南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Lab 13 - OJ
Maximum Flow

CS208 Algorithm Design and Analysis

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Q1: Maximum Flow

Description

You are given a **directed** connected graph consisting of n vertices and m edges. The source is s and the sink is t. Please calculate the maximum flow from s to t. Assume the flow is infinity in s.

Input Format

The first line contains four integers n, m, s, t.

Then m lines follow, each line contains three integers u_i, v_i and c_i, separated by space. Three integers denote that there is an edge from u_i to v_i, and its capacity is c_i.

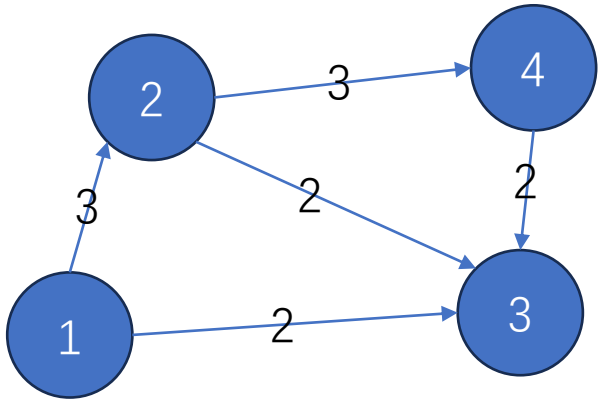
Output Format

One line, one integer denoting the maximum flow from s to t.

Q1: Maximum Flow

Sample Input

```
4 5 1 3
1 2 3
1 3 2
2 3 2
4 3 2
2 4 3
```



Sample Output

```
5
```

Q2: Project Selection

Description

Given a set of projects P and prerequisites E, choose a feasible subset of projects to maximize revenue.

Detailly, each project i has a revenue P_i, and prerequiste $E_i = (u, v)$ denotes that if you want to select project v, you must have selected project u.

The projects won't form a cycle or self-cycle itself. You can also take 0 project in total.

Input Format

The first line contains two integers n, m denotes the number of projects and the number of prerequisites.

The second line contains n integers, each integer P_i denotes the revenue of project i.

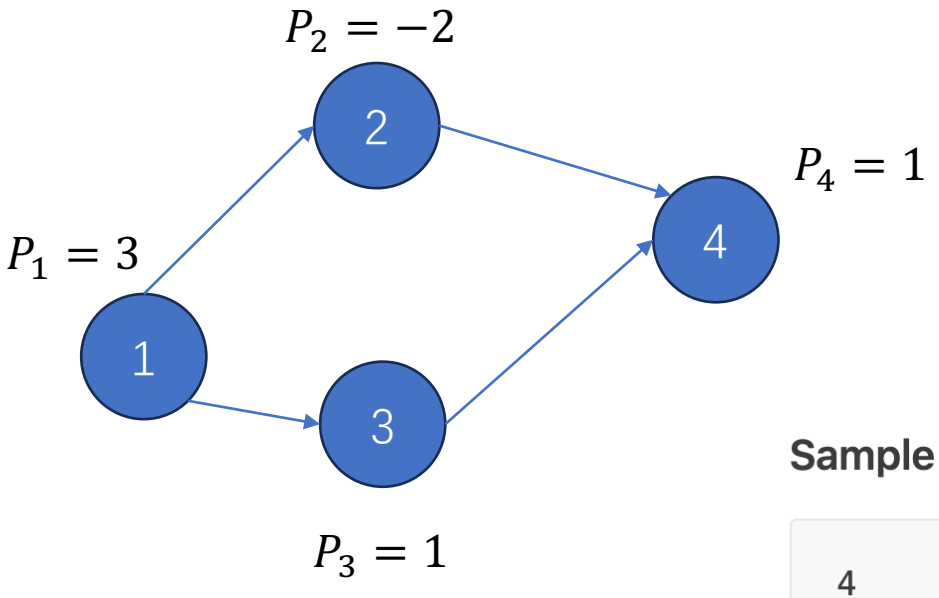
Then following m lines, and each line contains two integers u, v denoting the prerequiste E_i.

Output:
One line, one integer denotes the maximum revenue.

Q2: Project Selection

Sample Input

```
4 4
3 -2 1 1
1 2
1 3
2 4
3 4
```



Sample Output

```
4
```

Explanation

Select project 1 and project 3, so the total revenues are 4.