Lab 02 – 23-09-2024

This is graded lab. Evaluation will be lenient but no compromise on cheating or any other violation. Therefore, please do your own work.

```
from time import *
from random import *

def init(size):
    return [i for i in range(size)]

def init_random(size):
    return [random() for i in range(size)]

def linear_search(x, TARGET):
    for element in x:
        if element == TARGET:
            return True
    return False

def binary_search(x, TARGET):
    start = 0
    end = len(x) - 1
    while start <= end:
        mid = (start + end) // 2
        if x[mid] == TARGET:
            return True
        elif x[mid] > TARGET:
            end = mid - 1
        else:
            start = mid + 1
    return False

size = 100000
search_size = 10000
x = init(size)
start = time()
for _ in range(search_size):
    binary_search(x, random())
stop= time()
print('Time in binary search: ', stop - start)
x = init_random(size)
start = time()
for _ in range(search_size):
    linear_search(x, random())
stop= time()
print('Time in linear search: ', stop - start)
```

Task 1: Run the python code 5 times and note down the output on paper.
Copy this code for practice task I will share later. Next do CPP programs.

Task 2: Input marks and print grades using if-else conditions. Repeat this task for simple if-else and composite if-else. See sample run for your understanding:

Grade Point System

Less than 50	F
50 – 54	D
55 – 57	C –
58 – 60	C
61 – 64	C +
65 – 69	B –
70 – 74	B
75 – 79	B +
80 – 84	A –
85 – 100	A

```
Marks: 62
Grade: C+

Marks: 81
Grade: A-
```

Simple If Condition: if (x > y)

Composite If Condition:

```
if (x > y && x < z)     && for logical and
if (x > y || x < z)     || for logical or
```

Task 3: Input three numbers, the numbers can be in any order. Using if condition print numbers in order:

```
N1: 23
N2: 15
N3: 29
15 23 29

N1: 33
N2: 15
N3: 9
9 15 33
```