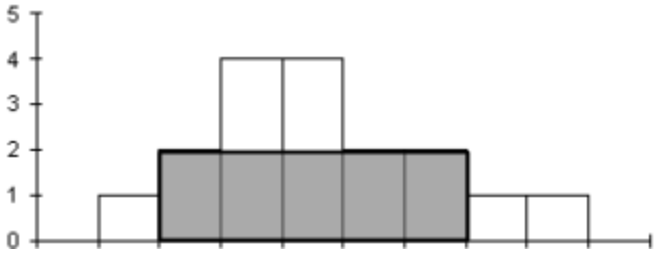
ESO 207 2015-16-I Assignment 2

Due Date 19 August 2015

Submit a hard copy in .pdf format. Submit in the class.

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 A contractor needs to find the height of the tallest building in every k consecutive buildings on one of the sides of a street. Heights of the buildings are provided in an array A[1..n] in order. See the example below. Design an efficient algorithm to compute the result for the input array A and window size k.

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

Hint Use dequeue operation of queue effectively