BUSES

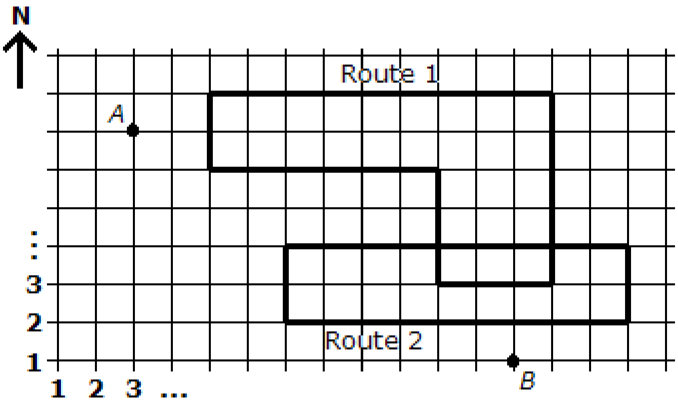
Portsaid is a north-eastern Egyptian city that lies near the Suez Canal. All streets in Portsaid are perfect straight lines oriented either north-south or east-west. Note that an intersection is a place where two streets cross each other. The public transport system of Portsaid consists of **R** bus routes. A route is a predefined cycle inside the city that is followed by a bus stopping at every intersection on that route. Each route has exactly one bus assigned to it that follows its path. Every bus has a fee $\mathbf{f_i}$, once paid you can take the bus as long as you want, but once you get off, you'll have to pay the bus fee again for another ride.

Since not every intersection in the city lies on the path of a route, sometimes you have to walk to be able to move from some intersection to another. When walking from one intersection to another, you can only use the streets.

Today you are in Portsaid for vacation and you want to go from intersection **A** to intersection **B**. Since you are here for vacation, you decided not to walk more than **D** blocks (A block is a distance that separates two consecutive intersections along a street). Also, you want to spend as little money as you can.

TASK

You are to write a program that is given the map of the bus routes and their fees, computes the minimum amount of money you have to spend to go from **A** to **B** walking at most **D** blocks.



To describe the city we will number North-South streets starting from the west and moving east, and East-West streets starting from the South and moving North as shown in figure. Intersections will be described as a pair (x, y) where x represents the North-South (vertical) street and y represents the East-West (horizontal) street.

INPUT

- 1st line consists of an integer **D** (0 <= **D** <= 300).
- 2nd line consists of two integers separated by a single space that represent intersection **A**.
- 3rd line consists of two integers separated by a single space that represent intersection **B**.
- Both coordinates of **A** and **B** range from 1 to 100,000,000 inclusive.
- **A** and **B** will never represent the same intersection.

- 4^{th} line consists of an integer **R** (1 <= **R** <= 100), the number of bus routes in the city.
- Each of the next **R** lines will describe a bus route; each route will be described as a sequence of integers separated by single spaces as follows:
  - The first integer on the line represents $\mathbf{N_i}$ (4 <= $\mathbf{N_i}$ <= 50), the number of intersections used to describe this route.
  - The second integer on the line represents $\mathbf{f_i}$, the fee associated with that route. (0 <= $\mathbf{f_i}$ <= 1,000,000).
  - The $\mathbf{N_i}$ pairs of integers follow, each represents an intersection. The bus starts moving from the first intersection and drives in a straight line to the second; it turns 90 degrees and drives in a straight line to the third, etc. It keeps moving that way until it reaches the last intersection on the description; from there it turns 90 degrees and drives to the first one to start again. Note, that the i^{th} route has $\mathbf{N_i}$ line segments which never overlap and never intersect except in the intersection point between any 2 consecutive segments. All coordinates will range from 1 to 100,000,000 inclusive.

OUTPUT

The output must be one integer representing the minimum amount of money you need to spend to get from **A** to **B** walking at most **D** blocks. If there is no possible way to achieve that, your program should output **–1**.

GRADING

In some cases worth 30 points:

- **D** does not exceed 100.
- **A**, **B** and the polygons' coordinates do not exceed 100.
- **R** does not exceed 25.
- $\mathbf{N_i}$ does not exceed 10.
- $\mathbf{f_i}$ does not exceed 10.
- Any line segment in any polygon does not have more than 40 lattice points including the starting and ending points of that line segment.

DETAILED FEEDBACK

During the contest, your submissions for this task will be evaluated on part of the official test data, showing you a summary of the results.

EXAMPLE

Sample Input 1	Sample Output 1
4 3 7 13 1 2 6 2 14 8 5 8 5 6 11 6 11 3 14 3 4 5 16 4 7 4 7 2 16 2	2

This sample input corresponds to the shown figure. Note that the best way here is to move for 2 blocks, then use the first bus route, then walk for 2 blocks to reach **B**.

Sample Input 2	Sample Output 2
2 1 5 10 7 3 4 10 1 4 5 4 5 6 1 6 4 10 5 5 5 7 7 7 7 5 4 20 9 5 9 1 7 1 7 5	-1