Question 1:

beautiful(A, n)

Input : An integer array with n elements

Output: sum all integers of this array

```
sum  <- A[0]
m <- n - 1
for i <- 1 to m do
  sum += A[i]
return sum
```

Explanation:

Sum need go through all integers of the array. The worst-case running time is same as the best-case running time.

Question 2:

$2^n < 2^{(n + 1)} < 2^{(2n)} < 2^{(2^n)}$

Question 3:

O(1) Hash (accessing array)

O(log n) binary search

O(n) findMax

O(n log n) merge sort

O(n^2) bubble sort

O(n^3) Finding the longest common subsequence

O(2^n) Towers of Hanoi

Question 4:

The Fibonacci sequence defined by the recurrence:

$fib(n)=fib(n-1)+fib(n-2)$

which n is decreased by a fixed amount(1 and 2) rather than proportional division of n.

And this is the reason fib(n) cannot be applied by Master Theorem.