

CE Internet CODE

| 11/21/2022

MISSING

10 Possible Points

Attempt 1



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Graphs

CE: Internet CODE



Learning Objectives

- Model a problem in a way that allows you to use existing algorithms to solve the challenge.



Overview

In this CE, you need to find the most cost-effective way to provide secure internet for n offices. You will write a program that determines which offices should get a router and which ones should be connected via fiber cable. In addition, you will calculate the total cost of providing internet connection to all the offices.

< [Previous](#)

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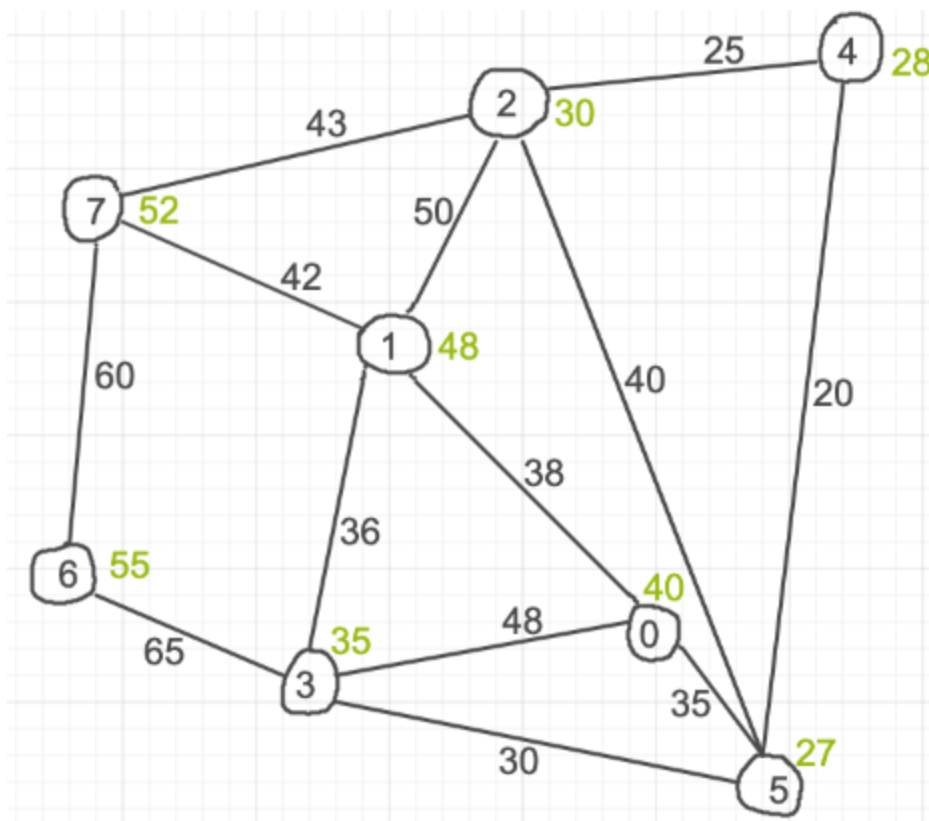
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Challenge:

Assume a company has n offices that need a secure internet connection. There are two ways for an office to obtain secure Internet: either we put a router in that office or we provide a fiber connection to another office that has internet. At least one of the offices need a router. You are tasked to find out which offices should get a router and which ones should be connected via fiber in order to minimize the total cost.

Sample Layout:

Here is a layout of one company that has 8 offices. The black numbers show the cost of connecting two offices via fiber. The green numbers show the cost of providing a router for the given office.

**Part A - Find the Right Model**

How you model a problem has a significant impact on how easy or hard it is to solve. Give yourself some time to think about the challenge described above.

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When you are ready, compare your idea with the [hint](#).


Now that you saw the hint, give yourself again some time to think it through.

How can the suggestion you just saw help you solve the challenge?

Give yourself another 5 - 10 minutes. When you are done, compare your work with the [solution](#).

Part B - Write the Code to Solve the Problem

- Create a new package called **graphInternet**
- Create a text file called **GraphInternet.txt**

It should correspond to the solution graph from the exercise described above and it should follow the structure described by Prof. Sedgewick (<http://algs4.cs.princeton.edu/43mst/>  (<http://algs4.cs.princeton.edu/43mst/>).

- Create a class called **InternetCE**. It includes the main method.

Use Kruskal's Algorithm to determine

- which offices should be connected with a fiber connection
- which offices should have a router
- the total minimum cost to provide internet to all offices rooms

Important:

Resist the temptation to print any hard-coded information. The program still needs to work if you add or remove airports from the original graph file.

The instructions above are based on an exercise from Princeton University.



Expected Output

Offices needing to be connected: 4-5 2-4 3-5 0-5 1-3 1-7

[Previous](#)

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[Next](#)

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Submission

Create a screen recording following the [guidelines for lab recordings](https://slcc.instructure.com/courses/817632/pages/guidelines-for-ce-recordings) (<https://slcc.instructure.com/courses/817632/pages/guidelines-for-ce-recordings>).

The video should be **25 - 50 seconds** long.

Post the video.

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< [Previous](#)

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[Next](#) >

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[< Previous](#)

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