UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University UAEU College of Information Technology

# Programming Lab 1 (CSBP121)

Fall 2021

## Project

## *Rubrics:*

| Assessment | Weight |
|---|---|
| **Methods (10 methods)** | 12 marks |
| **Full Program (No Errors in Main + working)** | 4 marks |
| **Presentation (Answer 2 questions out of 3)** | 4 marks |
| **Total** | 20 Marks |

## *Description:*

Write a program that helps your instructor in entering or displaying student details. Your main method should:

A. Prompt the user to enter the number of students registered in the section (less than 20).
B. Set valid names, IDs and marks. Use readData to read data from a file.

**Sample Input File <name id assignments exams>**

```
Ahmed_Salem    201201201   30    50
Rami_Hassan     202202202   20   40
```

C. Provide a menu of options (infinite loop) After reading and validating data. The menu includes the following list of main features and their requirements:

1. Find maximum mark:
    a. specify the marks (1. Assignments, 2. Exams, 3. Totals)
    b. print the result as full details of corresponding student.
2. Find minimum mark:
    a. specify the marks (1. Assignments, 2. Exams, 3. Totals)
    b. print the result as full details of corresponding student.
3. Find average
    a. specify the marks (1. Assignments, 2. Exams, 3. Totals)
    b. print the average.
4. Print details for a student:
    a. specify the student ID.
    b. print the result as full details of corresponding student.
5. Print details for all students

Your program must initialize at least the following global variables and arrays:

1. **names[20]:** Array of Strings to hold the names of the students, maximum number of students per section is 20.
2. **ids[20]:** Array of Strings to hold the IDs of the students, maximum number of students per class is 20.
3. **exams[20]:** Array of integers to hold the exams marks of the students.
4. **assignments[20]:** Array of integers to hold the assignments marks of the students.
5. **totals[20]:** Array of integers to hold the total marks of the students.
6. **examsW:** integer to hold the weight of exams and it has to be equal to 40.
7. **assignsW:** integer to hold the weight of exams and it has to be equal to 60.
8. **regStudents:** integer to hold the number of students registered in the section.

## *Your program must initialize at least the following methods:*

**1. readData:** (2 marks)

- Access file to get the name, ID, assignments mark and exams mark of every student from file "data.in".
- Call setValidName to set the validation of each name in the names[20] array.
- Call setValidID to set the validation of each ID in the ids[20] array.
- Call setValidMark to check the validation of the marks in the array of assignments[20] and exams[20] based on the provided weights.
- Save the data in names[20], IDs[20], assignments[20] and exams[20].
- Then calculate and fill array totals[20];
- Notify the user when the data is saved successfully

**2. setValidName:** (1.5 marks)

- The parameter is the index of the names.
- Check if a name in array (names) is valid name. (The name is valid if it has only character as alphabetic or underscore sample). Assume that name is separate by underscores instead of spaces, like: "Ahmed_Salem".
- In case of invalid name, the name will be printed and the user has to be prompted to enter a new value (the method must be terminated only in case of valid name entered).

**3. setValidID:** (1.5 marks)

- The parameter is the index of the ids.
- Check if an ID in array (ids) is valid id. (The id is valid if it has only character as number).
- In case of invalid ID, the ID will be printed and the user has to be prompted to enter a new value (the method must be terminated only in case of valid ID entered).

4. **setValidMark:** (1.5 marks)
    - The parameters are an index of mark and a character. The character is to specify if the mark is for an assignment or an exam. ‘A’ for assignment or ‘E’ for exams.
    - Check if a grade in array (assignments or exams) is valid. (The mark is valid if more than or equal to 0 and less than or equal to the assigned weight)
    - In case of invalid mark, the name will be printed and the user has to be prompted to enter a new value (the method must be terminated only in case of valid mark entered).

5. **getIndexByID:** (1 marks)
    - Return index for a specific student ID.

6. **getMaxIndex:** (0.5 marks)
    - Return the index of the maximum value in an array.

7. **getMinIndex:** (0.5 marks)
    - Return the index of the minimum value in an array.

8. **getAvg:** (1 marks)
    - Return average of values in an array.

9. **PrintDetailsByID:** (1 marks)
    - Print the ID, name, assignments, exams, and total mark of a student for a given ID in the following format:

| ID | Name | Assignments | Exams | Total |
|---|---|---|---|---|

10. **printDetails:** (1.5 marks)
    - Print full details for all students which are the ID, name, assignments, exams and total of all student in the following format:

| ID | Name | Assignments | Exams | Total |
|---|---|---|---|---|