

# CSCI204/MCS9204/CSCI804

## Object and Generic Programming in C++

### Laboratory Exercise 6 (Week 8)

#### Task: A template function (1.0)

- Create a function template named **average(...)**. It accepts two arguments of the same type and computes their arithmetic average. The average is returned as a **double**
- Overload **the average(...)** function to work correctly with three arguments.
- Create a class named **CollegeCourse** with fields for the course ID (e.g. 'ENG101'), your grade (e.g. 'A') and the credits earned for the **CollegeCourse** (e.g. 3).
  - The **CollegeCourse** constructor accepts values for these fields as arguments, and calculates a forth field named **honorPoints**. Calculate honorPoints as the product of the grade points (4 for an A, 3 for a B, 2 for a C and 1 for a D) and the credits.
  - The **CollegeCourse** has a manipulator **setValues(...)** accepts values for these fields as arguments, and calculates the forth field named honorPoints.
  - Overload the **+ operator** so that honor points for courses can be summed to create a summary **CollegeCourse** object whose course ID is "Total" and grade is determined by ratio of the total honor points and the total credit point. The grade is 'F' if the ratio is less than 1.
  - Overload the **/ operator** so that a **CollegeCourse** object's honorPoints can be divided by an integer
  - Overload the **<< operator** to display the details of a **CollegeCourse**.

Save the implementation as **Averages.cpp**. Download the file **testAverages.cpp** in which declares several integers, doubles and **CollegeCourses** and verifies that both versions of **average(...)** work correctly with different arguments.

Compile the program like

`g++ testAverages.cpp`

Run the program like.

`./a.out`

average of 7 and 26 is 16

average of 39.25 and 2.01 is 20.63

average of

ENG101 Grade: A Credits: 3 Honor points: 12

PSY251 Grade: B Credits: 3 Honor points: 9

10.5

average of 7, 26 and 100 is 44

average of 39.25, 2.01 and 4.2 is 15.1533

average of

ENG101 Grade: A Credits: 3 Honor points: 12

PSY251 Grade: B Credits: 3 Honor points: 9

HIS301 Grade: D Credits: 4 Honor points: 4

8.33333

### **Submission:**

You should submit the files of tasks to the server by 11:59 PM on Friday, 22 April 2016 via command:

```
submit -u your-user-name -c CSCI204 -a L6 Averages.cpp
```

and input your password.

**Make sure that you use the correct file names. The UNIX system is case sensitive. You must submit all files in one *submit* command line.**

After submit your assignment successfully, please check your email of confirmation. You should keep this email for the reference.

**You would receive ZERO of the marks if your program codes could not be compiled correctly.**

**Later submission will not be accepted. Submission via e-mail is NOT acceptable.**

**End of Specification**