

This Project is of a student database system used to track each undergraduate at an institution. This Project includes methods to ass, store, retrieve, visualize, and analyze data, such as an operation to search for a specific ID Number.

Student Class, ID, Name, Age, GPA, Major,

Methods, Used constructor with error checking for input/output.

displayinfor(), Show student info

updategpa(newGPA), Update for student GPA

Student Database, properties, array of objects used for students

addStudent(student), add student to database as an object

findStudentByID(ID): Finds student based on ID number

getStudentByMajor(major): Returns array of students in terms of major

saveToFile(filename): Saves database as a mat file with error handling

loadFromFile(filename): Loads database as a mat file with error handling

plotGpaDistribution(): For histogram visual

plotAverageGpaByMajor(): Uses Bar Chart to demonstrate GPA

plotAgeDistribution(): Histogram for student ages

plotGpaVsAgeInteractive(): Interactive scatter plot

plotGpaBoxPlotByMajor(): Box plot for GPA by major

gpaSummaryStatistics(): Include summary stats, such as S.D.

Run Main.m for the full list of students in order from 1-200.

To find specific student based on ID number, just run this as a file with database components.

```
% Search for student by ID Number, e.g., Student 22
student_id = 22;
specific_student = db.findStudentByID(student_id);
% Show the student's info when and if found
if ~isempty(specific_student)
    disp(['Displaying information for Student ' num2str(student_id) ':']);
    specific_student.displayInfo();
else
    disp(['Student with ID ' num2str(student_id) ' not found.']);
end
```

For Major run this as a separate file same way as previous.

```
% Specify the major you want to look for
desired_major = 'Mathematics';
% Retrieve students in major
students_in_major = db.getStudentsByMajor(desired_major);
% Check if any students were found and show their information
if ~isempty(students_in_major)
    fprintf('Students in the %s major:\n', desired_major);
    for i = 1:length(students_in_major)
        students_in_major(i).displayInfo();
    end
end
```

```
else
    fprintf('No students found in the %s major.\n', desired_major);
end
```