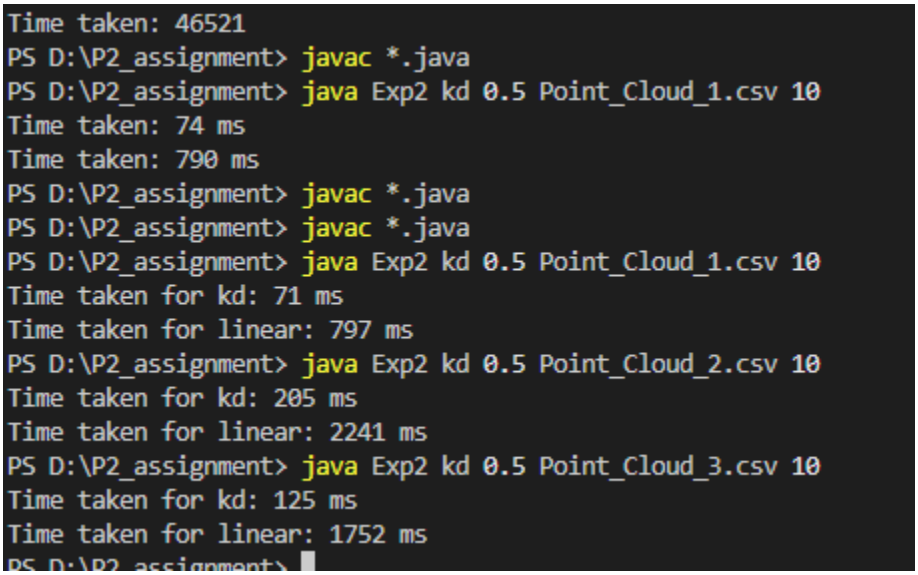
Programming Assignment

Experiment 1:

From the file exp1 subdirectory, 2 class NN and NNKD provide the same results of number of neighbors points

Experiment 2:



As from running we can see the time computing to find the number of neighbors from the list points for using NeareastNeighborsKD is much faster.

Experiment 3:

```
PS D:\Assignment4\P1_sol_finalized> javac *.java
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_2.csv 1.2 10
FAST
Cluster sizes: [28960,13695,2949,1691,860,698,672,355,199,125,82,77,57,55,53,30,27,25,24,24,20,19,19,18,17,17,16,15,10,]
Number of Points: 50821
Time taken15153
PS D:\Assignment4\P1_sol_finalized> javac *.java
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_2.csv 1.2 10
SLOW
Number of Points: 50821
Time taken 20713
PS D:\Assignment4\P1_sol_finalized> javac *.java
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_2.csv 1.2 10
Linear
Cluster sizes: [28960,13695,2949,1691,860,698,672,355,199,125,82,77,57,55,53,30,27,25,24,24,20,19,19,18,17,17,16,15,10,]
Noise: 12
Number of Points: 50821
Time taken 21024
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_1.csv 1.2 10
Linear
Cluster sizes: [9800,8033,2484,2029,1730,1445,779,726,657,342,328,268,202,192,138,104,93,56,45,22,22,18,16,15,14,13,13,13,13,]
Noise: 23
Number of Points: 29633
Time taken 6820
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_3.csv 1.2 10
Linear
Cluster sizes: [13401,10525,8086,6354,3170,862,363,312,297,280,239,209,137,93,92,75,65,62,61,39,39,32,31,28,28,23,23,22,20,20,19,17,17,16,15,14,13,12,12,11,]
Noise: 7
Number of Points: 45141
Time taken 13676
PS D:\Assignment4\P1_sol_finalized> javac *.java
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_1.csv 1.2 10
KD
Cluster sizes: [9800,8033,2484,2029,1730,1445,779,726,657,342,328,268,202,192,138,104,93,56,45,22,22,18,16,15,14,13,13,13,13,]
Noise: 23
Number of Points: 29633
Time taken 4867
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_2.csv 1.2 10
KD
Cluster sizes: [28960,13695,2949,1691,860,698,672,355,199,125,82,77,57,55,53,30,27,25,24,24,20,19,19,18,17,17,16,15,10,]
Noise: 12
Number of Points: 50821
Time taken 16215
PS D:\Assignment4\P1_sol_finalized> java -Xmx1024m DBScan .\Point_Cloud_3.csv 1.2 10
KD
Cluster sizes: [13401,10525,8086,6354,3170,862,363,312,297,280,239,209,137,93,92,75,65,62,61,39,39,32,31,28,28,23,23,22,20,20,19,17,17,16,15,14,13,12,12,11,]
Noise: 7
Number of Points: 45141
```

For DBScan both method basically works well and providing the same results. However using KD class is much faster than usual.

P/s: Running DBScan using either class KD and Linear by changing the Boolean variable inside DBScan class