Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Information Technology

المملكة العربية السعودية
وزارة التعليم
كلية الحاسب
قسم تقنية المعلومات

Course: CS 211 "Concepts of Algorithms" **Homework 1**
First semester 1442 / 1443 (421)

Mark_____/ 10

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Question 1: [5 Marks]
What is the complexity time for each of the following:

```
int a = 0, b = 0;
for (i = 0; i < n; i++) {
    a = a + rand();
}
for (j = 0; j < m; j++) {
    b = b + rand();
}
```
= O(n+m)

```
int a = 0;
for (i = 0; i < n; i++) {
    for (j = n; j > i; j--) {
        a = a + i + j;
    }
}
```
= O (n^2)

```
int x = 1;
int y = 2;
int sum;
sum = x+y;
cout<<sum;
```
= O(1)

```
int a = 0, i = n;
while (i > 0) {
    a += i;
    i /= 2;
}
```
= O (log n)

```
int i, j, k = 0;
for (i = n / 2; i <= n; i++) {
    for (j = 2; j <= n; j = j * 2) {
        k = k + n / 2;
    }
}
```
= O (n log n)

Question 2: [3 Marks]
Apply the Selection sort algorithm on the following sequence:
90, 100, 70, 30, 99, 1
1,100,70,30,99,90
1,30,70,100,99,90
1,30,70,100,99,90
1,30,70,90,99,100
1,30,70,90,99,100

Question 3: [2 Marks]
Reorder the following time complexity increasingly:
$Log_2 8$, 2^n, $n\ Log_2 n$, n^2, n^7, 10, $Log_2 n$

$Log_2 8$
10
Log n
$n\ Log_2 n$
n^2
n^7
2^n