Department of Computer Science

COS110 2016
Practical 6

UNIVERSITEIT VAN PRETORIA
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1   Introduction

1.1   Submission

The submission deadline for this practical is **27 September 2016 at 11:59 PM**. You should aim to complete this assignment before the due date.

Fitchfork marks by comparing the output of your program with specified expected output on a line by line basis. For this reason you should pay close attention to the instructions for the output of your program. Also remember that names of files are case sensitive.
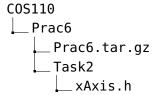
1.2   A Serious Warning

It is in your own interest that you, at all times, act responsible and ethically. As with any work done for the purpose of your university degree, remember that the University of Pretoria will not tolerate plagiarism. Do not copy a friend's assignment or allow a friend to copy yours. Doing so constitutes plagiarism, and apart from not gaining the experience intended, you may face disciplinary action as a result. For more information read the University of Pretoria's plagiarism policy on url http://www.library.up.ac.za/plagiarism/index.htm

1.3   Uploads

The student is advised to ensure that tarballs are created properly before uploading. The *.tar.gz* created by a student should not have any sub-folders. The zip folder should **ONLY** contain the source code.

Given code and data

Extract the content of the `Prac6.tar.gz` archive. After extracting this archive in a directory named `COS110/Prac6`, this directory should contain the files and directories shown in the following hierarchical structure:

```
COS110
└── Prac6
    ├── Prac6.tar.gz
    └── Task2
        └── xAxis.h
```

Task 1: Cuboid [10]

For this task, you are excepted to create a cuboid template class called **Cubiod** that is capable of determining the volume and surface area of itself. The template type will dictate the precision of all members and return values.

Let *m and M* denote member's types, and method's return types respectively, of the cuboid class. Then $m \in T$ *and* $M \in T$, where *T* is any type with defined addition (+) and multiplication (*) operators.

You must create a file **"cuboid.h"** where the template class is to be declared. All implementation must be defined inline in the class declaration (i.e. inside the **h - file**). The class requires at least three members to store the relevant scalar values of each dimension.

Do not provide getters or setters for these members. Furthermore the constructor needs to receive three parameters that denotes the width, height, and length in no particular order.

Two methods, `getVolume` **and** `getSurfaceArea`, need to be implemented that calculates and returns the volume and surface area of a cuboid object respectively.

On completion, create a tarball containing **cuboid.h** only. Upload it using the active fitchfork assignment called **Practical 6 - Cuboid**.

Task 2: Linked Bar Graph [20]

For this practical, students are expected to create a typical bar graph using linked lists. You have been provided with an **h - file**. This file contains 3 errors that you need to fix before you can continue.

The **h - file** defines a `struct` `node` which will be used to form the *x-axis* of the bar graph.

Each `node` has a label and a value which indicates the hieght of the bar for that particular label.

You are expected to implement the functions indicated in the **h - file**.

DO NOT CHANGE THE GIVEN FUNCTIONS.

Student may add helper function if needed.

Each function has a description in the **h - file** to indicate what is expected of you.

Finally, make your own main to test the functionality of your program.

On completion, create a tarball containing **xAxis.h** and **xAxis.cpp**. Upload it using the active fitchfork assignment called **Practical 6 - Linked Bar Graph**.