Name of the Students:
Erkin Aydin ID: 22002956 (I am undergrad and I will do the project single)

Name of the Project:
Implementation of two-dimensional (2D) Convex Hull construction algorithms and comparing their performances

Description (Taken from the website, as I am an undergrad):
I will implement and compare the following Convex Hull algorithms to calculate and visualize the Convex Hull of a set of 2D points:

- Graham's Scan Algorithm.
- Jarvis March Algorithm.
- Quick Hull Algorithm.
- Merge Hull Algorithm.

My program will generate the desired number of 2D points using the following distributions:

- Gaussian Distribution.
- Uniform Distribution.

We should be able to move and zoom in/out the 2D display of the points and the corresponding Convex Hull. We should be able to add new points manually by clicking on a specific position in the 2D space, which should cause the currently selected Convex Hull Algorithm to recalculate the modified Convex Hull. I will include an option to visualize the algorithms step-by-step; for example, we will see the partial Convex Hull being updated in an animated manner while the algorithm runs.

I will compare the performance of the three approaches using a reasonable number of test cases, e.g., starting with 1,000 and going up to 10,000,000 for constructing the Convex Hull from scratch. Also, I will compare the Convex Hull construction times in a dynamic setting; for example, start with an existing Convex Hull, add one new point to the space, and compare the performance of recalculating the Convex Hull with different approaches. In this case, the previously existing points will keep their order, and various algorithms will benefit from this configuration. In my report, I will also compare the performance of adding different numbers of points to an existing Convex Hull.