Q3:

Given: 100n meters, i meter of the shore

Output: Algorithm runs in O(nlogn)

Solve:

Regard the net as an number array consist with 0 and 1 that have the length of n; And regard the fish shore as an array of length 100n that consist with arbitrary integers. In order to find out the largest amount of fish. Use n number elements in fish net arrays as a group to match the fish shore array one by one. Store these numbers into a new Array and find the biggest number in the new Array.

To calculate the fish caught by each times. Let fish shore array be

A(x) = A(x) = 

and net array be B(x) = , Let C(x) = A(x)\*B(x); Find the convolution of A(x) and B(x). The highest degree of A(x)\*B(x) will be . Find the DFT of A(x) and B(x) with 101n-1 values. Then the A(x) DFT will be  , the B(x) DFT will be

. Then use FFT to calculate the A(x)\*B\*(x) we can get  It is equivalent to C(x) in DFT which is , apply the IFFT to find out the IDFT of C(x) with the time complexity of O(nlogn).