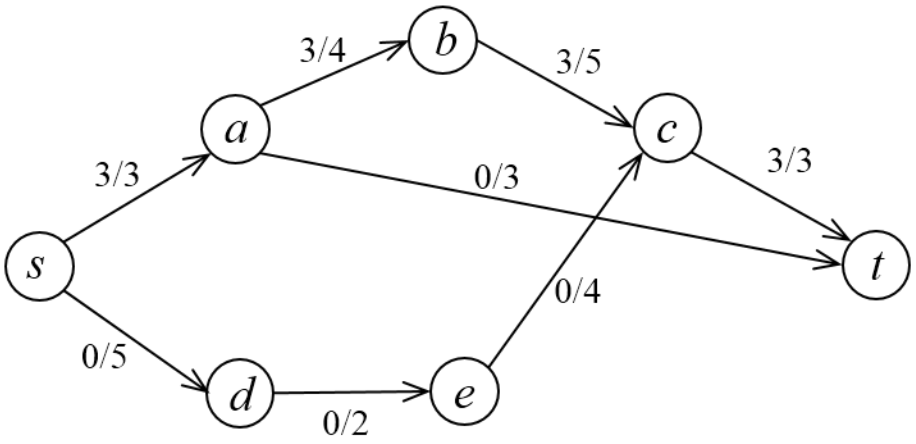
CS 594/690, Graph Algorithms, Applications and Implementations
Spring 2017, Homework 5

1. Form your groups of three for the class project. Have one member of your group email cphill25@utk.edu with the names of the three group members, your topic, and your first, second and third choices for presentation date. The dates are as follows:

   March 22
   March 29
   April 5
   April 12
   April 19
   April 26

2. The flow network below has a flow of 3. Assume we are running the Ford-Fulkerson algorithm.

   a. Draw the residual graph.
   b. Give an augmenting path.
   c. Draw the new flow network based on your augmenting path.
   d. Draw the new residual graph.



3. Write a program to list all cut vertices and bridges in an undirected, unweighted graph. The input graphs will not necessarily be connected. Your program should take the name of a graph file as a command-line argument. It should output a list of cut vertices on one line, followed by a list of bridges on the next line. The output should look very similar to the following.

```
>./findcutsandbridges graph5.txt
Cut vertices: 0 3 7
Bridges: (0,3) (6,7)
>
```

For this homework, we will compare the performance of your program versus other students in the class. The performance will not count toward your score. It is only for bragging rights. The performance times and rankings will be posted to the class website.

The following apply as usual.

- You may choose any programming language you wish, as long as your program compiles and runs when invoked from the Linux command line on the EECS Linux machines, using only software currently installed. I will test your code on one of the Hydra Lab machines.
- Do not use any library routines specifically designed for graphs (e.g. Boost).
- Include an example how to compile and/or invoke your program in a README.txt file.

Submit your program by emailing all files necessary to compile and run your code to cphill25@utk.edu prior to the beginning of class next Wednesday, February 8. Bring a hard copy of your answers to question 2 to class. If you have any questions, please do not hesitate to email me or drop by during office hours.