

Premier University, Department of CSE
Fall 2023, 5th Semester, Assignment, December 13, 2023
Course Title: Computational Methods for Engineering Problems, **Course Code:** CSE 301
Course Outcome: CO3, **Total Marks:** 10

You are tasked with developing a software module for a traffic management system in Bangladesh. The system needs to predict traffic congestion at specific locations based on historical traffic data. Interpolation is to be used to estimate traffic conditions at times for which data is not available.

Objectives:

The objectives of your solution include:

1. To implement a system that takes the historical traffic data and target times as input.
2. To use interpolation to estimate traffic congestion levels at the target times based on the available historical data.
3. To be able to handle different degrees of interpolation, allowing flexibility in adjusting the complexity of the interpolation.
4. To ensure that the system provides meaningful warnings or errors when the chosen target times are outside the range of the historical data.

Investigation:

With respect to a set of traffic data points consisting of time and traffic congestion levels at various locations analyze a list of target times for which traffic congestion predictions are required.

Evaluation:

Students need to prove her/his skills in interpreting complex engineering problems, analysis capabilities and ability to estimate proper design technique concisely and comprehensively.

Design:

Students' solution design must achieve the given objectives.

Deliverables:

A printed assignment reporting the following tasks:

- i. A properly reasoned solution using interpolation technique.
- ii. Briefly address the complex problem-solving questions:
 - Does problem-solving need in-depth engineering knowledge?
 - Does the problem-solving involve wide-ranging or conflicting technical, engineering and other issues?
 - Is the solution well-known or require abstract thinking and analysis to formulate?
 - Does the problem-solving involve infrequently encountered issues?
 - Does problem-solving need adherence to standards and codes of practice?
 - Does the problem-solving involve stakeholders with conflicting technical requirements?
 - Does the problem-solving involve interdependence between sub-problems or component parts?

Rubrics for Assignment marking:

Task	Criteria	Good (4-5)	Moderate (2-3)	Poor (1)
i.	Problem analysis	In-depth analysis	Shallow analysis	Incomplete analysis
ii.	Problem solution	Properly or near appropriately reasoned solution	Appropriate solution for some cases	Inappropriate or no solution