Assignment 1

Task 2:
(In order from first to last)
Breadth-first: A, B, C, D, E, F, G, H
Depth-first: A, B, D, E, C, F, G
Iterative deepening (assuming depth=2): A, B, D, E, C, F, G
Uniform cost: A, C, B, F, E, G (D does not get visited)

Task 3:

i. The best way to ensure that the correct number of degrees of separation is found would be to use breadth-first search. BFS will find the other person, and the only thing that needs to be kept track of is how many levels apart the two people are on the search tree. Another way would be to use depth-first search. This will also eventually find the other person, but it may take a long time, as the algorithm may be searching down the completely wrong branch at times. Again, the level of each node would have to be kept track of. Iterative deepening search would also find the degrees of separation, and it would do it in the same amount of time as BFS, but it will use less space/memory. From what it seems, these social network graphs have unweighted edges, which would make uniform cost search somewhat inapplicable here.

ii. Since only three levels of the search tree are required, it is impossible to show Peter in this tree, as there are four degrees of separation between John and Peter. Showing this relationship would bring the search tree to four levels, contrary to the prompt. There is not a one-to-one correspondence. The reason for this is that Mary is an acquaintance of both Christine and George. In order to show this relationship in the search tree, Mary must appear twice (one as a child of Christine and the other as a child of George). Since there are "duplicate" Mary's in the tree, there cannot be a one-to-one correspondence between the nodes of the tree and the vertices of the SNG.
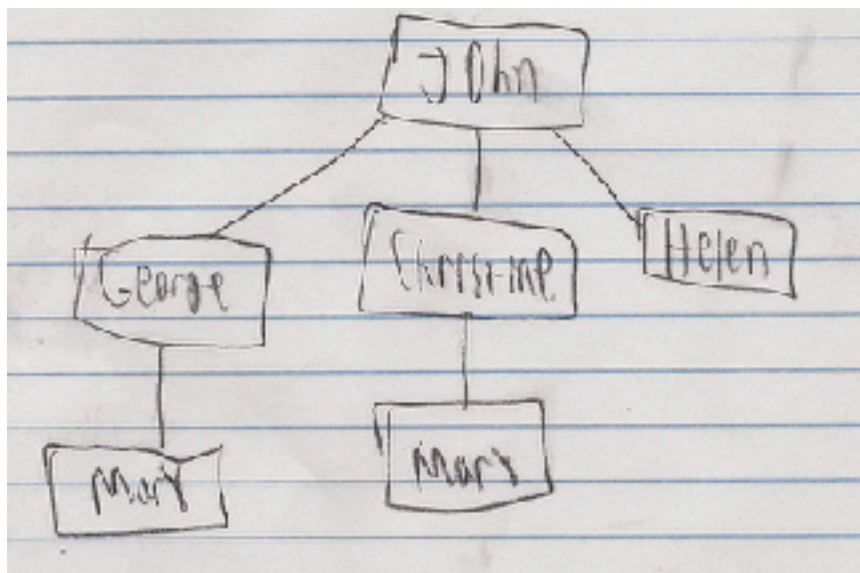
iii. For this part and the next, I've decided to use numbers instead of names to represent people. In this SNG, there are four degrees of separation between Person 1 and Person 2.
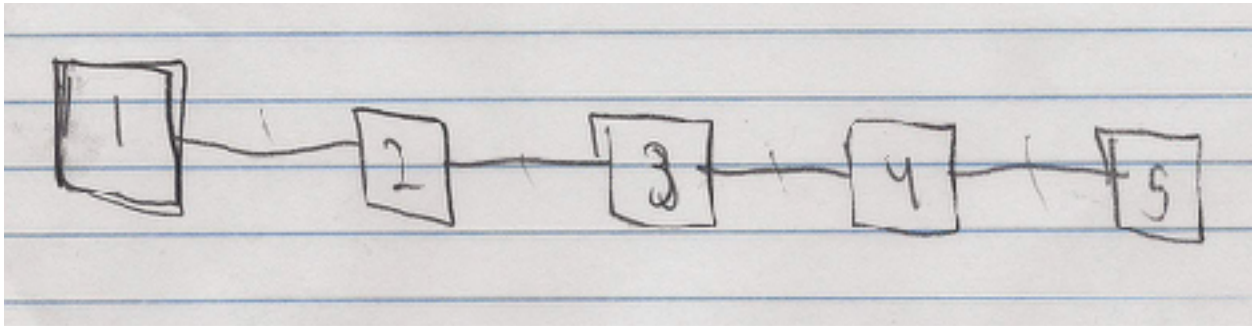
iv.
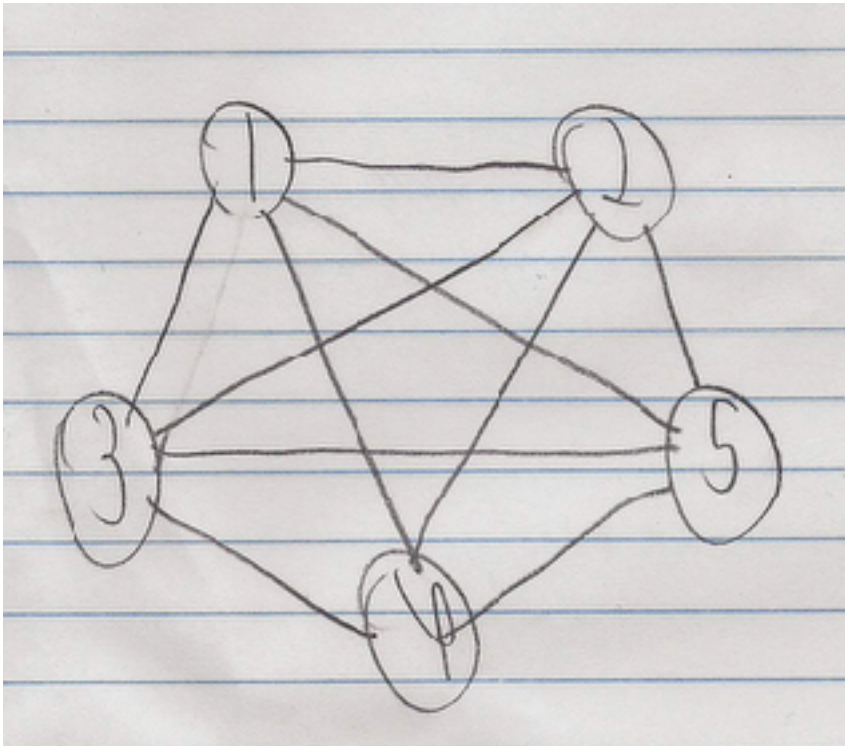
Task 4
Heuristic 1: Inadmissible (h(C), h(B) and h(D))
h(A) = 5
h(B) = 30
h(C) = 5
h(D) = 0
h(E) = 10

h(F) = 0

Heuristic 2: Inadmissible (h(D))
h(A) = 8
h(B) = 5
h(C) = 3
h(D) = 0
h(E) = 5
h(F) = 0

Heuristic 3: Inadmissible (h(A) and h(C))
h(A) = 20
h(B) = 30
h(C) = 5
h(D) = 0
h(E) = 0
h(F) = 50

Heuristic 4: Inadmissible (h(A), h(B), h(C), h(D), and h(E))
h(A) = 20
h(B) = 30
h(C) = 5
h(D) = 0
h(E) = 15

Heuristic 5: Admissible

Task 5:
h(City) = 2
h(Suburb) = 2
h(Farm) = 1
h(Mountain) = 0