University of Waterloo
CS240 - Fall 2025
Programming Question 1

Due Date: Tuesday October 21 at 5pm

Please read `https://student.cs.uwaterloo.ca/~cs240/f25/assignments.phtml#guidelines` for guidelines on submission.

Grace period: submissions made before 7:59PM on October 21 will be accepted without penalty. Your best submission will be graded. Please note that submissions made after 7:59PM **will not be graded** and may only be reviewed for feedback.

There are 6 possible marks available.

Problem 1 [6 marks]

Implement an algorithm that solves Problem 5 of Assignment 2 using `C++`. Compile your program using `g++ -std=c++17` in the `linux.student.cs.uwaterloo.ca` environment. The input/output specifications are as follows:

- Your program should read from `cin` the size n, then the n integers in the heap $A[0 \ldots n-1]$, and finally the integer c, and then write to `cout` the integers in the heap that are greater than or equal to c

- You may assume that every integer in the input is at least 0 and at most $2^{31} - 1$ (so that every integer will fit into a variable of type `int`).

- Every integer in the input and output should be on a separate line. For example, for the following input

```
5
18
16
14
10
3
12
```

  your program should print out the integers 18, 16, and 14 in any order (and on separate lines). Note, 5 represents n, so the next 5 numbers 18, 16, 14, 10, 3 represent what goes in the heap, and 12 represents c.

Although reading in the input file has running time $\Theta(n)$, the rest of your implementation should have running time $O(1 + k)$ in order to receive full marks. Submit the code for your `main` function, along with any helper functions, in a file called `report.cpp` to Marmoset.