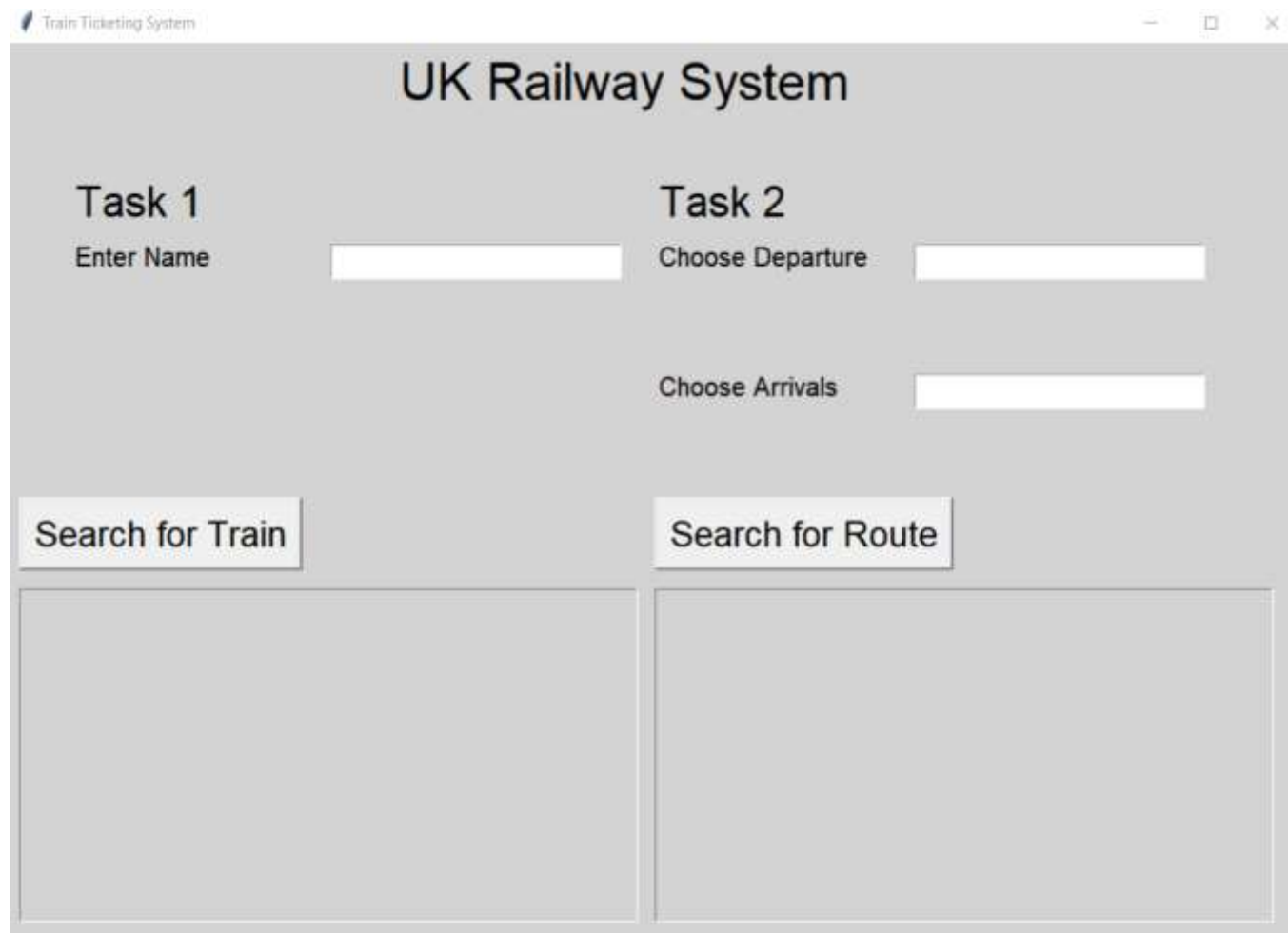


## Task 2: Design

Both Task 1 & 2 use a single unified interface which is show below:



The screenshot shows a window titled "Train Ticketing System" with a main header "UK Railway System". Below the header, there are two columns. The left column is labeled "Task 1" and contains the text "Enter Name" followed by a text input field. The right column is labeled "Task 2" and contains the text "Choose Departure" followed by a text input field, and below that, "Choose Arrivals" followed by another text input field. At the bottom of the Task 1 column is a button labeled "Search for Train". At the bottom of the Task 2 column is a button labeled "Search for Route". Below each button is a large, empty rectangular box for displaying results.

As we know that Task 2 is related to efficient calculation path from one station to another, two classes are used for this purpose. The details of both the classes along with their relevant functions are listed below:

### 1. RailwayMap

This class implements a graph to store a network of railway stations. Following are the functions used in the class for task2:

- **add\_edge**

This function is responsible for adding new vertices and edges in the graph. For each new entry, it updates the `adjacency_list` and the `cost_list` which are the members of this class.

## 2. RailwayNetwork

This class uses an object of the RailwayMap class to load the data stored in railway\_network.csv. Following are the functions used in task 2 from this class:

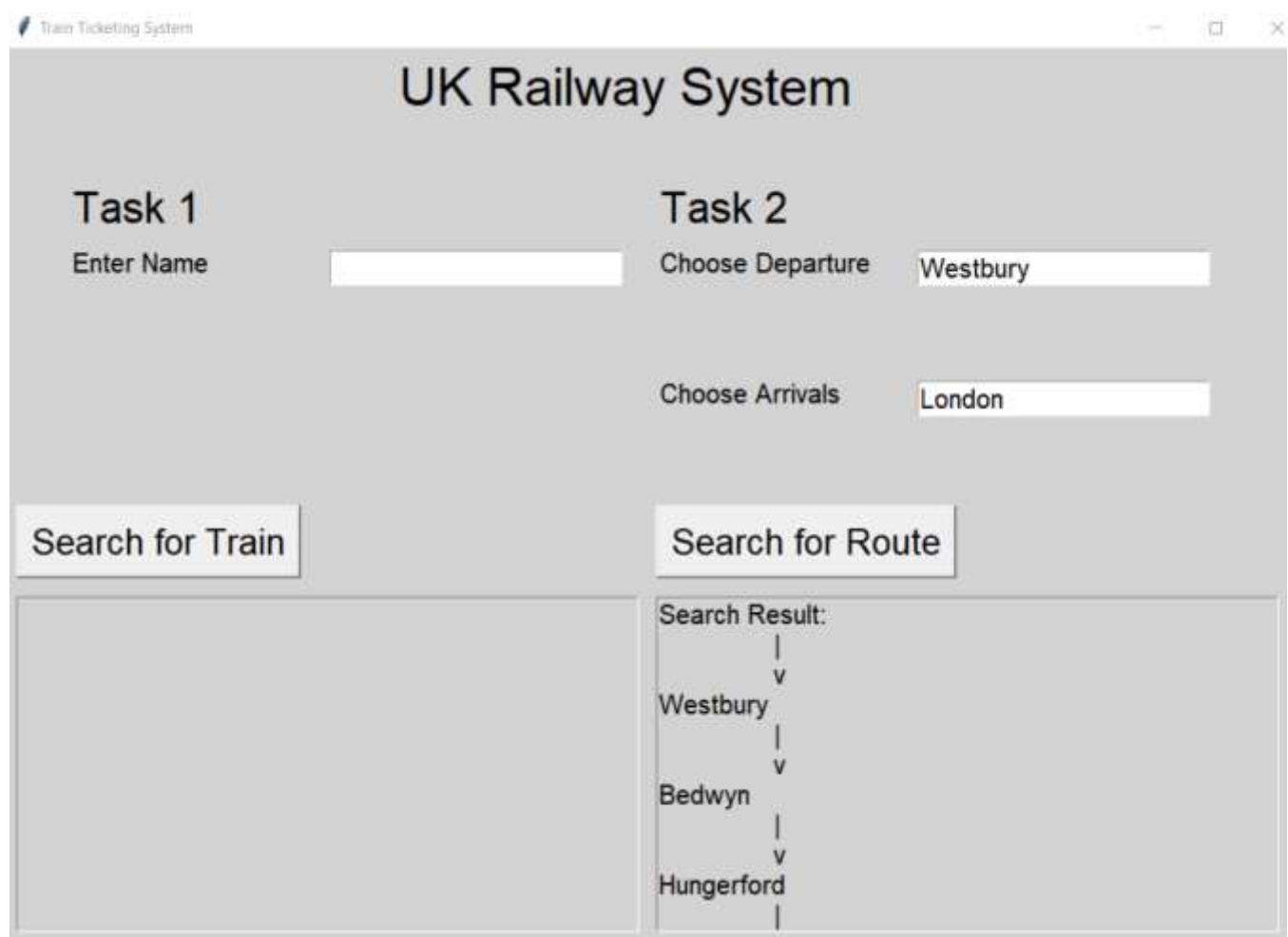
### 1. load\_railway\_stations\_data

This function accepts a csv filename as parameter and loads the file contents into an object of *RailwayMap*. The *RailwayMap* uses adjacency\_list and the cost\_list to implement the graph. For each new entry, a new element is append into the adjacency list and corresponding cost is stored in the cost list.

### 2. search\_railway\_path

This function is responsible for performing the main functionality required in task 2 . It implements Dijkstra search algorithm for to find the shortest path between source and destination railway stations.

## OUTPUT



The screenshot shows a window titled "Train Ticketing System" with a header "UK Railway System". It contains two main sections: "Task 1" and "Task 2".

**Task 1:** Labeled "Enter Name", it has an empty text input field.

**Task 2:** Labeled "Choose Departure", it has a dropdown menu with "Westbury" selected. Below it, labeled "Choose Arrivals", is a dropdown menu with "London" selected.

There are two buttons: "Search for Train" and "Search for Route".

The "Search Result:" section displays a vertical path: Westbury, Bedwyn, and Hungerford, connected by downward arrows (v).