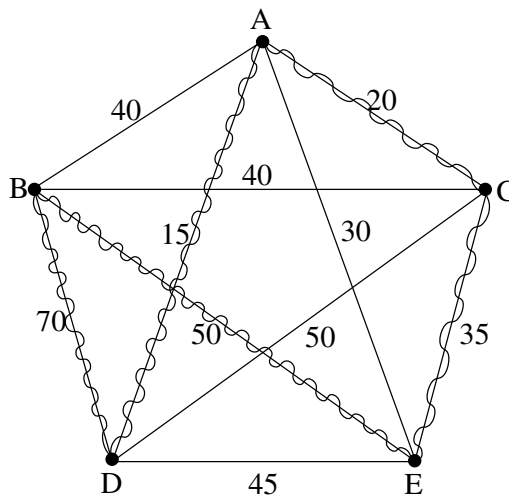
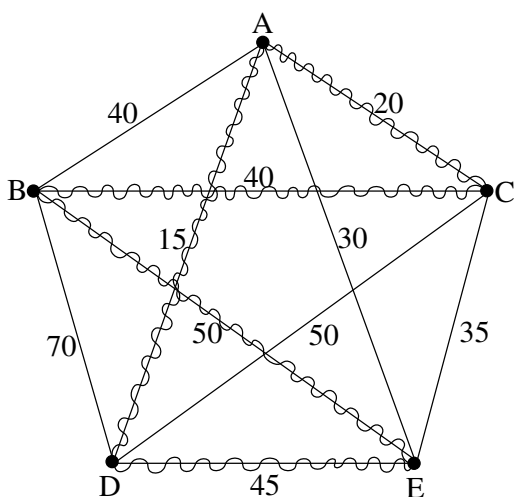


Quiz 2
 Friday, Feb. 2.

NAME _____

1. Consider the graph below (represented twice to make it easier to draw hamiltonian circuits, see questions (b) and (c)).



(a) Is the path ABECDBA a Hamiltonian circuit ?

Answer. No, since it visits vertex B twice.

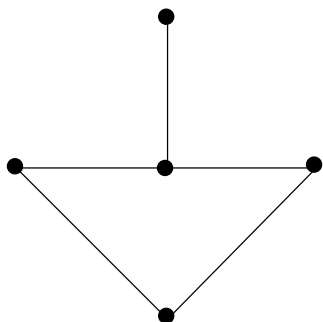
(b) Apply the nearest-neighbor algorithm starting at C ; represent the hamiltonian circuit obtained on the graph on the left above (use wiggly edges). What is the cost of the circuit you obtain ?

Answer See figure on the left above ; the cost of the circuit is $20+15+45+50+40=170$.

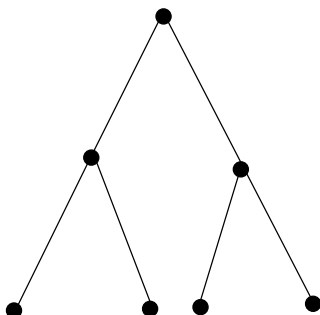
(c) Apply the sorted-edges algorithm to this graph ; use the graph on the right to represent it. What is the cost of the circuit you obtain ?

Answer. See figure on the right above ; the cost this time is $15+20+35+50+70=190$.

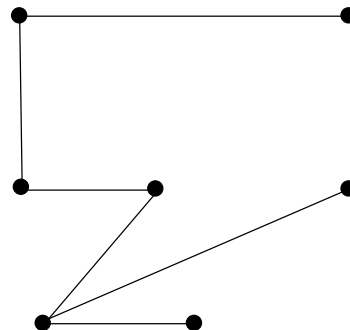
2. For each of the graphs below, state whether it is a tree or not.



I is not a tree



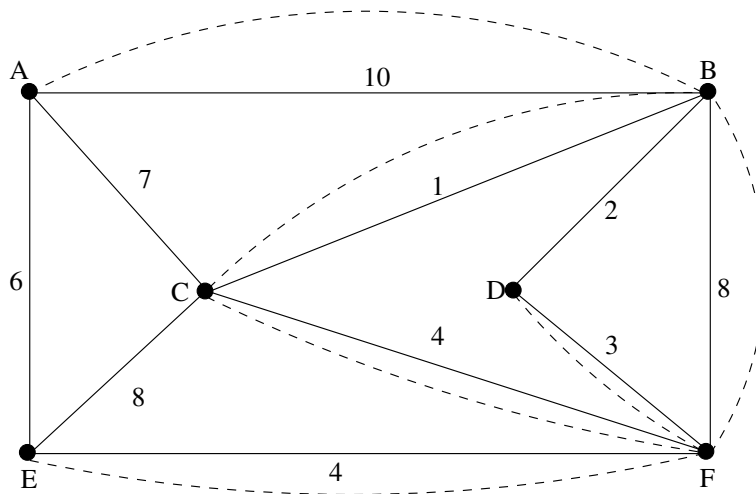
II is a tree



III is not a tree

3. A local cafe offers 3 different entrees, 10 different vegetables and 4 different salads. A Blue Plate Special includes an entree, a vegetable, and a salad. How many possible Blue Plate Specials are there?
Answer. There are $3 \cdot 10 \cdot 4 = 120$ possible Blue Plate Specials.

4. In the picture below, the dotted lines represent a student's attempt at finding a spanning tree for the graph.



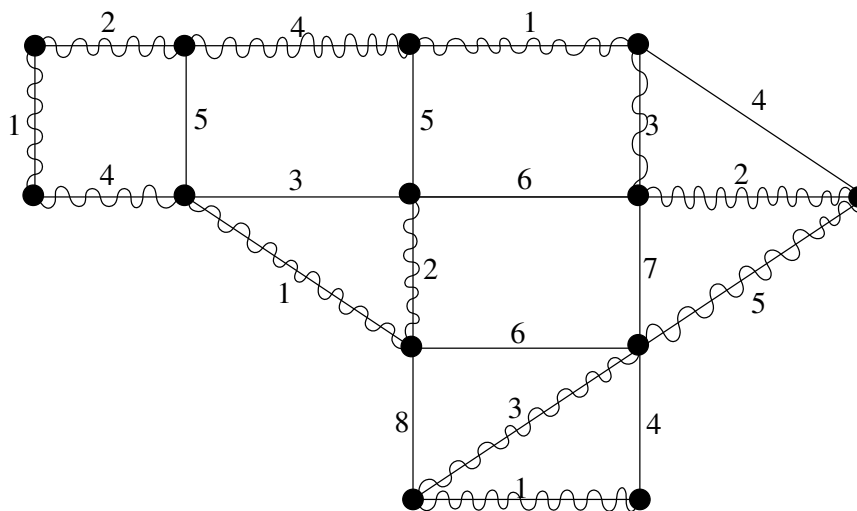
(a) Explain why the student's answer is incorrect.

The dotted lines don't make up a tree, because BCFB is a loop.

(b) Is it possible to delete one dotted line to make the answer correct? If so, which line is it best to delete?

To make the answer correct, one can delete the dotted line joining C and B, or the one joining B and F, or the one joining F and C. It is best to delete the one that has the highest cost, so it is best to delete the line that joins C and F.

5. Apply Kruskal's algorithm to the graph below. What is the cost of a minimal cost-spanning tree?



Answer. See figure above. The cost is $1+3+5+2+3+1+4+2+1+4+1+2=29$