MODEL QUESTIONS

Become a Tech-Savvy Entrepreneur

Theory Based Model Questions

Question 01
(a) The process of a typical software development lifecycle involves several stages. Fill in the missing stages in the correct order.

- **1st stage** is: *Requirements gathering*
- **2nd stage** is: ....
- **3rd stage** is: ....
- **4th stage** is: *Deployment*

(b)
(i) The use of Machine Learning models in various applications requires the processing and analyzing of vast amounts of data. Which type of cloud service is most appropriate for running these Machine Learning tasks, and why?

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(ii) Autonomous vehicles use a combination of sensors and data processing to make real-time driving decisions. Identify and explain a suitable network model that allows these vehicles to communicate effectively and ensure safety.

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(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box.
List: {1 - SaaS, 2 - PaaS, 3 - IaaS, 4 - Edge Computing, 5 - Data Warehouse, 6 - Blockchain, 7 - IoT Device, 8 - VPN, 9 - Web Server}

(i) A secure and encrypted communication channel over the internet is provided by ....
(ii) The concept of storing data in a large, organized, and efficient manner for analytics is referred to as ....
(iii) In ...., data is processed closer to where it is generated, reducing latency and improving response times.
(iv) A service model that provides virtualized computing resources over the internet is known as ....
(v) A distributed ledger technology used for secure and transparent transactions is called ....

(d)
(i) Your friend believes that 'software piracy' is a beneficial act since it provides access to expensive software for free. Explain to your friend why software piracy is considered unethical and harmful.
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(ii) Many devices contribute to e-waste in the modern world. Suggest a sustainable practice that can help manage e-waste effectively.
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Question 02

(a) The OSI (Open Systems Interconnection) model is fundamental in understanding computer networking. Complete the following blanks with the correct OSI model layers:

- **Layer 1** is: ....
- **Layer 4** is: ....
- **Layer 7** is: ....

(b)

(i) Explain the role of a proxy server in a computer network. Provide two specific examples of how it can be used.

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(ii) Describe the significance of using data encryption in online transactions. Name one widely-used encryption protocol.

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(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box.

List: {1 - Full Backup, 2 - Incremental Backup, 3 - Differential Backup, 4 - Router, 5 - Switch, 6 - Firewall, 7 - IMAP, 8 - SMTP, 9 - POP3}

(i) A device that forwards data packets between different networks is called a ....

(ii) An email protocol used to retrieve messages and keep them on the mail server is ....

(iii) A backup method that copies only the data changed since the last full backup is referred to as ....

(iv) A security system designed to prevent unauthorized access to or from a private network is known as a ....

(v) An email protocol used to send messages from a client to a mail server is ....

(d)

(i) Your friend is confused about the difference between RAM and ROM. Briefly explain the difference to your friend, mentioning the purpose of each type of memory.

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(ii) Discuss one environmental impact of using non-biodegradable computer components and suggest a way to minimize this impact.

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Question 03

(a) Database Management Systems (DBMS) are crucial in handling data effectively. Complete the following statements about the features and functions of a DBMS:

- A DBMS ensures data .... to prevent unauthorized access.
- The process of automatically backing up data at regular intervals is known as ....
- A **primary key** is a unique identifier for a .... in a table.

(b)

(i) Explain the concept of normalization in a database and describe why it is essential.

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(ii) Describe the difference between **inner join** and **left outer join** in SQL, providing a brief example for each.

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(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box.

List: {1 - Foreign Key, 2 - Entity-Relationship Diagram, 3 - Composite Key, 4 - Data Redundancy, 5 - Referential Integrity, 6 - Stored Procedure, 7 - Trigger, 8 - Data Warehouse, 9 - View}

(i) A visual representation used to design and model database structure is called a ....

(ii) A field that creates a relationship between two tables and enforces data consistency is known as a ....

(iii) A set of SQL statements that execute automatically in response to specific events within the database is called a ....

(iv) The concept that ensures that relationships between tables remain consistent is referred to as ....

(v) A virtual table that displays a subset of data from one or more tables is called a ....

(d)

(i) Your classmate does not understand why backup strategies are essential in a DBMS. Briefly explain the importance of regular backups and give an example of a backup method.

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(ii) Discuss one ethical concern related to data privacy in the context of using social media platforms and suggest a way to address this concern.

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Question 04
(a) In computer architecture, the Central Processing Unit (CPU) performs critical functions. Complete the following statements about the components and functions of a CPU:

- The **ALU** (Arithmetic Logic Unit) is responsible for
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- The **CU** (Control Unit) manages
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- Registers are
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(b)
(i) Explain the difference between **volatile memory** and **non-volatile memory**, providing one example of each.
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(ii) Describe how cache memory improves the performance of a computer system.
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(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box.
List: {1 - Static RAM, 2 - Dynamic RAM, 3 - SSD, 4 - HDD, 5 - Virtual Memory, 6 - PCIe, 7 - Data Bus, 8 - Address Bus, 9 - Control Bus}

(i) A type of non-volatile storage that uses flash memory and is faster than a traditional hard disk is known as ....

(ii) The connection pathway used to transfer data between the CPU and memory is called ....

(iii) A type of volatile memory that needs to be refreshed periodically to retain data is ....

(iv) A method of extending physical memory by using storage space on a disk is referred to as ....

(v) A bus that carries the address of the memory location being accessed is called ....

(d)
(i) Your friend is confused about how an **interrupt** works in a computer system. Briefly explain what an interrupt is and give an example of when it might be used.

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(ii) Discuss one environmental impact of excessive energy consumption by data centers and suggest a way to mitigate this issue.

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Question 05
(a) The Internet of Things (IoT) has transformed how devices interact in everyday environments. Fill in the blanks in the following statements related to IoT:

- IoT devices often communicate using .... (e.g., Wi-Fi, Bluetooth, or Zigbee).
- A .... is an IoT component that collects data from the physical environment.
- The term .... refers to the processing and analysis of data close to where it is generated to reduce latency.

(b)
(i) Describe how a **B2B (Business-to-Business)** e-commerce model operates, and give one example of a B2B transaction.

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(ii) Explain the **G2E (Government-to-Employee)** e-commerce model and describe one potential benefit it offers.

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(c) For the box in each of the following statements, select a suitable replacement from the given list and write the number of the selected replacement in the box.
List: {1 - C2C, 2 - G2G, 3 - B2E, 4 - G2C, 5 - B2C, 6 - Edge Computing, 7 - Actuator, 8 - Software Agent, 9 - Sensor}

(i) An IoT component that performs actions in response to received signals is called a **..................................**
(ii) A software entity that autonomously performs tasks on behalf of a user is known as a **..............................**
(iii) A model where citizens interact with government services online is referred to as **..................................**
(iv) A system that allows businesses to sell directly to individual customers is called **..................................**

(v) A type of computing that processes data near its source rather than in a centralized data center is called
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(d)
(i) Your friend is curious about the concept of **software agents**. Briefly explain what a software agent is and provide one example of how it can be used in an online shopping environment.
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(ii) Discuss one security concern related to IoT devices and suggest a method to mitigate this risk.
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Question 06

(a) Write down the most suitable items from the given list for the following statements:
List: {*cloud storage, edge computing, IoT devices, data encryption*}

(i) .... is used to ensure that sensitive information is secure and protected from unauthorized access.
(ii) .... refers to devices that are connected to the internet and can collect and exchange data.

(b) Write the most appropriate word or phrase to answer the following questions based on the description given below.

The new online ticket reservation system introduced for public transportation in Sri Lanka has revolutionized booking convenience. The system requires significant server capacity during peak hours (e.g., morning and evening rush hours) but remains underutilized during off-peak hours. This leads to challenges in maintaining cost-effective infrastructure.

(i) One of the solutions considered is to permanently invest in server hardware to handle peak loads. What is the main *disadvantage* of this approach?
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(ii) What is an *alternative solution* to efficiently handle the varying resource demands mentioned in (b)(i) while maintaining system performance?
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Question 07

(a) Write down the most suitable items from the given list for the following statements:
List: {*smart home systems, vehicle-to-vehicle communication, smart agriculture, environmental monitoring*}

(i) .... refers to the use of IoT technology to automate and manage systems within a household, such as lighting and security.
(ii) .... uses IoT sensors to collect data and improve crop yield and efficiency in farming practices.

(b) Write the most appropriate word or phrase to answer the following questions based on the description given below.

A new smart city project has been launched to manage urban infrastructure efficiently. The project uses IoT-based environmental sensors to monitor air quality, noise levels, and energy consumption in real time. However, it has been observed that during certain times, such as festivals or events, the network experiences high traffic, while it remains underutilized at other times.

(i) One approach is to maintain a fixed amount of network bandwidth for the sensors, which is designed to handle peak usage. What is the main *disadvantage* of this approach?
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(ii) Suggest an *alternative solution* to overcome the disadvantage mentioned in (b)(i) that efficiently manages varying network demands.
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Python Based Model Questions

Question 01

(a) Consider the following Python code snippet:

```python
def compute_values(n):
    values = []
    for i in range(3, n):
        if i % 3 == 0:
            values.append(i)
    print(values)

compute_values(20)
```

(i) What is the output of the above Python code?

(ii) Modify the above code so that the condition `if i % 3 == 0:` is replaced with `if i % 2 == 0:`. Write down the new output.

(b) The code below is designed to find the smallest value in a list of integers. Fill in the blanks with appropriate Python code to make it work correctly.

```python
def find_smallest(myList):
    smallest = Ⓐ
    for i in Ⓑ:
        if i < Ⓒ:
            smallest = Ⓓ
    print("Smallest value is", Ⓔ)

list1 = [12, 3, 45, 7, 89, 2]
find_smallest(Ⓕ)
```

- Ⓐ: ....
- Ⓑ: ....
- Ⓒ: ....
- Ⓓ: ....
- Ⓔ: ....
- Ⓕ: ....

Question 02

(a) What is the output of the following Python code?

```python
text = "A/Level Python Exam"
result = ""
for char in text:
    if char in ("A", "/", "E", "x", "m"):
        pass
    else:
        result += char
print(result)
```

Answer: ....

(b) What code line(s) in part (a) is/are to be modified to get `"A/Exam"` as the output?

1. ....
2. ....
3. ....

(c) Fill in the blanks for the following Python code. Assume that the purpose is to append the content of one text file (file1) to another text file (file2):

```python
file1_name = input("Enter the name of the first text file: ")
file2_name = input("Enter the name of the second text file: ")

f1 = open(_____, "r")
f2 = open(_____, "a")

for line in _____:
    f2.write(_____)

f1._____
f2._____
```

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Question 03

(a) What is the output of the following Python code snippet?

```python
def calculate_sum(limit):
    total = 0
    for number in range(1, limit + 1):
        if number % 4 == 0:
            total += number
    print(total)

calculate_sum(16)
```

Answer: ....

(b) Modify the above code so that it only adds numbers that are **not** divisible by 4. Write down the new output.

1. **Modified code line(s):** ....
2. **New output:** ....

(c) The code below is meant to read and process data from a text file. Complete the blanks to ensure the code correctly counts the number of lines in a text file:
file_name = input("Enter the name of the text file: ")

f = open(_____, "r")
line_count = 0

for line in f:

    _____

print("Total number of lines:", _____)

f._____

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- **Fourth blank:** ....

Question 04

(a) Analyze the following Python code and state the output:

```python
def check_prime(n):
    if n < 2:
        return False
    for i in range(2, n):
        if n % i == 0:
            return False
    return True

def count_primes(limit):
    prime_count = 0
    for number in range(1, limit + 1):
        if check_prime(number):
            prime_count += 1
    print(prime_count)

count_primes(10)
```

Answer: ....

(b) Modify the `count_primes` function so that it returns the sum of all prime numbers instead of counting them. Write the modified code and the new output.

1. **Modified code:**

```
def count_primes(limit):
    prime_sum = 0
    for number in range(1, limit + 1):
        if check_prime(number):
            prime_sum += number
    print(prime_sum)
```

New output: ....

(c) The following code snippet is designed to read a list of integers from a text file and calculate the average. Fill in the blanks to make the code work correctly:

file_name = input("Enter the name of the text file: ")
f = open(_____, "r")

numbers = []
for line in f:
    numbers.append(int(_____))

average = sum(numbers) / len(_____)
print("The average is:", average)

f._____

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