**ICS 104 Lab Project (Term 201)**

**Students Grade System**

**Implement a well-structured Python program that enables an instructor to maintain his students grades. The grade information is kept in a text-file of the form:**

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| **91007# Ahmad Said# 50.0 78.5 73.2**  **91004# Hassan Khan# 45.5 36.7 88.5**  **91003# Suleiman Wasim# 72.6 66.4 56.7**  **91002# Majed Sameer# 60.0 78.4 45.6**  **91006# Muhammad Adel# 85.5 69.8 44.5**  **91005# Muhsim Zuheir# 70.0 62.1 95.4**  **91001# Muneeb Abdullatif# 30.0 56.5 44.8** |

**The ‘#’ symbol separates the id from the name and from the grades i.e. each line has 2 ‘#’ symbols. The grades of each student are separated by one or more blanks. Each line of the text-file contains a unique student ID, the student first and last names, followed by test grades. No fixed number for number of test.**

**When your program starts, it will read all the information in the input file into list(s) or Dictionary. Then it will display the menu shown below.**

**1. Display Grade Info for all students**

**2. Display Grade Info for a particular student**

**3. Display tests average for all students**

**4. Modify a particular test grade for a particular student**

**5. Add test grades for a particular test for all students**

**6. Add a new Student**

**7. Delete a student**

**8. Exit**

**Please select your choice:**

**Your program must loop as long as option 8 has not been selected. It must display an appropriate error message if an invalid choice is entered. Each of the options must be implemented in separate function.**

**The options must have the following behaviors:**

**Option 1: Display Grade Info for all students**

**It displays the grade information of all students. The option must be implemented by reading directly from grades text-file. It then waits for the Enter key to be pressed before returning control to the main menu:**

**Please select your choice: 1**

**StudentID Student Name Test1 Test2 Test3**

**91007 Ahmad Said 50.0 78.5 73.2**

**91004 Hassan Khan 45.5 36.7 88.5**

**91003 Suleiman Wasim 72.6 66.4 56.7**

**91002 Majed Sameer 60.0 78.4 45.6**

**91006 Muhammad Adel 85.5 69.8 44.5**

**91005 Muhsim Zuheir 70.0 62.1 95.4**

**91001 Muneeb Abdullatif 30.0 56.5 44.8**

**Press Enter key to continue . . .**

**Note: The number of quizzes displayed depends on the number of quizzes in the grades text-file. Initially, if the file has no test grades; it has only student IDs and their corresponding names.**

**Option 2: Display Grade Info for a particular student**

**It prompts for and reads the studentID. It then searches for this studentID in the array of students’ objects. If the ID is not found an appropriate error message is displayed, otherwise; the student information is displayed. In both cases, the option waits for the Enter key to be pressed before returning control to the main menu.**

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| **Please select your choice: 2**  **Enter studentID: 91006**  **StudentID Student Name Test1 Test2 Test3**  **91006 Muhammad Adel 85.5 69.8 44.5.0**  **Press Enter key to continue . . .** |
| **Please select your choice: 2**  **Enter accountID: 91552**  **Error: Invalid student ID**  **Press Enter key to continue . . .** |

**Option 3: Display quiz averages for all students**

**The option displays the quiz grades and quiz averages of all students. Control is then returned to the main menu after pressing the Enter key.**

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| **Please select your choice: 3**  **StudentID Student Name Average**  **91007 Ahmad Said 65.1**  **91004 Hassan Khan 56.3**  **91003 Suleiman Wasim 80.7**  **91002 Majed Sameer 60.6**  **91006 Muhammad Adel 92.1**  **91005 Muhsim Zuheir 83.3**  **91001 Muneeb Abdullatif 51.0**  **Press Enter key to continue . . .** |

**Note: The average depends on the number of tests. Your program must work correctly for any number of tests taken. An appropriate message must be displayed if students have not taken any test.**

**Option 4. Modify a particular test grade for a particular student**

**It prompts for and reads a studentID, the test number, and the new test grade. If the test number is invalid, or the new test grade is negative or greater than 100 an appropriate error message is displayed; otherwise it searches for this studentID. If the studentID is not found an appropriate error message is displayed, otherwise; the student grade is updated in the list.**

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| **Please select your choice: 4**  **Please enter studentID: 91003**  **Please enter quiz number to modify: 2**  **Please enter new quiz 2 grade: 80.0**  **Before grade modification: 91003 Suleiman Wasim 72.6 75.0 85.0 90.0 80.7**  **After grade modification: 91003 Suleiman Wasim 72.6 80.0 85.0 90.0 80.7**  **Press Enter key to continue . . .** |
| **Please select your choice: 4**  **Please enter quiz number to modify: 6**  **Please enter new quiz 6 grade: 70.0**  **Error: Invalid quiz number**  **Press Enter key to continue . . .** |

**Control is returned to the main menu after pressing the Enter key.**

**Option 5: Add test grades for the next test for all students**

**It prompts the user to enter student grades for test n + 1, where n is the current number of tests for each student. The program then prompts for and reads the new test grade of each student and update the test list or dictionary of each student.**

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| **Please select your choice: 5**  **Please enter test grades for Test#3**  **Please enter grade for student : 91007**  **60.5**  **Please enter grade for student : 91004**  **70.0**  **Please enter grade for student : 91003**  **85.0**  **Please enter grade for student : 91002**  **55.5**  **Please enter grade for student : 91006**  **95.0**  **Please enter grade for student : 91005**  **90.5**  **Please enter grade for student : 91001**  **66.5**  **Press Enter key to continue . . .** |

**Note: An error message must be displayed when any invalid grade is entered.**

**Option 6: Add New Student**

**It prompts for and read the ID of the student to be added. It will check if a student with same id already exists in the Students list. If not, it will be added by reading the remaining information i.e. name and quizzes and added as a student object to the array of students.**

**If the student with same id already exists, an error message will be displayed.**

**Option 7: Delete Student**

**To implement option 7, search the Students list r dictionary for the studentID of the student to be deleted. If found, delete it from the list/dictionary. If the studentID does not exist, display an error;**

**Option 8: Exit**

**Save all data to the file, then terminate the program.**

**The following items must be observed when you write your code:**

* **Comments are important they are worth. (worth 5%)**
* **The code must use meaningful variable names and modular programming (worth 10%)**
* **Global variables are not allowed. You should learn how to pass parameters to functions and receive results.**
* **You must submit a working program. Non-working parts can be submitted separately. If a team submits a non-working program, it loses 20% of the grade.**
* **User input must be validated by the program i.e. valid range and valid type**
* **Your code has to be limited to the material covered in the lectures and Lab.**
* **The deadline for submitting the lab project is Friday December 4 before midnight.**
* **Submitting Saturday before midnight will lead to 5% penalty**
* **Submitting Sunday before midnight 15% penalty**

**Deliverable:**

**Each team has to submit:**

* **The code as a Jupyter notebook**
* **The report as part of the Jupyter notebook or as a separate word file. The report will describe how you solved the problem. In addition, you need to describe the different functions with their task and screen shots of your running code. (worth 5%)**

**Lab demo/presentation:**

* **The week of December 6 to 10 will be used for lab project presentations.**
* **A slot of 15 minutes will be allocated to each team for their presentation and questions**
* **Students who do not appear for lab demo/presentation will get 0.**

**Note:**

* **The project must be your own work.**
* **You must not share code with any other project group.**
* **Teams of 2 students will be formed. Choose your partner from any of my lab sections 70 or 57 (write your names on the excel sheet posted on MS Teams)**
* **The the project will be submitted on blackboard. The deadline is indicated above.**
* **Cheating in any form will result in a grade of F in the course.**