Assignment 4 – Two Dimensional Arrays/Strings/User-Defined Classes

Deadline: **Wednesday August 2 by 11:59pm.**
Type: **Group Assignment**
Weight: **This assignment is worth 5% of your final grade**

Submission instructions:

- Provide comments for your code
- Compress the files using zip or other tools
- Submit the zip file on Moodle
- Do not submit executable files
- All submissions must be done through Moodle

Questions:

Q1. (30 marks) Write a C++ program to add the elements on the two diagonals of a square two-dimensional integer array and display that sum. Ensure that if there is a middle element in the array it is not counted twice in the sum.

For example, with the array:

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

your program should display 68 (1+6+11+16+4+7+10+13).

With the array:

1	2	3
5	6	7
9	10	11

your program should display 30 (1+6+11+3+9) (note that the 6 is not counted twice).

Q2. (35 marks) We want to create a class called **Employee**, which represents the employees of a department at the univerity. An employee is defined with the following attributes: employee id (**int**), first name (**string**), last name (**string**), date of birth (**string**), address (**string**), year hired (**int**), salary

(**double**) and telephone (area code (**int**) and 7-digit telephone number(**string**). The member functions of the class **Employee** must perform the following operations:

- Return the employee id number.
- Return the first name of the employee
- Modify the first name of the employee
- Return the last name of the employee
- Modify the last name of the employee
- Return the hired year of the employee
- Return the full name, i.e., first name and last name
- Return the date of birth
- Modify the date of birth
- Return the salary of the employee
- Modify the salary of the employee
- Return the address of the employee
- Modify the address of the employee
- Return the telephone number
- Modify the telephone number
- Return true if two given employees have the same last name. Return false otherwise
- Return true if two employees have the same salary or they were hired on the same year. Return false otherwise

Test your class by prompting the user to enter information about two particular employees. Create two objects of the class **Employee** with the information entered by the user, and finally, and test the member functions of the class.

Deliverables:

- A file called **employee.h** that contains the specification of the class.
- A file called **employee.cpp** that contains the implementation of the member functions of the class.
- A file called **testemployee.cpp** that contains the main function.

Q3. (35 marks) We want to create a class called **Department**, which represents the information of a department at the university. A department is defined with the following attributes: identification number (**string**), name (**string**), department history (**string**), and a list of employees worked in the department (array of type **Employee** from previous question). You can assume that a department cannot have more than 25 employees. The member functions of the class **Department** must perform the following operations:

- Return the department identification number
- Return the department name
- Modify the department name
- Return the department history
- Modify the department history
- Add a new employee to the department
- Remove one employee from a department

- Search if an employee with a certain employee id works in the department
- Output list of employees
- Output the number of employees

Test your class by prompting the user to enter information about one of the university department and five employees. Create the department object and five objects of the class Employee. Assign the employees to the department**.** Test the member functions of the class.

Deliverables:

- A file called **employee.h** that contains the specification of the class.
- A file called **employee.cpp** that contains the implementation of the member functions of the class.
- A file called **department.h** that contains the specification of the class.
- A file called **department.cpp** that contains the implementation of the member functions of the class.
- A file called **testdepartment.cpp** that contains the main function.