Problem 11: Pokémon-MD5
7+3=10 Points

Problem ID: `rescueteam`

Rank: `3+3`

Introduction

You got "transported" into the world of Pokémon—now you must go through a [mystery dungeon](#) to seek your fortune. However, because we ran the deterministic [MD5 algorithm](#) (instead of a random number generator) to generate our dungeon, each floor has an identical layout. You originally wanted to explore every floor, but forgot to bring [apples](#), so you'll have to make do with the current energy stored in your belly. Each step depletes your belly, and you will fall asleep for a very long time if it reaches zero; you'll need to plan ahead to make it out in time!

Problem Statement

There is a dungeon with F floors, each with the **same layout** of N rooms (numbered 1 to N) and M bidirectional hallways. It's guaranteed to be possible to get from any room to any other room within a floor through some sequence of hallways. Every floor has the **same starting room**—the room numbered S, and the **same exit room**—the room numbered E. There is also a single treasure room on every floor; the ith floor has treasure in the room numbered R_i. Floors may have **different treasure room numbers**.

Begin at the starting room on floor 1. You can travel between rooms with connecting hallways. When at an exit room, you **have 3 options**: exit the dungeon, go to the starting room of the next floor (increasing the floor number by 1), or move to an adjacent room on the same floor.

You begin with a belly value of B. This decreases by 1 whenever you travel through a hallway. **Belly does not decrease when going to the next floor or exiting the dungeon**. You must exit the dungeon (at any exit room) by the time your belly reaches 0. Find the maximum number of treasures you can collect with an initial belly capacity of B.

Input Format

The first line of the input contains a single integer T denoting the number of test cases that follow. For each test case:

- The first line contains two space-separated integers F B, where:
  - F denotes the number of floors in the mystery dungeon.
  - B denotes your initial belly value.
- The second line contains four space-separated integers N M S E, where:
  - N denotes the number of rooms in each floor of the dungeon.
  - M denotes the number of hallways in each floor of the dungeon.
  - S denotes the room number of the starting room for each floor.
  - E denotes the room number of the exit room for each floor.
- The third line contains F space-separated integers R_1 R_2 … R_F, denoting that the treasure on the ith floor is located at room R_i.
- For each of the next M lines, the ith line contains two space-separated integers U_i V_i, denoting that a hallway connects rooms U_i and V_i in each floor of the dungeon.

Output Format

For each test case, output a single line containing the largest value of treasure you can collect.

Constraints

$1 \le T \le 100$
$3 \le N, M \le 10^5$
$S \ne E$
$R_i \ne S$ and $R_i \ne E$ for all i
$U_i \ne V_i$ for all i
The sum of N across all test cases in a test file does not exceed 10^5.
The sum of M across all test cases in a test file does not exceed 10^5.
There is at most one hallway between rooms.
It's guaranteed to be possible to get from any room to any other room through some sequence of hallways.

Main Test Set

$1 \le F \le 100$
$1 \le B \le 10^3$
The sum of F across all test cases in a test file does not exceed 100.
The sum of B across all test cases in a test file does not exceed 10^3.

Bonus Test Set

$1 \le F \le 10^5$
$1 \le B \le 10^9$
The sum of F across all test cases in a test file does not exceed 10^5.

Sample Test Cases

Sample Input	Download	Sample Output	Download

```
5
3 6
5 5 3 4
1 2 5
2 4
4 1
1 5
1 3
5 3
3 12
3 3 3 1
2 2 2
3 2
3 1
2 1
4 7
6 8 2 6
5 1 3 4
3 5
3 1
1 5
6 1
1 4
4 2
4 6
2 6
4 8
5 6 1 3
4 2 2 5
4 3
4 2
2 3
2 5
5 3
5 1
1 3
6 5 2 4
5
1 6
5 1
1 4
3 5
2 3
```

```
2
3
2
2
0
```

Sample Explanations

For each test case, the starting and exit rooms have been labeled **S** and **E**, and rooms with treasure are circled in red. Floor 1 is shown at the bottom and floor **F** is shown at the top.

Test Case #1:
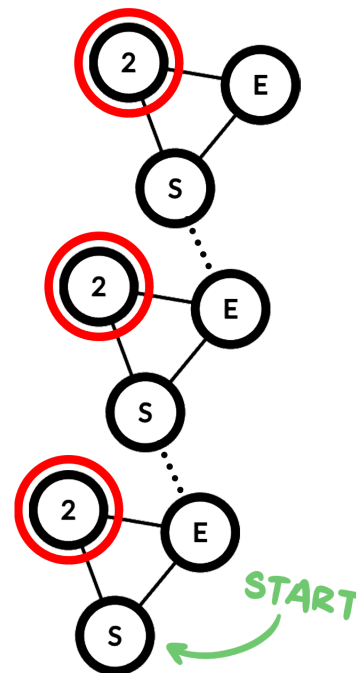The dungeon looks like this (labels 3 and 4 are replaced by S and E, respectively):

Test Case #2:
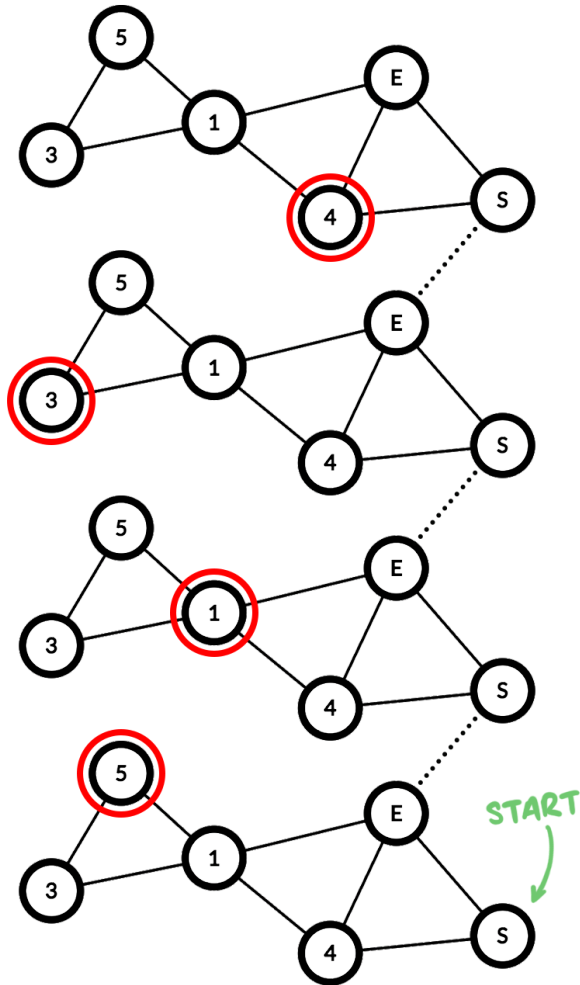The dungeon looks like this (labels 3 and 1 are replaced by S and E, respectively):
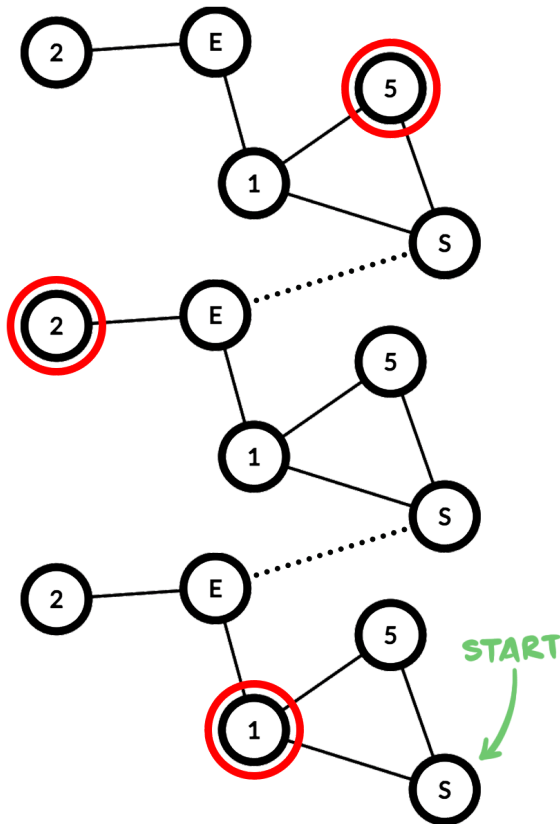
With **B** = 6 belly, you can collect a maximum of 2 treasures with the following steps:
1. **S** → 1: claim this floor's treasure
2. 1 → **E**: go to the next floor's **S**
3. **S** → 1
4. 1 → **E**
5. **E** → 2: claim this floor's treasure
6. 2 → **E**: exit dungeon

Following these steps, you exit the dungeon with 0 remaining belly. Note that we only explore the first two floors of the dungeon.

With **B** = 12 belly, you can collect a maximum of 3 treasures with the following steps:
1. **S** → 2: claim this floor's treasure
2. 2 → **E**: go to the next floor's **S**
3. **S** → 2: claim this floor's treasure
4. 2 → **E**: go to the next floor's **S**
5. **S** → 2: claim this floor's treasure
6. 2 → **E**: exit dungeon

Following these steps, you exit the dungeon with 6 remaining belly. Note that there are multiple ways to collect 3 treasures.

The dungeon looks like this (labels 2 and 6 are replaced by S and E, respectively):

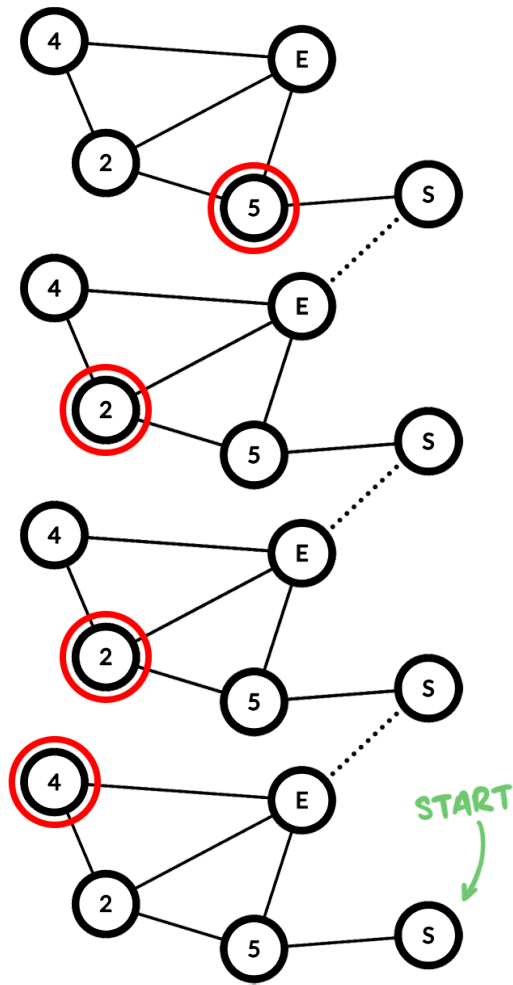The dungeon looks like this (labels 1 and 3 are replaced by S and E, respectively):

With **B** = 7 belly, you can collect a maximum 2 treasures exploring all 4 floors:

1. **S** → **E** (go to next floor)
2. **S** → 4 → R_2 = 1 → **E** (go to next floor)
3. **S** → **E** (go to next floor)
4. **S** → R_4 = 4 → **E** (exit, 0 belly left)

Note that there are multiple ways to collect a treasure value of 2.

With **B** = 8 belly, you can collect a maximum of 2 treasures exploring the first 3 floors:

1. **S** → 5 → **E** (go to next floor)
2. **S** → 5 → R_2 = 2 → **E** (go to next floor)
3. **S** → 5 → R_3 = 2 → **E** (exit, 0 belly left)

Note that there are multiple ways to collect a treasure value of 2, including ones that use only 7 belly and/or only explore the first two floors.

The dungeon looks like this (labels 2 and 4 are replaced by S and E, respectively):
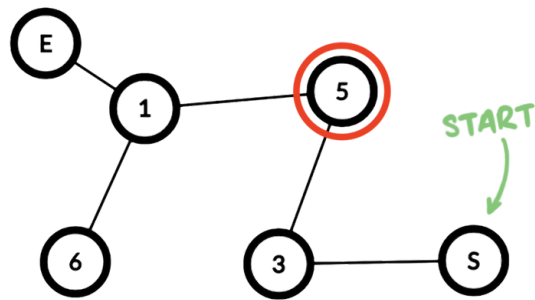
Note that the dungeon only has 1 floor. However, with B = 3 belly, it's impossible to collect the treasure and exit the dungeon before your belly reaches zero, so the maximum value of treasure you can collect is zero.

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