Software Development 2 – Assignment 1

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# 1.0) Assignment Outline

The purpose of this assignment is to design an application that can be used by lecturers to input student names and their associated grades.

The program will then present a menu with 5 options, the options will allow the lecture to view the Average grade, lowest grade, highest grade, Sort and Display in ascending order and search by student name.

This document outlines some of the challenges faced during the assignment(1.0) and what sourced I used to overcome them(1.6). It contains a Flowchat(1.2) of the program and Pseudocode for the program(1.3). There is also Sample test data(1.4) that outlines the tests conducted on the code, the sample data and the expected outcome. Lastly, there are screen shots of the programs UI(1.5), the screen shot outline each step of using the program.

# 1.1) Assignment Challenges

During the assignment I faced several issues. The primary issues were in forcing the user to input student names with characters only, sorting the array in ascending order during the menu option and searching by name in the array.

### Forcing user to enter name with characters only.

I was able to come to a solution to the problem with the help of a thread on StackOverflow. In the post, I saw the use of a regular expression this helped me in my code by guiding me to use the matches method to validate that the string contained characters only.

### Sorting the array

I had some difficulty figuring out how to sort my array, a google search pointed me to towards the array.sort function. This will take the array and sort it in ascending order. It uses the quicksort algorithm to sort the data in the array in ascending order. Code examples from past lectures enabled me to use the function in my code.

### Searching by name

I was able to implement a linear search to search by student name in the array. This method of search was suitable as the array size is quite small and unsorted. I was able to implement the search in the program through previous lectures and from discussions on StackOverflow about performing similar searches in arrays.

# 1.2) Flow Chart

### 1.2.1) P1

A diagram of a flowchart

Description automatically generated

### 1.2.2) P2

A diagram of a flowchart

Description automatically generated

### 1.2.3) P3

A diagram of a diagram

Description automatically generated

# 1.3) Pseudocode

Start

Import scanner

Import Arrays

Declare variables

Method: GradingApplication

Do {

Print: how many results to be entered

Read numOfResults

While numOfResults < 3 or > 26

Initialize array

declare studentName = string[numOfResults]

declare studentGrade = int[numOfResults]

Method: processResults

for i = 0; 1 < numOfResults; i++

Print: Enter student name

While studenName[i] contains non-alphabetical characters

Print: invalid input, characters only

Print: please enter grade

studentGrade[i]

While studentgrade < 1 || > 100

Print: invalid input, number between 1 and 100 only

Method: Calculate Average:

Total = 0

For each grade in studentGrades

Total += grade

Total / numOfResults

Method: Calculate Lowest:

minGrade = studentGrades[0]

Find lowest grade

for i from 1 to numOfResults - 1:

if studentGrades[i] < minGrade:

minGrade = studentGrades[i]

return minGrade

Method: Highest grade

maxGrade = StudentGrade[0]

for i from 1 to numOfResults - 1:

if studentGrades[i] > maxGrade:

maxGrade = studentGrades[i]

return maxGrade

Method: searchStudentByName

searchStudentByName(name: String):

Loop through each student's name

For each studentName in studentNames:

Check if the current student's name matches the name being searched

if studentName equalsIgnoreCase name:

Return the index of the student if found

return index of the current student

If the student is not found, return -1

Main Method:

Declare scanner as myInput

Int = userChoice

Do:

Print menu options 1 to 6

Read userChoice

Switch statement

case 1: Display average class grade

Print Average class grade

case 2: Display lowest class grade

Print Lowest class grade

case 3: Display highest class grade

Print Highest class grade

case 4: Sort & Display the grades in ascending order

Sort and display grades

Case 5: // Search for an individual student by name

Print Enter the name of the student you want to find:

Read the student's name from the user

Find the student's index by searching for their name in the list of students

If the student's index is not equal to -1:

Print "Student found:"

Print "Name: " followed by the name of the student at the found index

Print "Grade: " followed by the grade of the student at the found index

Else:

Print tudent not found

Case 6: // Exit

Exit the loop

End

# 1.4) Sample Test Data

|  |  |  |  |
| --- | --- | --- | --- |
| Test No. | Test Description | Sample test data | Expected outcome |
| 1. | No. of results to be entered | 1 & 100 | Re-prompt user to enter between 3 - 26 |
| 2. | Test student name | Robert! | Invalid input printed on screen |
| 3. | Test student result | 200 | Invalid input printed on screen |
| 4. | Test menu options | 1 to 6 | Option prints its corresponding information |
| 5. | Test menu options | 8 | Menu printed on screen again |

# 1.5) UI

A screenshot of a computer

Description automatically generated

# 1.6) Sources of help

|  |  |
| --- | --- |
| Loop until name with only letters is entered | <https://stackoverflow.com/questions/38279150/how-to-validate-input-string-using-while-loop>  <https://www.tutorialspoint.com/javaregex/javaregex_character_class_range.htm> |
| Sorting the array | <https://stackoverflow.com/questions/8938235/sort-an-array-in-java> |
| Searching by name in array | <https://vle-bn.tudublin.ie/pluginfile.php/204064/mod_resource/content/5/L3%20Searching.pdf>   <https://stackoverflow.com/questions/58490694/searching-a-array-for-unique-name-using-method> |