22620 Computer Networks
Homework #2
Due on May 7 (Tue)

Spring 2019

Please keep in mind the following policy:

- o Submit your work at the course webpage by 23:59 on the due date.
- o When your work is not turned in on time, a late penalty will be given. Notice that it is 10% a day within a week, and thereafter, your score is 0.
- o You may discuss problems with your friends, but all work must be done individually and you must be able to prove that you understand everything that you hand in. Any copied work will be given 0, for both the copied work and the work it was copied from.

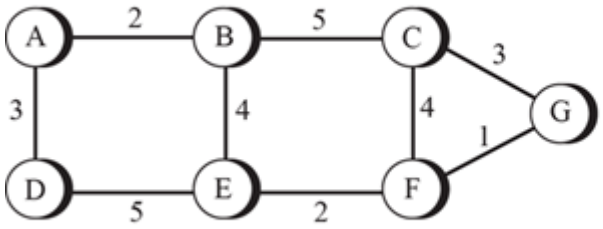
1. Exercises (problem solving)

None

2. Programming assignment

Your work is to write your own program that finds the least-cost tree rooted at a source router for unicast routing in any programming language. Refer to Chapter 20 of your textbook for the least-cost tree for unicast routing. An "internet" is modeled as an undirected weighted graph that is inputted to your program as a file of two-dimensional adjacency matrix. A source router is inputted via keyboard when your program is executed. The least-cost tree rooted at the source router should be represented as a linked list.

In order to get a high grade, you should run as many different inputs (the file input of network graph and the keyboard input of source router) as possible. The followings are examples of test inputs and outputs.



	A	B	C	D	E	F	G
A	0	2	0	3	0	0	0
B	2	0	5	0	4	0	0
C	0	5	0	0	0	4	3
D	3	0	0	0	5	0	0
E	0	4	0	5	0	2	0
F	0	0	4	0	2	0	1
G	0	0	3	0	0	1	0

<Example network graph and its adjacency matrix >

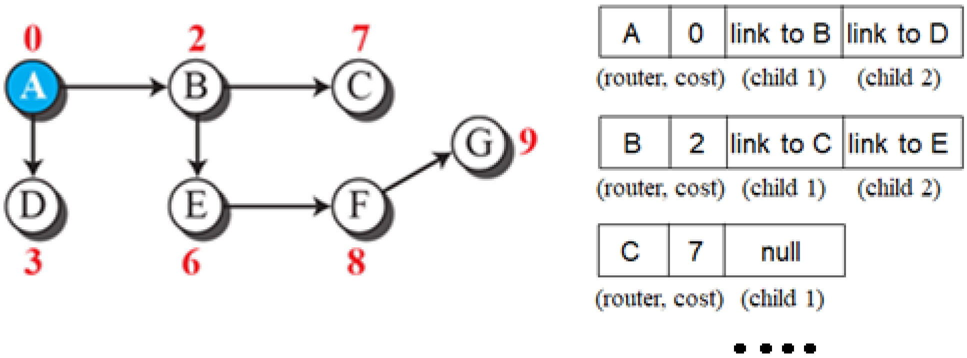
%%

% Program to find the least-cost tree for unicast routing %

%%

> Input the source router: A

<Example keyboard input>



<Example output tree and its linked list>

%%

% Program to find the least-cost tree for unicast routing %

%%

> Input the source router: A

> Least-cost tree rooted at A: (A, 0, B, D), (B, 2, C, E), (C, 7, null), (D, 3, null), (E, 6, F), (F, 8, G), (G, 9, null)

> Input the source router: B

> Least-cost tree rooted at B: (A, 2, D), (B, 0, A, C, E), (C, 5, null), • • • •

<Example output>

The below-mentioned TWO files should be turned in at the course webpage. (40 points of score)

1) Complete source code of your program
2) Technical report including the followings (*.doc, *.hwp, or *.pdf)
   a) Compile message of your program (screen capture)
   b) Input and output of your running test (screen capture)
   c) Brief description on what you have implemented and learned

3. Essay and/or reading assignment

None