probability of a defective product, given plan j. If a random product was observed and found to be defective, which plan was most likely used and thus responsible? **(10M)**

3. A discrete Random variable X has the following probability distribution.

   $$x: \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8$$

   $$p(x): \quad a \quad 3a \quad 5a \quad 7a \quad 9a \quad 11a \quad 13a \quad 15a \quad 17a$$

   Find the value of a, $P(X < 3)$, mean, variance and cumulative distribution function of X. **(10M)**

4. The Joint density for the random variables (X, Y), where X is the unit temperature change and Y is the proportion of spectrum shift that a certain atomic particle produces, is

   $$f(x,y) = \begin{cases} 10xy^2, & 0 < x < y < 1 \\ 0, & elsewhere \end{cases}$$

   (a) Find the marginal densities $g(x)$, $h(y)$ and the conditional density $f(y/x)$.
   (b) Find the probability that the spectrum shifts more than half of the total observations, given that the temperature is increased to 0.25 unit. **(10M)**

5. Let X and Y be the random variables with joint probability distributions: **(10M)**

y \ x	0	1	2
0	$\frac{3}{28}$	$\frac{9}{28}$	$\frac{3}{28}$
1	$\frac{3}{14}$	$\frac{3}{14}$	0
2	$\frac{1}{28}$	0	0

Find the expected values E(X), E(Y), E(XY), Marginal distributions and Covariance of X and Y.

School of Computer Science Engineering and Information Systems
Fall Semester 2023-2024
Continuous Assessment Test – I

Programme Name & Branch: MCA
Course Name & code: Database Systems- PMCA503L
Class Number (s): VL2023240106181, VL2023240106185, VL2023240106189
Faculty Name (s) MUTHAMIL SELVAN T, KARTHIKEYAN J, TAPAN KUMAR DAS
Exam Duration: 90 Min.   Maximum Marks: 50

Q.No.   Answer all Questions   5X10= 50 Marks

1.   If you were designing a Web-based system to make airline reservations and sell airline
      tickets, which client/server DBMS architecture for DBMS would you choose? Why? Why
      would the other architectures not be a good choice? Explain the chosen client/server
   architecture.

2.   Design an E/R diagram for the following database. The database for music stores details of a
      personal music library, and could be used to manage your MP3, CD, it's relatively simple
      and stores only the relationships between artists, albums, and tracks

      Requirements for our database.

      ✓ The collection consists of albums.
      ✓ Store the album details album id , album name, when it is purchased and where it is
        purchased.
      ✓ An album is made by exactly one artist.
      ✓ An artist makes one or more albums.
      ✓ An album contains one or more tracks
      ✓ Artists, albums, and tracks each have a name.
      ✓ Each track is on exactly one album.
      ✓ Each track has a time length, measured in seconds.
      ✓ When a track is played, the date and time the playback began (to the nearest second)
        should be recorded; this is used for reporting when a track was last played, as well
        as the number of times music by an artist, from an album, or a track has been
        played.

3.

Figure below shows an ER schema for a bank database that can be used to keep track of customers account and loan details. Map this schema into a relational schema and specify all primary keys and foreign keys.
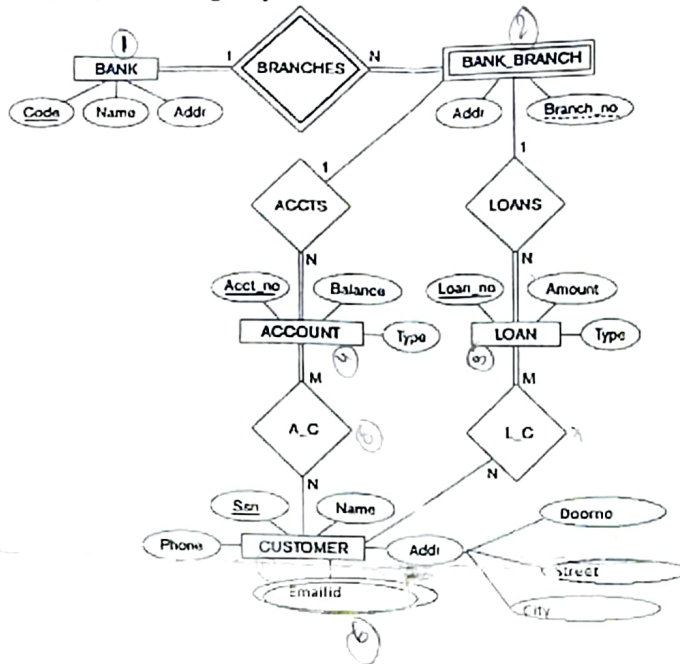
4.   Discuss about various constraints in the relational model with appropriate example.

5.

Consider the following schema:
Suppliers(sid, sname, address)
Parts(pid, pname, color)
Catalog(sid, pid, cost)

Write the following queries in relational algebra

A. Find the part ID whose cost is more than 1000 Rupees   (2 marks)
B. Count how many parts are there in each color.   (2 marks)
C. Find the suppliers ID who supply some red part   (3 marks)
D. Find the names of suppliers who supply some red part. (3 marks)