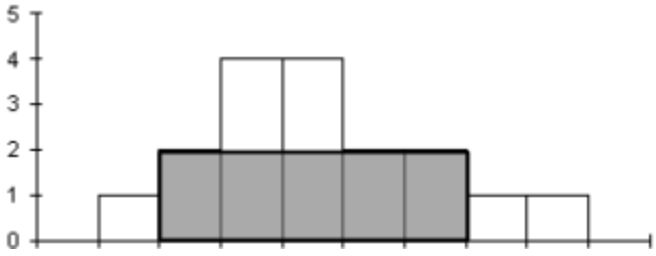
ESO207: Assignment2
Dur Date 19 Aug 2015

NOTE: Please submit the solution in the class. The solution should be a printout of a .pdf file.

Q.1. You are given a histogram consisting of n vertical bars each of unit width. Your aim is to compute the axis-parallel rectangle of maximum area which is contained in histogram (as shown



in the figure) using a stack. Give an O(n) algorithm.
The input is given in the form of an array H storing n numbers such that H[i] is the height of the i-th vertical bar in the histogram.

Hint: For each I, compute the largest range [j,k] such that i belongs to it and H[p] is not less than H[i] for all p in this range.

Q.2 On a street there are a lot of buildings. A contractor needs to find the height of the tallest building in every k consecutive buildings. Heights of the buildings are provided in an array A[1..n] along with window size k design an algorithm to find the tallest building's height in every k contiguous buildings. Design an efficient algorithm using a "Double-Ended -Queue" (deque).
A deque data-structure is a queue in which one can enqueue and dequeue elements on both ends. So the operations are Enqueue(H,x), Enqueue(T,x), Dequeue(H), and Dequeue(T) where H and T refer to the two ends.

Example:
A[] = {2,5,7,4,2,6}
k = 3
Output :
7 7 7 6