F. Factory Safety Inspection Chain

Constraint: Time Limit: 1 seconds, Memory: 128MB

Background

The **Novatek** chemical plant has strict safety protocols: before ending their shift, engineers must inspect all critical areas.

The plant is modeled as an **undirected graph** consisting of:

- **n** areas (numbered from 1 to n), $2 \le n \le 15$
- **m** corridors connecting areas bidirectionally
- Each corridor has a **travel time** w (in minutes), $1 \le w \le 1000$

Engineers start from the **central control room** (area **s**) and must end at the **data storage room** (area **t**), $s \ne t$. During the journey, engineers must **visit at least once** all **p** critical areas (containing hazardous chemicals, reaction tanks, high-pressure systems).

Requirements

Find the **minimum total time** for an engineer to travel from **s** to **t** while visiting **all p (**$0 \le p \le n-2$**) mandatory areas at least once**. **Mandatory areas do not include s and t** ($r_i \ne s$ and $r_i \ne t$).

If no valid route exists, output **-1**.

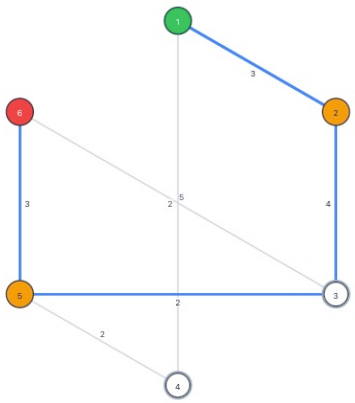
Input/Output Format

Input	Output
- Line 1: Five integers **n**, **m**, **p**, **s**, **t** • n: number of areas • m: number of corridors • p: number of mandatory areas to visit	A single integer: • Minimum total time (in minutes), or • **-1** if no valid route exists

• s: starting area (control room) • t: ending area (storage room) - Next **m** lines, each contains 3 integers **u**, **v**, **w**: • Describes a bidirectional corridor between areas u and v with travel time w minutes - Last line: **p** integers $\mathbf{r_1}$, $\mathbf{r_2}$, ..., $\mathbf{r_p}$ • List of mandatory areas to visit	

Example 1

Input	Output
6 7 2 1 6 1 2 3 2 3 4 3 6 5 1 4 2 4 5 2 5 3 2 5 6 3 2 5	12



- The plant has **6 areas** and **7 corridors**
- Start from area **1**, end at area **6**
- Must visit 2 mandatory areas: **2** and **5**

Optimal route: 1 → 2 → 3 → 5 → 6

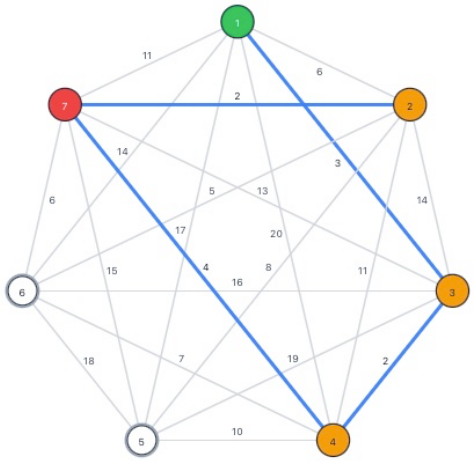
Calculation:

- 1 → 2: 3 minutes
- 2 → 3: 4 minutes
- 3 → 5: 2 minutes
- 5 → 6: 3 minutes
- **Total: 12 minutes**

This is the shortest route that satisfies visiting both areas 2 and 5

Example 2

Input	Output
7 21 3 1 7 1 2 6 1 3 3 1 4 20 1 5 17 1 6 14 1 7 11 2 3 14 2 4 11 2 5 8 2 6 5 2 7 2 3 4 2 3 5 19 3 6 16 3 7 13 4 5 10 4 6 7 4 7 4 5 6 18 5 7 15 6 7 6 2 3 4	13



Chosen route
1 → 3 → 4 → 7 → 2 → 7
Total cost: 13