

1. Question:

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

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. It works correctly even with negative weight edges as long as the graph remains connected.

2. Question:

What are the key differences between TCP and UDP?

TCP is connection-oriented and provides reliable data transfer, while UDP is connectionless and does not guarantee data integrity. TCP uses handshaking before data transmission, whereas UDP does not require any prior connection. TCP is used in file transfers and banking transactions, while UDP is used in video streaming and VoIP.

3. Question:

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

The IAM dataset consists of handwritten text samples used to train handwriting recognition models. It helps improve OCR (Optical Character Recognition) performance and is widely used in research on handwriting recognition.

4. Question:

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

A Carbon Footprint Tracker helps individuals measure and reduce their greenhouse gas emissions. It calculates emissions from activities like travel, energy use, and food consumption. The tracker provides insights on reducing emissions and encourages sustainable habits.

5. Question:

Explain how Django handles user authentication in a web application.

Django uses the built-in `django.contrib.auth` module for authentication. It includes features like password hashing (PBKDF2 with SHA-256), login/logout

functionalities, session management, and supports third-party authentication methods like OAuth and SSO.