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Vellore Institute of Technology
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School of Information Technology and Engineering

Winter Semester 2022-2023 - Fresher

Continuous Assessment Test – I

Programme Name & Branch: MCA

Course Name & code: Data Mining and Business Intelligence (ITA5007)

Class Number (s): 0528, 0296, 0530

Slot: C2+TC2

Faculty Name (s): Harshita PateL, Dr. Ephzibah E.P., Jagadeesan S.

Exam Duration: 90 Min. **Maximum Marks: 50**

Q.No.	Question	Max Marks
1.	There is a strong linkage between statistical data analysis and data mining. Some people think of data mining as an automated and scalable method for statistical data analysis. Do you agree or disagree with this perception? Present one statistical analysis method that can be automated and/or scaled up nicely by integration with the present data mining methodology.	10
2.	Briefly outline how to compute the dissimilarity between objects described by the following: (a) Nominal attributes (b) Asymmetric binary attributes (c) Numeric attributes (d) Term-frequency vectors	10
3.	Use these methods to normalize the following group of data: 200, 300, 400, 600,1000 (a) min-max normalization by setting min = 0 and max = 1 (b) z-score normalization (c) normalization by decimal scaling	10
4.	Suppose that a hospital tested the age and body fat data for 18 randomly selected adults with the following results: *age*: 23, 23, 27, 27, 39, 41, 47, 49, 50 *%fat*: 9.5, 26.5, 7.8, 17.8, 31.4, 25.9, 27.4, 27.2, 31.2 *age*: 52, 54, 54, 56, 57, 58, 58, 60, 61 *%fat*: 34.6, 42.5, 28.8, 33.4, 30.2, 34.1, 32.9, 41.2, 35.7 (a) Calculate the mean, median, and standard deviation of age and %fat. (b) Draw the boxplots for age and %fat. (c) Draw a scatter plot and a q-q plot based on these two variables.	10
5.	Consider the following data (in increasing order) for the attribute age: 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70. (a) Use smoothing by bin means to smooth these data, using a bin depth of 3. Illustrate your steps. Comment on the effect of this technique for the given data. (b) How might you determine outliers in the data? (c) What other methods are there for data smoothing?	10

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			SLOT : B2
School of Information Technology and Engineering			
Winter Semester 2022-2023			Continuous Assessment Test – I
Programme Name & Branch		MCA	
Course	ITA5006	Course	Distributed Operating Systems
Class	VL2022230500270 , VL2022230500524, VL2022230500243		
Faculty	Dr.M.RAJKUMAR, Dr.T.SENTHIL KUMAR, Dr.D.KARTHIKEYAN		

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): Answer ALL Questions.

Q.No.	Question	Max. Marks
1.	(a) Identify the best choice scheduling algorithm for the following cases and justify your answer. **Case 1:** The incoming processes are short and there is no need for the processes to execute in a specific order. (2 marks) **Case 2:** The processes are a mix of long and short processes and the task will only be completed if all the processes are executed successfully in a given time. (2marks) **Case 3:** The processes are a mix of user based and kernel-based processes. (2 marks) (b) Compare and contrast the various scheduling algorithms highlighting their advantages and disadvantages. (4 marks)	10
2.	Experiment the various classical problems depicting flaws of process synchronization in systems where cooperating processes are present. Explain with the help of pseudocode.	10
3.	Consider the following process with the CPU burst time givenin milliseconds.	10

Process	Arrival Time	Burst time	Priority
P1	0	10	4
P2	1	4	2
P3	2	12	1
P4	4	5	3

Process arrives in P1, P2, P3, P4 order, all process arrives at 0 msec.

i) Draw Gantt chart to show execution using Priority, and RR (Quantum Time=2ms) Scheduling.(4 Marks)

ii) Also calculate the Average waiting time and Turnaround time. (4 Marks)

iii) Comment on the algorithm which produces minimum Average waiting time and Turnaround time. (2 Marks)

4. Assume that source and destination in the same network. One of the process in the source system wants to make a reliable communication to the one of the application in the destination system. Elaborate with the neat sketch on layer communication, protocol functionalities, encapsulation and de-capsulation happens at both sender and receiver side. **10**

5. (a) Demonstrate the need for communication primitives in Distributed OS. (5 marks) **10**

(b) Explain how remote procedure call will be implemented and how it handles the structuring and procedure call. (5 marks)

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			SLOT: A1
School of Information Technology and Engineering			
Winter Semester 2022-2023			Continuous Assessment Test – I
Programme Name & Branch		MASTER OF COMPUTER APPLICATION	
Course Code:	MAT 5010	Course Title:	Foundations of Data science
Class Number(s)	VL2022230500506		
Faculty Name(s)	Dr Shashikiran Venkatesha		

Exam Duration: 90 Min. **Maximum Marks: 50**

1. Differentiate Business Intelligence versus Data Science. Illustrate with examples the evolution of analytics from Descriptive to Prescriptive. 10 marks

2. Discuss the Layered approach for Big Data Analysis Framework. 10 marks

3. Suppose that the data for analysis includes the attribute age. The age values for the data tuples are (in increasing order) 13, 15, 16, 16, 19, 20, 20, 21, 22, 22, 25, 25, 25, 25, 30, 33, 33, 35, 35, 35, 35, 36, 40, 45, 46, 52, 70.

(a) What is the midrange of the data? 2.5 marks

(b) Find the first quartile (Q1) and the third quartile (Q3) of the data? 2.5 marks

(c) Give the five-number summary of the data. 2.5 marks

(d) Draw boxplot for Five number summary data. 2.5 marks

4. Calculate the Mean, Median and the mode for the data given below. 10 marks

The velocities of the jet aircraft were observed at the time of a catapult on an aircraft carrier.

Velocity in knots	135	140	145	150	155	160	165	170
Frequency	4	6	13	8	17	14	7	1

5. Estimate Standard deviation, $\sqrt{\beta_1}$, & β_2 for the following distribution. 10 marks

The Frequency distribution of the heights (in inches) of 200 students in class is given below.

Heights in inches	54	55	56	57	60	61	62	63
Frequency	1	3	7	12	11	34	33	43

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School of Information Technology and Engineering

Winter Semester 2022-2023

Continuous Assessment Test – I

Programme Name & Branch	:	**MCA**
Course Name & code	:	**ITA6007 & Network and Information Security**
Class Number	:	**VL2022230500249 & VL2022230500274**
Slot	:	**D2+TD2**
Faculty Name (s)	:	**Dr.C. NAVANEETHAN** **Dr.A. ANBARASA KUMAR**

Exam Duration: 90 Min. **Maximum Marks: 50**

Q.No.	Question	Max Marks
1.	Identify the types of Security Attack occurred in the following scenarios a) Passive Attack (5 Marks) b) Active Attack (5 Marks)	10
2.	Classify the five categories of security services. a) Access Control b) Authentication c) Confidentiality d) Integrity e) Non repudation	10
3.	a) What is threat? And list out its various types. (5 Marks) b) State the difference between threats and attack. (5 Marks)	10
4.	a) With a neat block diagram, Explain the DES algorithm for 64 bit data and 64 bit key size. In DES algorithm we have **8 S boxes** Substitution boxes [S box]:. Input for S box is 48bit. and output from S box is 32 bit. The input 48 bit will be divided equally to 8 s boxes from s1, s2, … s8. So each s box will get 48/8= 6 bits as input. This Each S box reduce 6 bits to 4 bits. i.e input for each S box is 6 bits and output is 4 bits. How the 6 bits is reduce to 4 bits? Let you consider 6 bits 1 0 0 1 1 0. Find the position of 2nd row in 3rd column for S1. (5 Marks) S1 14 4 13 1 2 15 11 8 3 10 6 12 5 9 0 7 0 15 7 4 14 2 13 1 10 6 12 11 9 5 3 8 4 1 14 8 13 6 2 11 15 12 9 7 3 10 5 0 15 12 8 2 4 9 1 7 5 11 3 14 10 0 6 13 b) Explain Public Key Cryptography and when is it preferred. (5 Marks)	10
5.	With a neat block diagram, Explain in detail the key generation, Input Array, State Array and Output Array in AES Algorithm and its expansion format.	10

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			SLOT : E2+TE2
School of Information Technology and Engineering			
Winter Semester 2022-2023			Continuous Assessment Test – I
Programme Name & Branch		M.C.A & Computer Application	
Course Code:	ITA6009	Course Title:	Cloud Computing
Class Number(s)	VL2022230500276, VL2022230500300, VL2022230500534		
Faculty Name(s)	Benjula Anbu Malar M B, Krishnamoorthy N, Arunkumar A		

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s):

Q.No.	Question	Max Marks
1.	ABC curriculum and courseware have an excellent reputation among the educators and students. The company have strong development and operational teams supporting the products. Its sales organization and departments knows as soon as prospects get their hands on the product they want it. a) Suggest a suitable cloud service for the given scenario? Define the service and give the characteristics (4 marks) b) Identify the suitable cloud deployment model and give its benefits (4 marks). c) Justify your answer (2 marks).	10
2.	Elucidate on the storage virtualization in an educational sector. List the various services in the storage virtualization with a neat diagram.	10
3.	Elaborate in detail the NIST cloud computing architecture with a neat diagram.	10
4.	a) Large and small scale business sees the increase the productivity in the cloud. What are the business benefits involved in the cloud architecture b) What are the essential things to be taken in concern by users before migrating to cloud computing environment platform?	10
5.	Identify cloud actor that manages the use, performance and delivery of cloud services, and negotiates relationships between cloud providers and cloud consumers. Explicate with a neat a diagram and with suitable scenario.	10

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Continuous Assessment Test - 1

Course Name & code: ITA5004- Object Oriented Programming using JAVA **(Slot:** A2)
Programme Name & Branch: MCA **Class Number:** VL2022230500239/0294/0268

Faculty Name: Prof. B K Ray/Prof. Thanga Mariappan L/Prof. Shynu P.G. **Duration:** 90 min **Max Marks:**50

Answer All (5 x 10 marks)

1) Create a Java program that sorts arrays *using method overloading*. The program should have overloaded methods named `sortArray()` that can handle the following array types:
Integer arrays: Pass an integer array, sort it in ascending order, and return the sorted array.
Double arrays: Pass a double array, sort it in ascending order, and return the sorted array.
String arrays: Pass a String array, sort it alphabetically, and return the sorted array.

Prompt the users to select the type of array they want to sort (e.g., 1 for Integer, 2 for Double, 3 for String). Ask the user to enter the number of elements in the array. Display the sorted array to the user after processing. Check if the user's choice for the type of array is valid (1, 2, or 3). If not, display an error message and prompt the user to re-enter their choice. Validate that the number of elements the user enters is a positive integer. If not, display an error message and prompt the user to re-enter the number of elements.

2) Create a Java program that simulates an online store's inventory management system. The system should include the following classes: Product, Category, and Inventory.
   - Product class: This class should have a product ID, name, price, and a Category object. Create a constructor that takes these parameters and initializes the class variables. Define a toString() method to display the product's information.
   - Category class: This class should have a category ID and a category name. Create a constructor that takes these parameters and initializes the class variables. Define a toString() method to display the category's information.
   - Inventory class: This class should have a list of Product objects. Implement the following methods:
     - addProduct(Product product): Adds a product to the inventory.
     - removeProduct(int productID): Removes a product from the inventory by its product ID.
     - updateProductPrice(int productID, double newPrice): Updates the price of a product by its product ID.
     - searchProductByCategory(Category category): Searches for products by their category and returns a list of matching product objects.
     - displayInventory(): Displays the entire inventory.

Demonstrate *passing and returning of objects*, focusing on the interaction between the Product, Category, and Inventory classes. For example, when adding a product to the inventory, pass a Product object to the addProduct() method. When searching for products by category, pass a Category object to the searchProductByCategory() method, which returns a list of Product objects.

3) Create a Java program that simulates a vehicle service management system. The program should demonstrate *method overriding and polymorphism using an inheritance hierarchy* of different vehicle types. Implement the following classes:

Vehicle: This class should have attributes such as vehicle ID, make, model, and manufacture year. Include methods to get and set the attributes and a toString() method to display the vehicle's information. Define an

abstract method `service()` that will be overridden in the subclasses. **Car**: This class should inherit from Vehicle. It should have additional attributes specific to cars, such as body type and number of doors. Override the `service()` method to display the service details, including a message like "Car service includes engine check, tire rotation, and brake inspection." **Motorcycle:** This class should inherit from Vehicle. It should have additional attributes specific to motorcycles, such as engine displacement and whether it has ABS. Override the `service()` method to display the service details, including a message, "Motorcycle service includes engine check, chain lubrication, and brake inspection." **Truck**: This class should inherit from Vehicle. It should have additional attributes specific to trucks, such as payload capacity and the number of axles. Override the `service()` method to display the service details, including a message like "Truck service includes engine check, tyre rotation, and suspension inspection."

Create a ServiceCentre class to manage the vehicles and their services. Implement the following methods:

- addVehicle(Vehicle vehicle): Adds a vehicle to the service centre.
- removeVehicle(int vehicleID): Removes a vehicle from the service centre by its vehicle ID.
- displayVehicles(): Displays all vehicles in the service centre.
- performService(int vehicleID): Performs the service for a vehicle by calling the service() method, which should display the appropriate service message based on the vehicle type.

4) Demonstrate *how to use abstract classes and interfaces* to model the scenario given in **Q. No-3**. Write down suitable assumptions required for the design and write the program with the explanation.
5) Implementing suitable *exception-handling* requirements ensures that the Vehicle Service Management System in **Q. No-3** runs smoothly and provides a user-friendly experience. Implement the following three exception-handling requirements to ensure the program runs smoothly and handles potential errors: (1) **Invalid user input**: - Check for invalid user input when adding a new vehicle or performing other operations. If the input does not match the expected format or value range, throw a custom exception `InvalidInputException` with an appropriate error message. Catch the exception and prompt the user to re-enter the input. (2) **Vehicle not found**: - When attempting to remove a vehicle, perform a service, or display details for a specific vehicle, check if the vehicle with the given vehicle ID exists in the service centre. If not, throw a custom exception `VehicleNotFoundException` with an appropriate error message. Catch the exception and inform the user that the vehicle ID was not found. (3) **Duplicate vehicle ID**: - When adding a new vehicle to the service centre, check if a vehicle with the same vehicle ID already exists. If so, throw a custom exception `DuplicateVehicleIDException` with an appropriate error message. Catch the exception and ask the user to provide a unique vehicle ID.

Best Wishes!!!