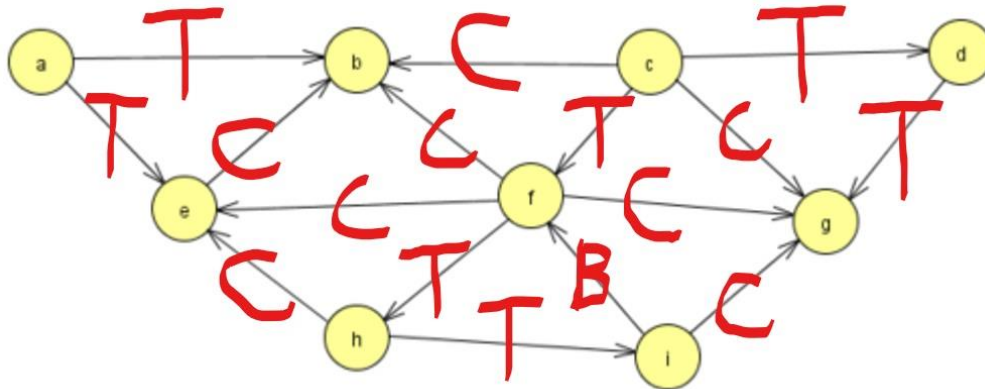# HW6 (50 point HW)

Name: Ellie Barry

1. (25) Perform Depth First Search (DFS) on the following graph. Start at **a** and visit nodes in alphabetic order. Showing a queue or stack, etc., will gain more partial credit if there are any errors. Label each edge as tree, "t"; cross, "c"; forward, "f"; or back, "b" as DFS would label it. Give the topological sort or state if it does not exist and why.

- Stack:
    - A
    - BA
    - A
    - EA
    - ---------
    - C
    - DC
    - GDC
    - DC
    - C
    - FC
    - HFC
    - IHFC
    - HFC
    - FC
    - C
- There is no topological sort since I to F is a back edge.

2. (25) A most perfect melody: You know the notes to the most perfect melody – their number and values, but you do not know the *order* of the notes. The melody should be repeated over and over. You do, however know how melodious (good) each note is when adjacent to another note and have quantified melodiousness to numbers, higher is better, and the perfect melody would have the

greatest value for each adjacent pair of notes. What problem is this a form of and how to translate this problem to the general problem, concisely (two sentences or less)?

(10) General Problem is: Knapsack

(15) Explain (basically, explain how to convert this problem to another problem from class):

This problem is a knapsack problem because you want to find the order based on the higher values so you must prioritize based on their number. In this problem compared to the knapsack general problem the melody's number is the same as the weight.