Problem 6: Heap

Consider a minimum priority queue PQ implemented using binary min-heap tree. This PQ is used for a printer to print tasks (documents). A printer receives many tasks to be printed. Each task has a priority, an ID and a duration (number of unit time needed to be printed). Consider you receive n tasks into the printer. Tasks with low value of priority are printed before tasks with high value of priority. You wish to calculate the necessary time for your task, having a given ID, to be totally printed.

- Write a C++ program to implement the solution with n random tasks as input. What is the complexity of your program? Draw the binary min-heap for the example below, and redraw it when you remove the first task.

Example, you receive n = 6 tasks with a form (priority, ID, duration): (2,100,3), (5,40,4), (1,20,2), (4,30,5), (5,200,4), (3,50,4). Your ID is: 30. The necessary time to print your task is: 14.