

## Assignment 7

In this lab assignment, use **class** to create the data structure of student records. Each record contain RUID, student name, quiz grades, and exam grades. The data structure should be declared as below. All member data of the class are declared as private data.

```
class students {
public:
    // all necessary member functions here;

    // using the friend function in class
    friend void change_name() // passing necessary inputs

private:
    struct record {
        int RUID;
        string first_name;
        string last_name;
        vector <double> quiz_grades;
        array <double,3> exam_grades;
    };

    vector <record> student_records;
};
```

In this assignment, we also introduce the **friend** function of the class. A function can be declared as friend of the class as seen as above. A friend function is not a member function of the class. However, it has access to the private data of the class. To call the friend function in the main() function:

```
int main() {
    students stdn;
    change_name ( stdn, <any additional input here>);
}
```

The program should work as follow,

- Starting the program, the menu displayed as follow and wait for user input  
**Welcome to class list!**

**Select the following options (-1 to quit):**

1. Print current list.
2. Add new records to the list.
3. Find record by RUID (binary search).
4. Delete record by RUID.
5. Change name in the record (using FRIEND function).

- Option 1: Print the list of the current records. If the list is empty, prompt the user to input new student records by entering first name and last name, the RUID and grades should be generated using appropriate random numbers. (RUIDs should be 4-digit numbers). (-1 to finish making new record and display the list).
- Option 2: Add new record to the list by entering first name and last name. (-1 to finish and display the list).
- Option 3: Search for a student record using RUID and display if record found. Display appropriate message if not found RUID.
- Option 4: Delete a record using RUID. Display appropriate message if not found RUID.
- Option 5: Change the name in the record using **friend** function. Use RUID to search for the record.

When inputting the names for the new records, enter -1 to exit making new records and display the list. Use **try/catch** to catch the error of input of -1 to **string first\_name** or **last\_name** variable and prevent your program from crashing.

Write a header file for class definition, a cpp file for the functions of the class, and a main.cpp file. Submit all 3 files for this assignment.

Look in the following sample out for the guideline of your program. The program quit on -1 input.

Welcome to class list!

Select the following options (-1 to quit):

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1

The student list is empty. Enter new student record (-1 to quit)

Student 1 first name: Mary  
Student 1 last name: Jane  
Student 2 first name: James  
Student 2 last name: Page  
Student 3 first name: Michael  
Student 3 last name: -1

Student	RUID	First Name	Last Name	Quiz Score	Exam Score
1	8003	Mary	Jane	72	44
				47	35
				83	61
2	4247	James	Page	52	13
				88	69
				61	87

Select the following options (-1 to quit):

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2

Student 3 first name: Michael  
Student 3 last name: Lang  
Student 4 first name: -1

Student	RUID	First Name	Last Name	Quiz Score	Exam Score
1	8003	Mary	Jane	72	44
				47	35
				83	61
2	4247	James	Page	52	13
				88	69
				61	87
3	5398	Michael	Lang	26	25
				43	6
				79	78

Select the following options (-1 to quit):

1. Print current list.
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4. Delete record by RUID.
5. Change name in the record (using FRIEND function).

3

Enter the RUID for searching (4-digit number): 5398

Found the following record:

RUID	First Name	Last Name	Quiz Score	Exam Score
5398	Michael	Lang	26 43 79	25 6 78

Select the following options (-1 to quit):

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2. Add new records to the list.
3. Find record by RUID (binary search).
4. Delete record by RUID.
5. Change name in the record (using FRIEND function).

4

Enter the RUID for deleting (4-digit number): 4247

Student	RUID	First Name	Last Name	Quiz Score	Exam Score
1	5398	Michael	Lang	26 43 79	25 6 78
2	8003	Mary	Jane	72 47 83	44 35 61

Note that the record is sorted by RUID after the searching.

Select the following options (-1 to quit):

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4. Delete record by RUID.
5. Change name in the record (using FRIEND function).

5

Enter the RUID for chaging name: 8003

Enter new first name: Jenny

Enter new Last name: Smith

RUID	First Name	Last Name	Quiz Score	Exam Score
8003	Jenny	Smith	72	44
			47	35
			83	61

Select the following options (-1 to quit):

1. Print current list.
2. Add new records to the list.
3. Find record by RUID (binary search).
4. Delete record by RUID.
5. Change name in the record (using FRIEND function).

-1

Program terminated.