# Food Delivery Motorcycles

## Introduction

Millions of people hanger three time a day. Motorcycles are an exciting development for delivering. They aim to make time saver and more available food variety.
In this competition problem, we'll be looking at how a fleet of motorcycles can efficiently get orders to their order makers in a simulated city.

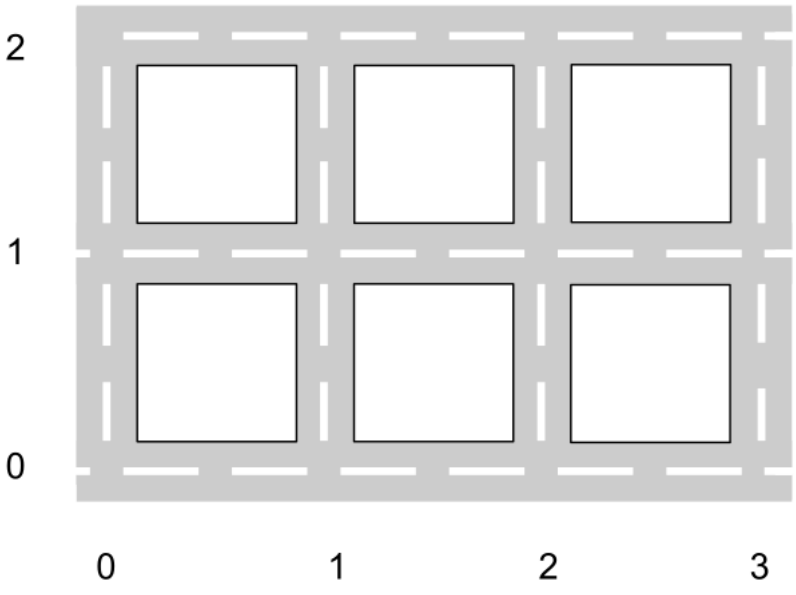
## Task

Given a list of reserved orders in a city and a fleet of motorcycle, assign the orders to motorcycles, so that order get to their order maker on time. For every order that arrived on time (or early), you will earn points proportional to the distance of that path; plus an additional bonus if the motorcycle also started on time.

# Problem description

## Map

The city is represented by a rectangular grid of streets, with R horizontal streets (rows) and C vertical streets (columns). Street location are referenced by integer, 0-based coordinates of the horizontal and the vertical street. For example, [ r , c ] means the location of the r-th horizontal and the c-th vertical street ( $0 \leq r < R$ , $0 \leq c < C$ ).



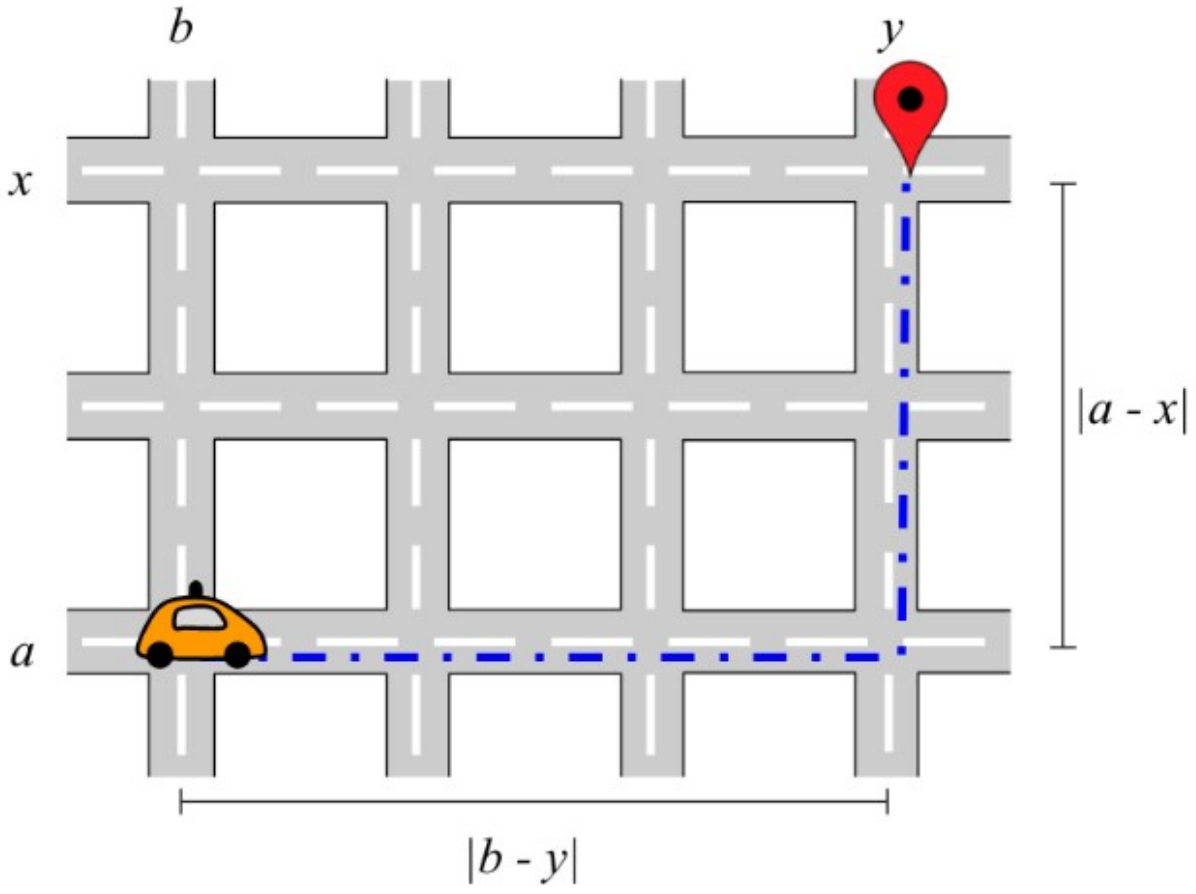

**Example city of 3 horizontal and 4 vertical streets.**

## Motorcycles

There are M motorcycles in the fleet. At the beginning of the simulation, all motorcycles are in the location [0, 0].
There is no limit to how many motorcycles can be in the same location.

## Time and distance

The simulation proceeds in T time, from 0 to T−1 .
The distance between two location is defined as the minimum total number of city blocks (cells in the grid) that a motorcycle has to pass in each direction to get from one intersection to the other. That is, the distance between location [a, b] and location [x, y] is equal to | a − x | + | b − y | .
The number of time required to drive between two intersections is equal to the distance between them.



## Orders

There are N reserved orders.
Each order is characterized by the following information:
● **restaurant location** – to begin the delivering, the motorcycle must be in this location.
● **client location** – to end the delivering, the motorcycle must be in this location.
● **order start time** – the start time in which the motorcycle can start. It can also start at any later time.
● **order deadline** – the latest time by which the motorcycle must finish to get extra points for it.

## Simulation

Each motorcycle makes the delivery you assign to it in the order that you specify:
● first, the motorcycle drives from its current location ([0,0] at the beginning of the simulation) to the **restaurant location** of the next order (unless the motorcycle is already in this location)
● then, if the current time is earlier than the **order start time** of the next order, the motorcycle waits until that time
● then, the motorcycle drives to the **client location**
    ○ the motorcycle does this even if the arrival time is later than the **order deadline** ; but no points are earned by such a order
● then, the process repeats for the next assigned order, until the motorcycle handles all scheduled order or the simulation reaches its final time T (whichever comes first)
● any remaining assigned orders are simply ignored.

## Input data set

The input data is provided as a data set file - a csv file containing exclusively ASCII characters with lines terminated with a single '\n' character (UNIX- style line endings).

### File format

The first line of the input file contains the following integer numbers :

- R – number of rows of the grid ( $1 \leq R \leq 10000$)
- C – number of columns of the grid ( $1 \leq C \leq 10000$)
- F – number of motorcycle in the fleet ( $1 \leq F \leq 1000$)
- N – number of reserved orders ( $1 \leq N \leq 10000$)
- B – bonus for starting the order on time ( $1 \leq B \leq 10000$)
- T – time of simulation for each motorcycle ( $1 \leq T \leq 109$ )

N subsequent lines of the input file describe the individual rides, from order 0 to order $N - 1$ . Each line contains the following integer numbers:

- a – the row of the restaurant location ( $0 \leq a < R$ )
- b – the column of the restaurant location ( $0 \leq b < C$ )
- x – the row of the client location ( $0 \leq x < R$ )
- y – the column of the client location ( $0 \leq y < C$ )
- s – the order start time ( $0 \leq s < T$ )
- f – the order deadline ( $0 \leq f \leq T$ ) , ( $f \geq s + |x - a| + |y - b|$)
    - note that f can be equal to T – this makes the order deadline equal to the end of the simulation

## Submissions

### File format

The submission file must contain F lines, one for each motorcycle in the fleet.

Each line describing the orders of a motorcycle must contain the following integers separated by single comma:

- M – number of orders assigned to the motorcycle ($0 \leq M \leq N$ )
- $R_0$ , $R_1$ , ..., $R_{M-1}$ – order numbers assigned to the motorcycle, in the order in which the vehicle will perform them ( $0 \leq R_i < N$ )

Any order can be assigned to a motorcycle at most once . That is, it is not allowed to assign the same order to two or more different motorcycles. It is also not allowed to assign the same order to one motorcycle more than once.

**Scoring**

Each order start before its order start time earns the number of points equal to the distance between the restaurant location and the client location before simulation time finish.

Additionally, each order deliver in its order deadline or before gets an additional bonus of B .