ASSIGNMENT 2

DATA STRUCTURE AND ALGORITHM

Q1. What is the time, space complexity of following code:

```
int a = 0, b = 0;
for (i = 0; i < N; i++) {
a = a + 1;
}
for (j = 0; j < M; j++) {
b = b + j;
}
```

=> Lets see how many times count++ will run.

When i=0, it will run 0 time.
When i=1, it will run 1 time.
When i=2, it will run 2 times and so on.
Total number of times count++ will run is 0+1+2+...+(N−1) = $\frac{n(n-1)}{2}$
So the time complexity will be **O(N²).**

In the above-given code, the array consists of N, M integer elements. So, the space occupied by the array is 4 * n. (The size of the integer data type is 2 or 4) Also we have integer variables such as n, i and j. So, the space complexity is **O(n)** or linear.

Q2. What does it mean when we say that an algorithm X is asymptotically more efficient than Y?
a)X will be a better choice for all inputs
b)X will be a better choice for all inputs except possibly small inputs
c)X will be a better choice for all inputs except possibly large inputs
d)Y will be a better choice for small inputs

=> c)X will be a better choice for all inputs except possibly large inputs

Q3. Write a Python program to print even numbers in a list.

Sample:

Input: list1 = [12, 3, 55, 6, 144]

Output: [12, 6, 144]

Input: list2 = [2, 10, 9, 37]

Output: [2, 10]

```python
list1 = [12, 3, 55, 6, 144]
list2 = [2, 10, 9, 37]
print("Even numbers in list1 is:")
for i in list1:
  if i % 2 == 0:
    print(i, end = " ")
print("\n Even numbers in list2 is:")
for j in list2:
  if j % 2 == 0:
    print(j, end = " ")
```

Output: Even numbers in list1 is:

12 6 144

Even numbers in list2 is:

2 10