**Project 4**

[Project 4](https://fcps.blackboard.com/webapps/blackboard/content/listContent.jsp?course_id=_1516674_1&content_id=_43601203_1&mode=reset)

Write a CPP file (l041.cpp) in which

**a) PART 1**

 Create the method part1() that generates 100 2-dimensional points (in the unit square [0, 1])  then cluster them into 5 clusters using Loyd's algorithm.

You will output the file clusters.ppm in which all the points will be displayed  using 5 different colors (each point will be displayed using a very small circle of radius 2 for better visibility).

**Update 2021/01/05:**

**In the ppm also draw a black circle of radius 3 for all k-means (should be 5 black circles)**

**Also fill in the document with 2 sample runs of your application:**[**Project 4 Part 1.docx**](https://fcps.blackboard.com/bbcswebdav/pid-44395967-dt-content-rid-49343096_2/xid-49343096_2)[**Project 4 Part 1.docx - Alternative Formats**](https://fcps.blackboard.com/webapps/blackboard/content/listContent.jsp?course_id=_1516674_1&content_id=_43601203_1&mode=reset)

Write your lab in such a way that can be scaled very easily to a different number of clusters and different number of features.

Resources for this lab:

**Video lecture on Lloyd's algorithm for K-Means Clustering :**

**https://www.youtube.com/watch?v=IuRb3y8qKX4**

Read the following paper on k-d trees which we will need in future parts:

[k-means-with-kdtree.pdf](https://fcps.blackboard.com/bbcswebdav/pid-44395967-dt-content-rid-49130904_2/xid-49130904_2) [k-means-with-kdtree.pdf - Alternative Formats](https://fcps.blackboard.com/webapps/blackboard/content/listContent.jsp?course_id=_1516674_1&content_id=_43601203_1&mode=reset)

**Video link to Prof. Sedgewick's lecture on kd-trees :**

**https://www.youtube.com/watch?v=BqipVbEE9BM&list=PLRdD1c6QbAqJn0606RlOR6T3yUqFWKwmX&index=49**