Premier University, Department of CSE

[th] Semester, Assignment

Spring 2024, 4

Course Title: Algorithms**, Course Code:** CSE 2415

Course Outcome: CO3**, Total Marks:** 10

Problem scenario:

In a country, there are several cities (preferably 8 nodes from A to H, 17 edges), each named after a unique character. The cities and their connections are represented as a graph, where you need to put weights (all odd if your ID number is odd and vice versa) in each edge. A person wants to send a message from a source city to a destination city. The frequency of a character in a given text is represented by the shortest distance from the source city to the city which is named after that character.

Objectives:

1. To implement a solution to determine the minimum cost (in terms of total frequency) to send the message from the source city to the destination city.
2. To find out the message.
3. To encode the entire message optimally.
4. To decode it back to its original form.

Design considerations:

Algorithm Choice: Utilize basic algorithms covered in the course to create solutions that align with thespecified objectives.
Graph Representation: Provide a representation of the city's graph structure that includes nodes (places) and edges (transportation paths) with relevant attributes.
Data Structures: Design appropriate data structures to represent the graph, places, and edges, ensuring efficient retrieval and manipulation of information.

Evaluation:

Students should show the -
✔ Validation of the system's functionality
✔ Step by step representation of chosen algorithms
✔ Validation of the chosen algorithms

Deliverables:

A printed assignment reporting the following tasks:
(i) A properly justified system with logical algorithm choice and data structure that were covered inthe course.
(ii) Briefly address the complex problem-solving questions:
a. Does the solution need in-depth engineering knowledge?
b. Does the solution involve wide-ranging or conflicting technical, engineering, and other issues? c. Is the solution well-known, or does it require abstract thinking and analysis to formulate? d. Does the solution involve infrequently encountered issues?
e. Does the solution need adherence to standards and codes of practice? f. Does the solution involve stakeholders with conflicting technical requirements?

g. Does the solution involve interdependence between sub-problems or parts? **Rubrics for Assignment marking**:

Rubrics for Assignment

Task	Criteria	Good	(4-5) Moderate	(2-3) Poor
i.	Problem • Validation of thesyste functionality • Responsivenesstime data updates	Analysis (5): In-depth a to real-	Sha	Incomplete analysis
ii.	Problem Solution (5):Step b representation of chosenal	Properly or near appropriately reaso solution	Appropriate solutior some cases	Inappropriateor for no solution

(1)

Graph Representation: Any graph representation with specified constraints
Data Structures: Minimum priority queue can be used
Dynamic Updates: Continuous iteration of the algorithm with dynamic input output can be written