

Criterion C – Development

I used Netbeans, powered by Java to program a database with interactions. I used different algorithms to create an organizational database with 2 complex calculation features.

Summary of All Techniques:

- Parameter passing
- Random number
- For Loops
- Nested Loops
- While Loops
- Do While Loop
- Method Returning a Value
- Used defined objects made from OOP “template” class
- Encapsulation of private methods that work on public attribute of a “template” class
- Setting attributes
- Making an array of objects
- Simple & Compound selection (if/else)
- Sorting
- Searching (Sequential Search)
- Saving
- Opening a file to a table
- String Tokenizer
- Flag Values
- GUI (Radio Button, Combo Box, GUI Table)
- GUI Pop-up Menu’s
- Passing a file using String Tokenizer
- Gregorian Calendar
- Buffered Reader
- Buffered Writer
- Try and catch phrases
- File Writer
- File Reader
- File Chooser
- Row Vector (adding a row with every input)
- Swing Objects
- Class Referencing
- Parsing
- Mathematical processing of data input

Structure of the Program:

This program is divided into several different classes to make the program more efficient and quick. There is a template class that defines the Students and what different events they will be recording. Then there is a class that is for sorting and searching, this is used with the display table. Also a small sub-class is for finding the best trial of either a distance event, which consists of 3 trials or a timed event that consists of 2 trials. Then there are two major subclasses for the calculation of the best scores and calculating the averages of the data input. The main class is the MainGUI class where the interactions with the GUI are coded (eg. displaying the students in the display table), and also call for the different classes to output the most complex features (eg. the best scores.)

Data Structures Used:

In my program I used mainly the ArrayList, which is a non-static array that can have elements added and the size of it can be adjusted. My main ArrayList was the Student ArrayList, which was made up of 23 attributes. The reason this array of students is an ArrayList is because the number of students is not known before input, therefore each time a new student is added, a new "Student" element is created in the Student ArrayList. Another ArrayList that was used was for the complex calculations, which took in the elements of only a certain 'class' or 'year' so that the calculations would be focused on only those selected elements of a certain class or year.

I also used an ordinary array to send Strings, which were the 3 top scores found along with the names of the students that scored these best scores. I used an array because a return method can only return one object, so I used an array to send the 6 Strings that needed to be displayed.

The program also uses a feature of File Structuring. This feature was to save the Students that were input into the program using FileWriter. Then also FileReader to be able to open the saved files and display the Students previously saved into the display table.

Main Unique Algorithm

My program takes in Students and their scores and transfers them into an object into an ArrayList. The name and class go in as String, distances as doubles and times are set as GregorianCalendar object. These objects are displayed in the display table and can be sorted or searched by simple algorithms, which can be called for. The main 2 most complex algorithms are finding the Best Score of either a class, year or overall and the average of a class or year. The Best Score method is divided into the class method, the year method and overall method. Each takes in the StudentList, what class/year to search in and the event. The method selects out the objects with the given class/year into another ArrayList. This ArrayList is sorted by the scores of the selected event.

User Interface/GUI Work

In my program I used the GUI feature of NetBeans, which adds more complexity to the program. The GUI feature is to make the user interface much more simple as the program will open up as a window, so it is easier to use. The GUI offers many different features such as tabs, text fields, button, button groups and combo boxes, all to make the program more user friendly. As the user uses the GUI each section or button refers to the code behind the program and carries out a certain action.

Software Tools Used

The software tool I used to create my program was Netbeans. This program is free to download and uses the Java language, which is why it was the best possible option for this school project. Netbeans also has many helpful features as it can import already prepared code to make workflow easier. Also for the GUI feature Netbeans generates the ground base code for the GUI visual features.