CENG 315
Hw #3
Due: November 28th, 2012, 23:55

Princess Peach and Luigi are captured by King Koopa and held in the Koopa's castle. As Mario, you have to save them at all costs. However, surprisingly you are not going to fight with any enemies in this mission. King Koopa's only request is that you bring enough gold to him, but you don't know how much gold he will ask before you reach to his chamber. King Koopa knows how much gold Mario has beforehand and he just ensures that he will not ask an impossible amount of gold. Therefore, you should go to the chamber with maximum possible gold amount to complete your mission.

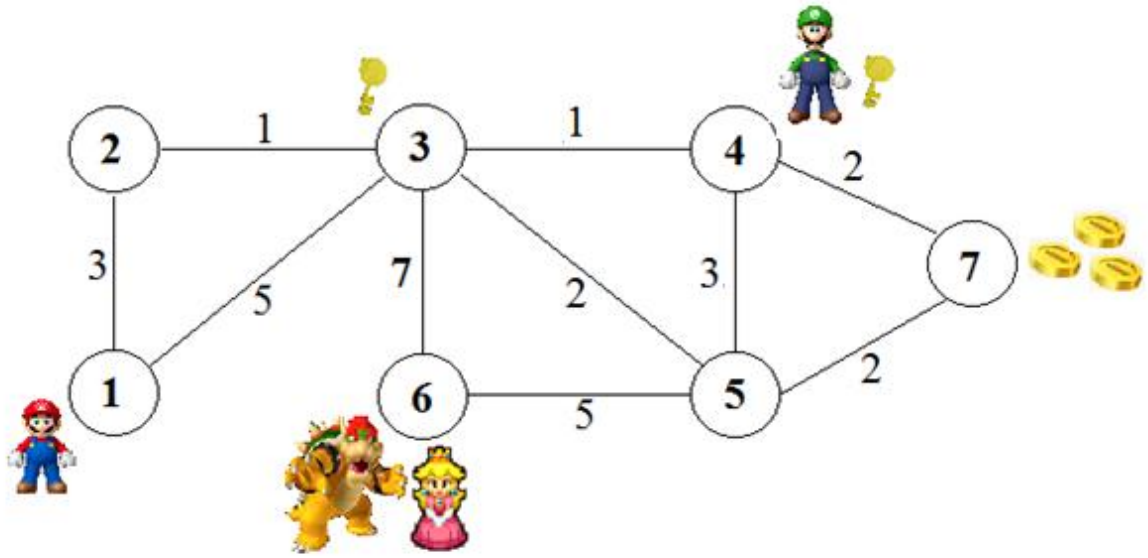
In the castle, there are several rooms. Rooms are connected by corridors and the corridors are guarded by King Koopa's henchmen. When you pass a corridor, the henchman takes some of your gold. Moreover, in some rooms, there are gold that you can take with you. In your mission, there are three special rooms. First one is holding the key that opens the door that Luigi is being kept in. After obtaining this key, you have to save Luigi first because Luigi has the key which opens the chamber's door. Therefore, the second special room is Luigi's room. And the final room is the chamber.

The rooms in the castle are open or locked in specific periods. In each period, you are in a room, and in the next period you have to move on to another room. To explain this with an example; for instance, you start with room1, and room1 is connected to room2, room3. Let us say that there are two periods. In the first period, just room2 is locked and in the second period just room3 is locked. So, in the first period, you are in room1 and in the next period, you should not stay in room1 no matter it is going to be locked or not and since you cannot go to room3 in the second period, you should just go to room2. Moreover, these two periods work repeatedly; for the above example, in the third period, again room2 is locked and in the fourth period, room3 is locked and so on.

Note that;

- You cannot stay in a room no longer than one period.
- You can revisit a room but note that it will decrease your gold amount because you pass the same corridor again.
- If you come to a room which has gold, in that period you can increase your gold amount by the gold stored in the room. Once you take the gold in a room (if there is any) and if you revisit the same room, there will be no gold left in that room.
- There will be two periods in the assignment. You will be given the list of locked rooms for these two periods separately; first period represents the odd numbered periods, and the second period represents the even numbered periods.
- In the first period, you are in room numbered by 1.
- If a room is locked in the next period, you cannot go to that room in the next period.

- Luigi's room and the chamber will be closed until you open them with the keys. You can assume that once you visit a room which has a key, you have that key automatically. And once you have the key of a room, the room automatically opens when you reach that room.
- Your journey will end at the chamber.



The above graph illustrates the sample input. Vertex numbers are room numbers and edge (corridor) numbers are the gold amounts that you should give to the henchmen to pass through that corridor.

Input Specifications:

- You should read the inputs from "hw3.inp"
- The first line of the input will include one integer, showing the number of gold you have.
- The next line will give one integer representing the total number of rooms, the value of n ($3 \leq n \leq 10000$).
- The next line will have the room number of the chamber (where Princess Peach is held).
- The next line will include the room number that the key of Luigi's room is stored.
- The next line will include the room number of Luigi's room.
- Next line will include an integer representing how many rooms are locked in the odd periods followed by the list of rooms locked in odd periods.
- Next line will include an integer representing how many rooms are locked in even periods followed by the list of rooms locked in even periods.
- The next line will give the number of corridors, let us say m.
- The next m lines will consist of three integers, the first two are the room numbers connected by the corridor and the third is the gold amount you should give to the henchman in order to pass through the corridor.
- Next line will consist of an integer showing the total number of rooms holding gold, let us say k ($0 \leq k \leq 10000$).
- Each of the next k lines have two integers, first for the room number, second for the amount of gold you can get from that room.

Sample Input:

```
100
7
6
3
4
2 2 7
1 2
10
1 2 3
2 3 1
1 3 5
3 6 7
3 4 1
3 5 2
5 6 5
4 5 3
4 7 2
5 7 2
1
7 3
```

Output Specifications:

- Output file should have the name “hw3.out”
- In the first line, you should print the number of gold you have left.
- In the second line, you should give the number of rooms you visited.
- In the third line, you should output the rooms in the order you traversed.

Sample output:

```
88
6
1 3 4 7 5 6
```

Specifications:

- All the work should be done individually. Your homeworks will be checked for cheating.
- Submit a single file called "hw3.cpp" through the COW system.
- Since black box evaluation method is going to be used, be careful about input/output specifications. You should use space as a delimiter and do not print any unnecessary characters, white spaces etc.