Final Assessment Test (FAT) - May 2024

Programme	M.C.A.	Semester	WINTER SEMESTER 2023 - 24
Course Title	CLOUD COMPUTING	Course Code	PMCA506L
Faculty Name	Prof. Anusooya G	Slot	F2+TF2
		Class Nbr	CH2023240501395
Time	3 Hours	Max. Marks	100

General Instructions:

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

Section - I
Answer all questions (4 X 15 Marks = 60 Marks)

01. The Avatar company has a video transcoding application that helps monitor violent activities in public places. The processing of the large volume of videos requires the maintenance of a separate queue. The backlog of videos awaiting processing is substantial. Since it is a violence detection video, an immediate response needs to be given by Avatar to the appropriate reporting authorities, but they lack processing capabilities. **[15]**

a) Is it possible for Avatar to switch to a cloud platform to carry out efficient and on-time video processing? (3 Marks)

b) How can multiple machines in the cloud handle the simultaneous load? (3 Marks)

c) Describe steps to track the CPU utilization of multiple running machines. (3 Marks)

d) Discuss security concerns when processing video applications on the Avatar cloud platform. (3 Marks)

e) Can we visualize the batch processing of videos on a cloud platform as multi-tenant clouds? Justify in detail. (3 Marks)

02. In the past decade, chemical and biological laboratory experiments have generated an explosive amount of data. As a result, a set of applications that manipulate these dynamic, heterogeneous, and massive amounts of data has emerged. An example of such application in the pharmaceutical industry is the computational process involved in the early drug discovery of lead drug candidates for a given target disease. The discovery of lead drug candidates requires both consecutive and random data access to the pharmaceutical drug candidate database. **[15]**

a. Which cloud model will be best suited to focus on performance enhancement techniques for the pharmaceutical drug candidate database application? Explain. (5 marks)

b. Argue the difference between static load balancing and dynamic load balancing in the context of the drug candidate database application. (4 marks)

c. Illustrate scalability approaches to load balancing techniques for the above scenario. (6 marks)

03. Diana is a Mac freak who frequently buys the latest Apple products on the market. She [15] purchased the latest Apple product using an e-commerce platform, but she was dissatisfied with the product delivery, which she experienced during the product's unpacking. While she tried to return the product, she experienced a long waiting time and difficulty viewing her payment details. She couldn't reach the customer support team through the mail due to the long waiting queue on the e-commerce platform. Help Diana sort out her issue by answering the following scenario-related questions:

a) How do microservices help address the aforementioned issue? Justify your explanation by mentioning each issue and corresponding solution (5 marks).

b) What is the role of microservice protocols in reducing Diana is a Mac freak who frequently buys the latest Apple products on the market. She purchased the latest Apple product using an e-commerce platform, but she was dissatisfied with the product delivery, which she experienced during the Apple unpacking. While she tried to return the product, she experienced a long waiting time and difficulty viewing her payment details. She couldn't reach the customer support team through the mail due to the long waiting queue on the e-commerce platform. Please assist Diana in resolving her issue by providing answers to the following questions that pertain to the scenario: latency and customer wait times? (2 Marks)

c) Will we adopt server-less architecture to reduce the associated delays? Provide the solution architecture with a detailed explanation. (5 Marks)

d) Describe the process of achieving application isolation using Dockers. (3 Marks)

04. Your startup company focuses on developing solutions in health care for Artificial Intelligence [15] (AI)-based applications. You must evaluate infrastructure options to support the development and deployment of AI applications as your company expands its operations.

a) Propose a deliberate plan for selecting and migrating to an IaaS platform that aligns with your company's goals and objectives. (8 marks)

b) Provide a perception of the potential challenges and mitigation strategies associated with adopting IaaS for hosting AI applications in the healthcare industry. (7 marks)

Section - II
Answer all questions (4 X 10 Marks = 40 Marks)

05. A Cloud Service Provider has created dozens of tools and technologies to automate various [10] aspects of data center operations. Many questions arise concerning the tools. Which is the best? Does a given data center need to use more than one? Do they all work well together, or are there cases where two or more tools attempt to follow conflicting choices? Perhaps the most puzzling question is: "Why have so many tools been designed?" Justify your perspectives on understanding the data center of your choice.

a) Is operating a data center an extremely complex task? Justify. (5 marks)

b) Is it easiest to automate each small part of the task independently? Elaborate on your answer. (5 marks)

06. Fulcrum Technologies is a fast-growing company providing software-as-a-service (SaaS) that [10] helps telecom companies, including mobile phone companies, manage their widespread, multisite inventories of equipment, parts, and site infrastructure. Fulcrum Technologies is a company managing close to 100 servers with one-off manual configuration scripts. Fulcrum's infrastructure was split about evenly between the development environment and the production environment, which hosts Fulcrum's software delivered as a service. The SaaS environment was

growing quickly, and for each new customer, Fulcrum needed to spin up at least two new instances of the application. The primary challenge is to overcome the manual configuration for the above-mentioned application.

a) What are your guiding principles for automating the above scenario? (7 marks)

b) Discuss your approach in detail. (3 marks)

07. Genuine Parts Company is one of the busiest websites, getting approximately 2.5 billion requests a month. It's hit by approximately 57 million threats every month. Suggest and explain a suitable cloud service provider that can block all 57 million threats. **[10]**

08. Design Map Reduce the programming approach to identify the similar names of students in MCA who studied at VIT (Vellore, Chennai, and Bhopal). Provide a step-by-step explanation for narrowing down the given problem with intermediate architecture flow diagrams. **[10]**

⟺⤫⟺