

CO 225 – LAB 03 – PART C

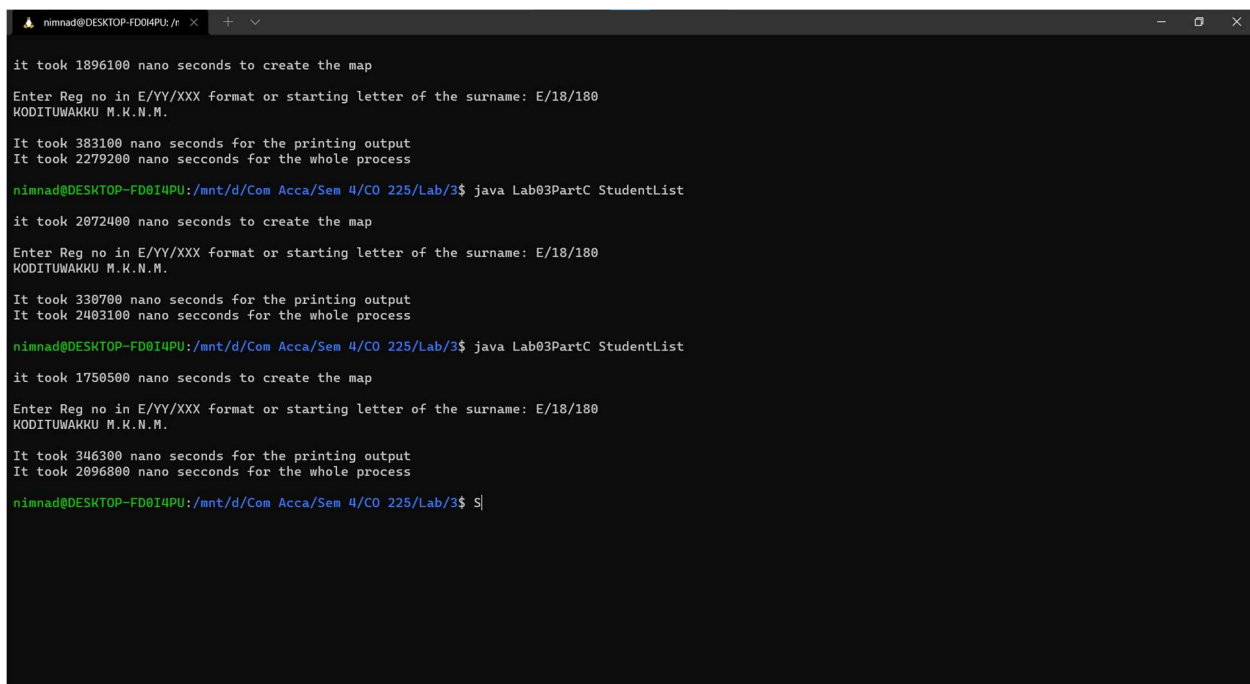
E/18/180 – KODITUWAKKU M.K.N.M.

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

Running times

Part C-Map

When inputting a E-number



```
nimnad@DESKTOP-FD0M4PU: /r
+ - x

it took 1896100 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUWAKKU M.K.N.M.

It took 383100 nano seconds for the printing output
It took 2279200 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartC StudentList

it took 2072400 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUWAKKU M.K.N.M.

It took 330700 nano seconds for the printing output
It took 2403100 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartC StudentList

it took 1750500 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUWAKKU M.K.N.M.

It took 346300 nano seconds for the printing output
It took 2096800 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ s|
```

When inputting a letter

```
ninnad@DESKTOP-FD014PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartC StudentList
it took 1865780 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/181      KONARA K.M.S.L.
E/18/180      KODITUMAKKU N.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
It took 22294600 nano seconds for the printing output
It took 24168300 nano seconds for the whole process
ninnad@DESKTOP-FD014PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartC StudentList
it took 1956780 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/181      KONARA K.M.S.L.
E/18/180      KODITUMAKKU N.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
It took 19888900 nano seconds for the printing output
It took 20965600 nano seconds for the whole process
ninnad@DESKTOP-FD014PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartC StudentList
it took 1817480 nano seconds to create the map
Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/181      KONARA K.M.S.L.
E/18/180      KODITUMAKKU N.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
It took 22453300 nano seconds for the printing output
It took 24278700 nano seconds for the whole process
ninnad@DESKTOP-FD014PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ |
```

- 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.

Part D-List

When inputting a E-number

```
nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 2101700 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUNAKKU M.K.N.M.

It took 291900 nano seconds for the printing output
It took 2393600 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 1870600 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUNAKKU M.K.N.M.

It took 397500 nano seconds for the printing output
It took 2268100 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 2219200 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: E/18/180
KODITUNAKKU M.K.N.M.

It took 351500 nano seconds for the printing output
It took 2570700 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ |
```

When inputting a letter

```
nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 1998000 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
E/18/181      KOMARA K.M.S.L.
E/18/180      KODITUNAKKU M.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.

It took 18633400 nano seconds for the printing output
It took 20631400 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 2226200 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
E/18/181      KOMARA K.M.S.L.
E/18/180      KODITUNAKKU M.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.

It took 19923900 nano seconds for the printing output
It took 22150100 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartD StudentList

It took 2250700 nano seconds to create the ArrayList

Enter Reg no in E/YY/XXX format or starting letter of the surname: k
E/18/170      KARUNARATHNA W.K.
E/18/168      KARAN R.
E/18/181      KOMARA K.M.S.L.
E/18/180      KODITUNAKKU M.K.N.M.
E/18/177      KHAN A.K.M.S.
E/18/173      KASTHURIPITIYA K.A.I.M.

It took 19527300 nano seconds for the printing output
It took 21778000 nano seconds for the whole process

nimmad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ |
```

- 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.

Part E-Set

When inputting a E-number

```
nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2149400 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : E/18/180
KODITUNAWAKKU M.K.N.M.

It took 404100 nano seconds for the printing output
It took 2553500 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2184200 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : E/18/180
KODITUNAWAKKU M.K.N.M.

It took 392100 nano seconds for the printing output
It took 2576300 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2203500 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : E/18/180
KODITUNAWAKKU M.K.N.M.

It took 474000 nano seconds for the printing output
It took 2677500 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ |
```

When inputting a letter

```
nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2104400 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : k
E/18/177 KHAN A.K.M.S.
E/18/168 KARAN R.
E/18/180 KODITUNAWAKKU M.K.N.M.
E/18/170 KARUNARATHNA W.K.
E/18/173 KASTHURIPITIYA K.A.I.M.
E/18/181 KONARA K.M.S.L.

It took 1770200 nano seconds for the printing output
It took 19807200 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2037600 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : k
E/18/177 KHAN A.K.M.S.
E/18/168 KARAN R.
E/18/180 KODITUNAWAKKU M.K.N.M.
E/18/170 KARUNARATHNA W.K.
E/18/173 KASTHURIPITIYA K.A.I.M.
E/18/181 KONARA K.M.S.L.

It took 18579600 nano seconds for the printing output
It took 20617200 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ java Lab03PartE StudentList

It took 2063700 nano seconds to create the set

Enter Reg no in E/YY/XXX format or starting letter of the surname : k
E/18/177 KHAN A.K.M.S.
E/18/168 KARAN R.
E/18/180 KODITUNAWAKKU M.K.N.M.
E/18/170 KARUNARATHNA W.K.
E/18/173 KASTHURIPITIYA K.A.I.M.
E/18/181 KONARA K.M.S.L.

It took 19720000 nano seconds for the printing output
It took 21783700 nano seconds for the whole process

nimnad@DESKTOP-FD0I4PU: /mnt/d/Com Acca/Sem 4/CO 225/Lab/3$ |
```

- 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.

1. Time to insert data into different data instructions

Trial	Making time in nanoseconds		
	Map	List	Set
1	1896100	2101700	2149400
2	2072400	1870600	2184200
3	1750500	2219200	2203500
4	1865700	1998000	2104400
5	1956700	2226200	2037600
6	1817400	2250700	2063700
Avg. Time	1893133.333	2111066.667	2123800

- From above results inserting data into map is faster than other two.

2. Time taken by two operations in different data structures

Trial	Map		List		Set	
	Enum as input	Letter as input	Enum as input	Letter as input	Enum as input	Letter as input
1	383100	22294600	291900	18633400	404100	17702800
2	330700	19008900	397500	19923900	392100	18579600
3	346300	22453300	351500	19527300	474000	19720000
Avg. Time	353366.6667	21252266.67	346966.6667	19361533.33	423400	18667466.67
Overall Avg. Time	10802816.67		9854250		9545433.333	

From the results we can obtain that functionality is fast is Set implementation.