

## CCSC:MW Programming Competition

### Package Priorities

Delivery Dan has an idea for a package delivery system. If a sender wants a package delivered to a recipient, the sender drops it off at Dan's delivery hub and Dan delivers it to the recipient. Dan will charge senders and recipients different rates for his service depending on the priority they want for their packages. It may not be a great idea, but Dan wants your help to create a simulation to see how it would work.

Each package is dropped off at a time step  $t_i$  and has an ID number. For each package, we know the travel time from the hub to the recipient, and it takes the same amount of time to travel back to the hub. We also know the sender's priority and the recipient's priority for the package.

Each time Dan returns from a delivery he looks at the packages currently at the hub and decides which package to deliver next based on the following rules:

1. If one package at the hub has a recipient priority that is higher than all the other packages at the hub, deliver that package next.
2. If multiple packages at the hub share the highest recipient priority, and one of those packages has a sender priority that is higher than the others, deliver that package next.
3. If multiple packages at the hub share the highest recipient and highest sender priorities of all the packages at the hub, deliver from those the package with the oldest (minimum) arrival time next.

Each package is described with 5 integers I A T S R:

- I is the ID number. The first package has ID 1, and the IDs are sequential.
- The package arrives at the hub at time step  $t_A$ . No two packages arrive at the same time step, and the packages are ordered by arrival time in the input.  $1 \leq A \leq 100000$
- Delivering the package takes T time steps to travel to the recipient, and T time steps to return to the hub.  $1 \leq T \leq 10$
- S is the sender priority.  $1 \leq S \leq 5$
- R is the recipient priority.  $1 \leq R \leq 5$

### Input

The input starts with a row containing the integer N, where  $1 \leq N \leq 10000$ , followed by N rows containing I A T S R values representing a sequence of packages arriving at the hub.

For example, consider the following input:

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

The package with ID 1 arrives at time  $t_1$ . This is the only package at the hub at time  $t_1$ , so it will be delivered next. The travel time is 1, so Dan delivers the package to the recipient at time  $t_2$  and arrives back at the hub at time  $t_3$ . Packages 2 and 3 arrived at  $t_2$  and  $t_3$ , so now Dan must decide which of the 2 to deliver next. Package 3 has the higher recipient priority and has a travel time of 2, so it is delivered at  $t_5$  and Dan returns at  $t_7$ . Package 2 is the only package remaining, so it is delivered last.

### Output

The output of the simulation is a list of IDs in order of delivery, with one ID per line. For the example input above, the output would be this:

1  
3  
2

### Example

Input:

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

Output:

1  
3  
4  
2