CSCI 002 NAME Jesus Morales

Provide a clear trace of the following recursive functions. Use a separate piece of paper please.

1. **Sum**

```
        cout << sumUpTo(8) << endl;
```

OUTPUT: 36

Function**********

```
int sumUpTo(int n) {
        int sum = 0;
        if (n == 1) sum = 1;
        else sum = n + sumUpTo(n - 1);

        return sum;
}
```

sum=8 n=8 sum=8+ sumUpTo(7) sum=36

sum=0 n=7 sum=7+sumUpTo(6) sum=28

sum=0 n=6 sum=6+sumUpTo(5) sum=21

sum=0 n=5 sum=5+sumUpto(4) sum=15

sum=0 n=4 sum=4+SUT(3) sum=10

sum=0 n=3 6 = sum=3+SUT(2) =6

sum=0 n=2 sum=2+SUT(1) → sum=2+1 return 3

sum=0 n=1 sum=1 return 1

2. **Binary Search**

```
        const int arraySize = 9;
        int a[] = {1,6,7,12,15,22,26,41,50};
        cout << binarySearch(a, 0, arraySize, 6) << endl;
```

Function **********

a 0 9 6

```
int binarySearch(const int anArray[], int first, int last, int target) {

        int index;
        if (first > last)
                index = -1;
        else {
                int mid = first + (last - first) / 2;
                if (target == anArray[mid])
                        index = mid;
                else if(target<anArray[mid])
                        index = binarySearch(anArray, first, mid - 1, target);
                else
                        index = binarySearch(anArray, mid + 1, last, target);
        }

        return(index);
}
```

3-0

OUTPUT: 1

mid= 4 5

6 == 15 ⇒ no/false

6 < 15 ⇒ yes/true

mid= 1

6 == 6 ⇒ true

index = 1

return 1

index = binarySearch(a, 0, 3, 6)

index = 1 → return 1