

## CO 225 - Lab 03 – Part C

### Wijerathne E.S.G. – E/18/397

- Lab03PartC.java was implemented by using Map
- Lab03PartD.java was implemented by using List
- Lab03PartE.java was implemented by using Set

#### Running Times

Lab03PartC – When input is E No.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartC StudentList
```

```
It took 51549800 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 191000 nano seconds for the printing output
```

```
It took 51740800 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartC StudentList
```

```
It took 2115800 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 441400 nano seconds for the printing output
```

```
It took 2557200 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartC StudentList
```

```
It took 1891100 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 433100 nano seconds for the printing output
```

```
It took 2324200 nano seconds for the whole process
```

### Lab03PartC – When input is letter.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java
Lab03PartC StudentList
```

```
It took 1955400 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
W
```

```
WIJERATHNE R.M.N.S.      E/18/398
```

```
WIJERATHNE E.S.G.       E/18/397
```

```
WEERARATHNE L.D.        E/18/382
```

```
WANDURAGALA T.D.B.      E/18/379
```

```
WIMALASIRI K.H.C.T.     E/18/402
```

```
It took 339824300 nano seconds for the printing output
```

```
It took 341779700 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java
Lab03PartC StudentList
```

```
It took 3788500 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
W
```

```
WIJERATHNE R.M.N.S.      E/18/398
```

```
WIJERATHNE E.S.G.       E/18/397
```

```
WEERARATHNE L.D.        E/18/382
```

```
WANDURAGALA T.D.B.      E/18/379
```

```
WIMALASIRI K.H.C.T.     E/18/402
```

```
It took 24159200 nano seconds for the printing output
```

```
It took 27947700 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java
Lab03PartC StudentList
```

```
It took 6187700 nano seconds to create the map
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
W
```

```
WIJERATHNE R.M.N.S.      E/18/398
```

```
WIJERATHNE E.S.G.       E/18/397
```

```
WEERARATHNE L.D.        E/18/382
```

```
WANDURAGALA T.D.B.      E/18/379
```

```
WIMALASIRI K.H.C.T.     E/18/402
```

```
It took 27147200 nano seconds for the printing output
```

```
It took 33334900 nano seconds for the whole process
```

- A Map is an object that maps keys to values. A map cannot contain duplicate keys: Each key can map to at most one value. It models the mathematical function abstraction.

## Lab03PartD – When input is E No.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 6748100 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
E/18/397
WIJERATHNE E.S.G.

It took 269300 nano seconds for the printing output
It took 7017400 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 2176500 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
E/18/397
WIJERATHNE E.S.G.

It took 254700 nano seconds for the printing output
It took 2431200 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 2611900 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
E/18/397
WIJERATHNE E.S.G.

It took 439500 nano seconds for the printing output
It took 3051400 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 3623200 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
E/18/397
WIJERATHNE E.S.G.

It took 485000 nano seconds for the printing output
It took 4108200 nano seconds for the whole process
```

### Lab03PartD – When input is letter.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 2595200 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
E/18/397      WIJERATHNE E.S.G.
E/18/398      WIJERATHNE R.M.N.S.
E/18/382      WEERARATHNE L.D.
E/18/379      WANDURAGALA T.D.B.
E/18/402      WIMALASIRI K.H.C.T.

It took 25777500 nano seconds for the printing output
It took 28372700 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 2200800 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
E/18/397      WIJERATHNE E.S.G.
E/18/398      WIJERATHNE R.M.N.S.
E/18/382      WEERARATHNE L.D.
E/18/379      WANDURAGALA T.D.B.
E/18/402      WIMALASIRI K.H.C.T.

It took 21853500 nano seconds for the printing output
It took 24054300 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList

It took 3584900 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
E/18/397      WIJERATHNE E.S.G.
E/18/398      WIJERATHNE R.M.N.S.
E/18/382      WEERARATHNE L.D.
E/18/379      WANDURAGALA T.D.B.
E/18/402      WIMALASIRI K.H.C.T.

It took 21652800 nano seconds for the printing output
It took 25237700 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartD StudentList
```

- List in Java provides the facility to maintain the ordered collection. It contains the index-based methods to insert, update, delete and search the elements. It can have the duplicate elements also.

### Lab03PartE – When input is E No.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList
```

```
It took 6228100 nano seconds to create the set
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 361300 nano seconds for the printing output
```

```
It took 6589400 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList
```

```
It took 1740600 nano seconds to create the set
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 387600 nano seconds for the printing output
```

```
It took 2128200 nano seconds for the whole process
```

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList
```

```
It took 1765400 nano seconds to create the set
```

```
Enter Reg no in E/YY/XXX format or starting letter of the surname
```

```
E/18/397
```

```
WIJERATHNE E.S.G.
```

```
It took 356000 nano seconds for the printing output
```

```
It took 2121400 nano seconds for the whole process
```

### Lab03PartE – When input is letter.

```
PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList

It took 2028700 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
WIJERATHNE R.M.N.S.      E/18/398
WIMALASIRI K.H.C.T.     E/18/402
WANDURAGALA T.D.B.      E/18/379
WIJERATHNE E.S.G.       E/18/397
WEERARATHNE L.D.        E/18/382

It took 14853000 nano seconds for the printing output
It took 16881700 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList

It took 2086000 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
WIJERATHNE R.M.N.S.      E/18/398
WIMALASIRI K.H.C.T.     E/18/402
WANDURAGALA T.D.B.      E/18/379
WIJERATHNE E.S.G.       E/18/397
WEERARATHNE L.D.        E/18/382

It took 9657100 nano seconds for the printing output
It took 11743100 nano seconds for the whole process

PS D:\my files\Semester 4\C0225 Software Construction\labs\lab3> java Lab03PartE StudentList

It took 1981500 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname
W
WIJERATHNE R.M.N.S.      E/18/398
WIMALASIRI K.H.C.T.     E/18/402
WANDURAGALA T.D.B.      E/18/379
WIJERATHNE E.S.G.       E/18/397
WEERARATHNE L.D.        E/18/382

It took 19812800 nano seconds for the printing output
It took 21794300 nano seconds for the whole process
```

- The set is an interface available in the java.util package. The set interface extends the Collection interface. An unordered collection or list in which duplicates are not allowed is referred to as a collection interface. The set interface is used to create the mathematical set. The set interface use collection interface's methods to avoid the insertion of the same elements.

## Conclusion

Calculating Average Times using above results

Trial	making time in nanoseconds		
	Map	List	Set
1	2115800	2176500	6228100
2	1891100	2611900	1740600
3	3339800	3623200	1765400
4	3788500	2200800	2028700
5	6187700	3584900	2086000
6	4388300	3238200	1981500
Average time	3618533	2905917	2638383

Table 01: Time to insert data into different data instructions

- As seen in above table inserting data into set is much faster.

Trial	Map		List		Set	
	E.No as inp.	Letter as inp.	E.No as inp.	Letter as inp.	E.No as inp.	Letter as inp.
1	441400	24159200	254700	21853500	361300	14853000
2	433100	27147200	439500	21652800	387600	9657100
3	472700	29529800	485000	25390300	356000	19812800
Average time	449066.67	26945400	393066.67	22965533.3	368300	14774300

Table 02: Time take by two operations in different data structures (Time is in nano seconds)

- As seen in this table implementations of lab 03-part C functionalities also fast in set implementation