**Input format**

The first line contains the number of processes.

Each next line contains 4 numbers: process id, processing time, deadline time and period, respectively.

In order to run successfully, it must be ensured that the input format is correct.

**Problem and solution**

Earliest Deadline First Scheduling is a dynamic priority scheduling algorithm used in real-time operating systems. The main principle is: “The task with the closest deadline has the highest priority”.

* **Utilization:** In this problem, each process has a deadline and period. Since missing deadline is allowed, we calculate the utilization according to execution time and period. If utilization > 100%, the tasks can’t be scheduled.
* **Observation time:** the schedule will be repeated after a time called hyper-period. Hyper-period is the lowest common multiple of all periods of processes.

Naturally, we only need to iterate through time from 0 to hyper-period and decide which task is executed at each time frame.

To choose the highest priority tasks, we can use a min-heap which is a priority queue in C++.

Other data structures like map, vector can be used to track information of all processes, in order to log requested information such as number of total processes, number of completed processes, number of processes that missed the deadlines, average waiting time for each process,…