Data Structures and Algorithms

Agenda

- Introduction to course
- Introduction to Data Structures
- Time and Space complexity
- Searching Algorithms
    - Linear Search
    - Binary Search

GitHub Repository

- https://github.com/nilesh-g/dsa-06

Python Example

- Factorial -- O(n)

```
res = 1
for i in range(1,n+1):
    res = res * i
print("Factorial : ", res)
```

Linear Search

- How to return all found element indices in search?

```
List<Integer> linearSearch(int[] arr, int key) {
    List<Integer> list = new ArrayList<>();
    for(i=0; i<arr.length; i++) {
        if(key == arr[i])
            list.add(i);
    }
    return list;
}
```

Assignments

1. Implement binary search algorithm if array is sorted in descending order.
2. Implement linear search algorithm to find the nth occurence of the given element. If nth occurrence is not found, return -1.

```
int linearSearch(int[] arr, int key, int n);
```

```
Example: arr = {88, 33, 66, 99, 11, 77, 22, 55, 11};
    - if key = 11 and n = 2, then return index 8
    - if key = 11 and n = 1, then return index 4
    - if key = 11 and n = 3, then return index -1
```