

Getting Started:

(3 points)

Create a new Java project called `Final_2420`

In the `src` folder create a package called `finalCode`

Add the following class: `ExerciseFinal` It should include a main method.

Add a folder inside the package `finalCode`. It should be called `Resources`.

Add `algs4.jar` to the buildpath.

Style / Best Practices:

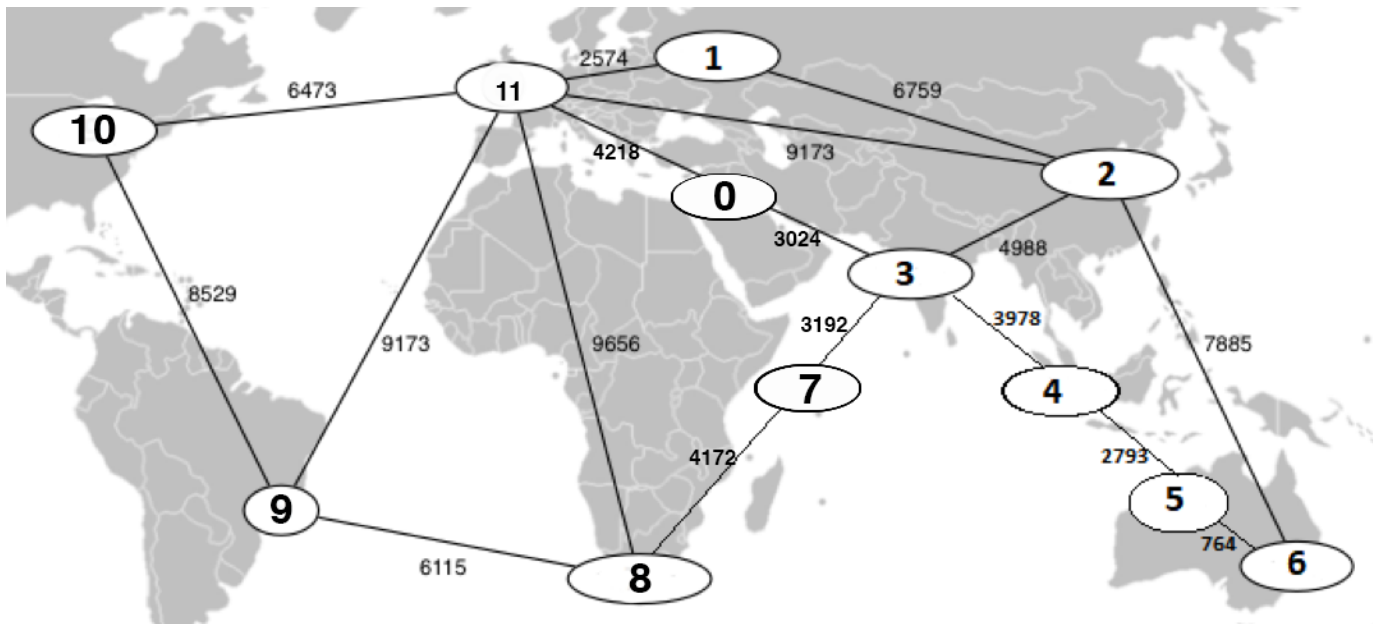
(5 points)

Make sure to follow best practices like using doc comments, following Java naming conventions, using descriptive names, using proper indentation, avoiding absolute paths when accessing files, etc.

IMPORTANT REQUIREMENTS:

1) Use classes from `algs4` and `java.lang` only.

2) Avoid hardcoding. The code still needs to work if I run it with a graph that is based on a different map.

ExerciseFinal:**Directions Part A** (23 points)

- Create a graph file based on the graph shown above and name it `Route.txt` (6 points)

It should be stored inside the `Resources` folder.

FYI: Some might choose to create another graph file in order to solve one of the upcoming challenges. Creating another graph file is permissible.
- The map above shows the network of an organization that engages in illegal activities. The vertices mark centers of their operation.

In order to break up the network, the CIA sends agents to strategic locations. It is your job to write a software that helps the CIA pursue its mission.

First, provide a way for agents to select a start and destination vertex. (6 points)

The prompt should include the range of valid choices (e.g. $n1 - n2$) where $n1$ and $n2$ are the smallest and the largest vertex number. Avoid the temptation to hard-code. Instead, use the

graph file to determine at run-time what the smallest and largest vertex numbers are.

No need for input validation. You may assume that the user enters a valid number.

- Map out the best routes for your agents.

(14 points)

To minimize the risk that your agents are uncovered, find a route that takes them from start to destination passing through the minimum number of centers of operation.

Display the route as shown in the sample output (5 out of 15 points)

Directions Part B (max 18 points)

- You hear that the organization started to build “channels” between centers where they transmit large sums of money through a series of person-to-person transactions without the involvement of banks and without paper trails. Knowing that they need to connect all centers and that this form of money transfer is difficult to establish, you are convinced that they will look for the shortest way to connect all the centers. (minimum combined distance of all the required connections that are necessary to reach all the centers).

In order to intercept this illegal transactions, you need to find out, where those “channels” are.

Compute the shortest way to connect all centers.

(10 points)

- Display the minimum distance that is required. (See output below)

(4 points)

- List all the “channels” that are part of the shortest connection between the centers.

(6 points)

Use headers, labels, and single empty lines to make the output to look like the expected output.

(1 points)