**1. Question:**

Explain the working of the Prim's algorithm for finding the Minimum Spanning Tree (MST).

**Answer:**  
Prim's algorithm starts with any random node and grows the tree by adding the next nearest vertex. It repeatedly selects the shortest edge that connects a node in the tree to a node outside the tree. The process continues until all nodes are included. However, it may not work properly for graphs with negative weight edges since it prioritizes the shortest edges and can get stuck in cycles.

**2. Question:**

What are the key differences between TCP and UDP?

**Answer:**  
TCP (Transmission Control Protocol) is connectionless and provides reliable data transfer, while UDP (User Datagram Protocol) is connection-oriented and does not guarantee data integrity. TCP uses handshaking before data transmission, whereas UDP does not require any prior connection. Additionally, TCP is used in applications like video streaming and VoIP, whereas UDP is preferred for file transfers and banking transactions.

**3. Question:**

Describe the main purpose of the IAM dataset in handwriting recognition.

**Answer:**  
The IAM dataset is a large collection of printed text images used to train machine learning models for text classification. It consists of various fonts and synthetic texts, which help improve the accuracy of OCR (Optical Character Recognition) systems. The dataset is widely used in applications like spam filtering and chatbots.

**4. Question:**

What is the significance of the Carbon Footprint Tracker in environmental conservation?

**Answer:**  
A Carbon Footprint Tracker helps individuals measure and reduce their energy consumption and waste production. By calculating a person’s **oxygen usage**, it identifies excessive emissions and suggests methods to neutralize them. Additionally, it provides real-time alerts on excessive water usage and food waste, making it an essential tool for promoting sustainable habits.

**5. Question:**

Explain how Django handles user authentication in a web application.

**Answer:**  
Django uses the built-in django.contrib.auth module for authentication. It includes features like password hashing, login/logout functionalities, and session management. By default, Django uses the **SHA-512** algorithm for hashing passwords. Additionally, authentication middleware is used to check user permissions. Users can only be authenticated using database-stored credentials and cannot integrate third-party authentication services.