CSE 2216 : DSA 1 Lab Assignment

Fall 2024

January 12, 2025

Problem 1: Evaluate Postfix Expression Using Stack

Problem Description:
Given a postfix expression, evaluate its value using a stack. The expression consists of integers and the operators `+`, `-`, `*`, `/`.

Input:

- A string `expr` representing a postfix expression.

Output:

- The evaluated result of the postfix expression.

Example:

- Input: `expr = "5 1 2 + 4 * + 3 -"`
- Output: `14`

Problem 2: Reverse First k Elements of a Queue

Problem Description:
Given a queue, reverse the first k elements while keeping the order of the remaining elements unchanged.

Input:

- An integer k.
- A queue of integers.

Output:

- The modified queue after reversing the first k elements.

Example:

- Input: $k = 3$, Queue = [1, 2, 3, 4, 5]
- Output: [3, 2, 1, 4, 5]

Problem 3: Shortest Path in an Unweighted Graph Using BFS

Problem Description:
Given an unweighted graph represented as a list of edges, find the shortest path from a given source vertex to all other vertices using Breadth-First Search (BFS).

Input:

- An integer V (number of vertices).
- An integer E (number of edges).
- A list of edges, where each edge is represented as a pair (u, v) indicating an undirected edge between vertices u and v.
- A starting vertex `start`.

Output:

- The shortest distance from the source vertex to every other vertex.

Example:

- Input:

```
V = 5, E = 6
edges = {(0, 1), (0, 2), (1, 3), (1, 4), (2, 4), (3, 4)}
start = 0
```

- Output:

```
Distance from 0: [0, 1, 1, 2, 2]
```

Instructions and Submission Guidelines

Instructions:

- You need to submit a report (PDF) containing the simulation of the given sample inputs and outputs.

Submission Guidelines:

- Keep your code file(s) and the PDF file into a folder named `<YourID>`.
- Zip the folder and submit it.

Deadline:

- **30th January (Thursday), 11:55 pm.**