F - Eat and Ride

Editorial (/contests/abc422/tasks/abc422_f/editorial)

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 500 points

Problem Statement

There is a connected undirected graph with N vertices and M edges. The vertices are numbered vertex 1, vertex 2, $\ldots$, vertex N, and the i-th edge $(1 \leq i \leq M)$ connects vertices u_i and v_i.

For $i = 1, 2, \ldots, N$, solve the following problem:

Initially, Takahashi's weight is 0.

He travels by car to visit vertex 1 and moves toward vertex i. When he visits vertex v $(1 \leq v \leq N)$, his weight increases by W_v.

The car he is riding can move along the edges. When he passes through an edge, letting X be his weight at that time, the car consumes X fuel.

Find the minimum amount of fuel consumed for him to reach vertex i.

Constraints

- $1 \leq N \leq 5000$
- $1 \leq M \leq 5000$
- $1 \leq W_i \leq 10^9$ $(1 \leq i \leq N)$
- $1 \leq u_i \leq v_i \leq N$ $(1 \leq i \leq M)$
- The given graph is connected.

- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{llll}
N & M & & \\
W_1 & W_2 & \dots & W_N \\
u_1 & v_1 & & \\
u_2 & v_2 & & \\
\vdots & & & \\
u_M & v_M & &
\end{array}
$$

Output

Output over N lines. On the i-th line $(1 \leq i \leq N)$, output the amount of fuel needed for Takahashi to reach vertex i.

Sample Input 1 Copy

Copy

```
5 6
3 1 4 1 5
1 2
1 3
2 3
2 4
3 5
4 5
```

Sample Output 1 Copy

Copy

```
0
3
3
7
10
```

The given graph is as follows:

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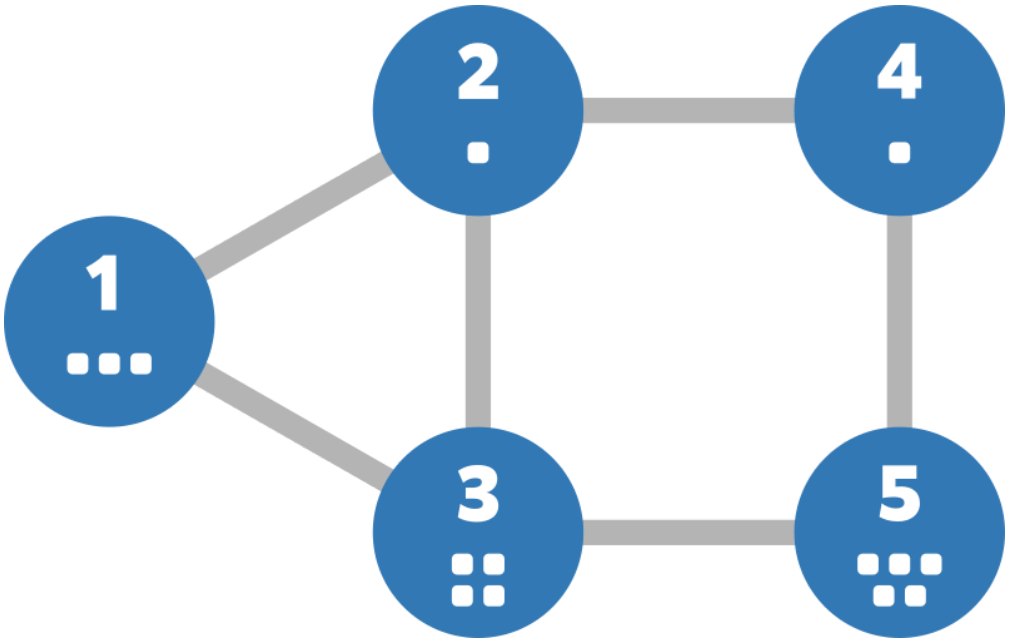
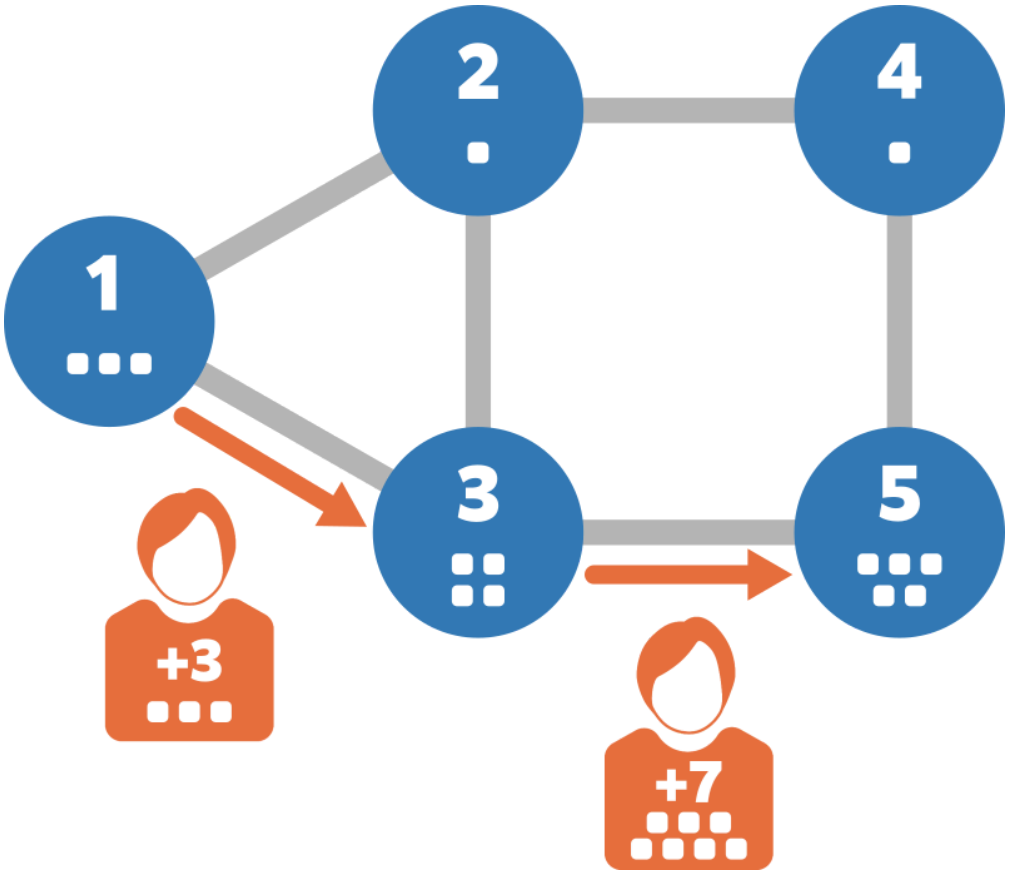


For example, Takahashi can reach vertex 5 by visiting vertex 1 and then acting as follows:

- He visits vertex 1. His weight increases by 3, becoming 3.
- He consumes 3 fuel to move to vertex 3. His weight increases by 4, becoming 7.
- He consumes 7 fuel to move to vertex 5. His weight increases by 5, becoming 12.



By acting this way, he can reach vertex 5 by consuming 10 fuel. It is impossible to reduce the fuel consumption to 9 or less, so output 10 on the 5th line.

Sample Input 2

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```
5 4
1000000000 1000000000 1000000000 1000000000 1000000000
1 2
2 3
3 4
4 5
```

Sample Output 2

```
0
1000000000
3000000000
6000000000
10000000000
```

Note that the answer may exceed 2^{32}.

Sample Input 3

```
10 20
74931 58277 33783 91022 53003 11085 65924 63548 78622 77307
1 8
3 6
5 10
4 6
1 3
1 7
2 6
7 10
8 9
3 4
4 4
4 6
6 6
5 10
1 7
4 5
1 2
3 7
2 3
5 8
```

Sample Output 3

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```
0
74931
74931
183645
213410
183645
74931
74931
213410
215786
```

/#telegram)

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