

USA Computing Olympiad



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RESOURCES

USACO 2024 FEBRUARY CONTEST, GOLD PROBLEM 1. BESSLA MOTORS

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Contest has ended.

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[English \(en\)](#)

****Note: The time limit for this problem is 3s, 1.5x the default. The memory limit for this problem is 512MB, twice the default.****

Farmer John would like to promote his line of Bessla electric tractors by showcasing Bessla's network of charging stations. He has identified N ($2 \leq N \leq 5 \cdot 10^4$) points of interest labeled $1 \dots N$, of which the first C ($1 \leq C < N$) are charging stations and the remainder are travel destinations. These points of interest are interconnected by M ($1 \leq M \leq 10^5$) bidirectional roads, the i -th of which connects distinct points u_i and v_i ($1 \leq u_i, v_i \leq N$) and has length ℓ_i miles ($1 \leq \ell_i \leq 10^9$).

A Bessla can travel up to $2R$ miles ($1 \leq R \leq 10^9$) on a single charge, allowing it to reach any destination within R miles of a charging station. A destination is deemed *well-connected* if it is reachable from at least K ($1 \leq K \leq 10$) distinct charging stations. Your task is to assist Farmer John in identifying the set of well-connected travel destinations.

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains five space-separated integers N , M , C , R , and K . Each of the following M lines contains three space-separated integers u_i , v_i , and ℓ_i such that $u_i \neq v_i$.

The charging stations are labeled $1, 2, \dots, C$. The remaining points of interest are all travel destinations.

OUTPUT FORMAT (print output to the terminal / stdout):

First, output the number of well-connected travel destinations on a single line. Then, list all well-connected travel destinations in ascending order, each on a separate line.

SAMPLE INPUT:

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

SAMPLE OUTPUT:

```
1
2
```

We have one charging station at 1. From this charging station, we can reach point 2 (since it is distance 3 away from 1), but not point 3 (since it is distance 5 away from 1). Thus, only point 2 is well-connected.

SAMPLE INPUT:

```
4 3 2 101 2
1 2 1
2 3 100
1 4 10
```

SAMPLE OUTPUT:

```
2
3
4
```

We have charging stations at 1 and 2, and both points 3 and 4 are within distance 101 of both 1 and 2. Thus, both points 3 and 4 are well-connected.

SAMPLE INPUT:

```
4 3 2 100 2
1 2 1
2 3 100
1 4 10
```

SAMPLE OUTPUT:

1
4

SCORING:

- Inputs 4 and 5: $K = 2$ and $N \leq 500$ and $M \leq 1000$.
- Inputs 6 and 7: $K = 2$.
- Inputs 8-15: No additional constraints.

Problem credits: Alexander Wei

Contest has ended. No further submissions allowed.