Department of Computer Science  
Faculty of Engineering, Built Environment  
& Information Technology  
University of Pretoria

COS143 - Introduction to Programming 2

Study Guide

Version 3

27 August 2015
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1 Overview

1.1 Description

This module follows on from the previous module and introduces the concepts of functions, memory management and libraries in the imperative programming paradigm. An introduction to object orientation will be given. After completing this module and the module prerequisite, the student should understand the fundamental elements of a program, the importance of good program design and user friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

COS143 is part of the four-year program for Computer Science. (To be edited, to add the course synopsis from Course outline booklet)

1.2 Prerequisites

As a prerequisite for COS143, a student must be admitted into one of the following four-year degree programmes:

- B.Sc.(Four-year programme) (IT)
- B.IS.(Four-year programme) (Multimedia)
- B.Sc.(Four-year programme) (Mathematical Sciences)
- B.Sc.(Four-year programme) (Physical Sciences),

successfully completed and passed COS133 in the first semester.

1.3 Related modules

This module is the second of the three semester modules that form part of the four year-year degree programme for the computer science (that is, COS 133, COS 143 and COS 153). COS 153 will be a prerequisite for three-year programme modules, COS 121 (Software module) and COS 110 (Program design: Introduction).

2 Plagiarism policy

This department considers plagiarism as a serious offence. Disciplinary action will be taken against student who commits plagiarism. For a more formal definition of plagiarism, the student is refereed to http://www.ais.up.ac.za/plagiarism/index.htm (From the UP Main page follow the Library quick link and then the Plagiarism link)
2.1 Study units

Introduction to Programming 2 using C++

Outcomes:

- Create and work with single and multidimensional arrays
- Basics of sorting arrays and searching for data stored in arrays
- Explain how to use pointers
- Discuss various ways to process text at a detailed level
- Create abstract data types using structures, unions and enumerated data types
- Discuss various modes for opening files and for reading and writing file contents
- Create classes
- Discuss the concepts of inheritance, polymorphism and virtual functions

3 Instructors

3.1 Contact details

3.1.1 Course coordinator

Mr. Taurai Hungwe
Office: 107 New Science Building
Mamelodi Campus
Email: thungwe@cs.up.ac.za

3.1.2 Assistant lecturers

Mr. Oyelami Babajide
Office: 106 New Science Building
Email: oyalamibabajide@gmail.com

Mr. Ivans Kigwana
Office: 105 New Science Building
Email: kigwana05@gmail.com

Mr. Derek Masvosvere
Office: 101 New Science Building
Email: dkmasvo911@yahoo.com
3.1.2 Tutors

Miss. Itumeleng Mokhachane  
Office: 102 New Science Building  
Email: doraitm@gmail.com

Miss. Lerato Molokomme  
Office: 102 New Science Building  
Email: leratomolokomme@gmail.com

Miss. Maria Qumayo  
Office: 102 New Science Building  
Email: mariaqumayo38@gmail.com

4 Organisation

4.1 Module website

Visit the course website http://www.cs.up.ac.za/courses/COS143 regularly for:
- All Announcements
- Practical/Assignment specifications and submissions
- Interaction such as discussion boards and/or polls
- All administrative and educational course information

4.2 Announcements

Announcements will be made on the course website. Announcements may include deviations from the planned schedules and other information as published in the study guide. This will be kept to a minimum as far possible, but it is of the utmost importance that you visit the course website regularly.

4.3 Lectures

<table>
<thead>
<tr>
<th>Group</th>
<th>Lecture 1</th>
<th>Venue</th>
<th>Lecture 2</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>G101 (BMAT)</td>
<td>Mondays 1300-1400</td>
<td>C3</td>
<td>Thursdays 1600-1700</td>
<td>C3</td>
</tr>
<tr>
<td>G102 (BBIS/BPHYS)</td>
<td>Mondays 1400-1300</td>
<td>C3</td>
<td>Tuesday 1400-1500</td>
<td>C3</td>
</tr>
<tr>
<td>G103 (BSIT)</td>
<td>Thursday 1300-1400</td>
<td>C3</td>
<td>Friday 0900-1000</td>
<td>C3</td>
</tr>
</tbody>
</table>
4.4 Practicals

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 101</td>
<td><strong>Practical 1</strong> Monday 08:00-11:00</td>
<td>IT Red Lab</td>
</tr>
<tr>
<td></td>
<td><strong>Practical 2</strong> Tuesday 14:00-17:00</td>
<td>IT Green Lab</td>
</tr>
<tr>
<td></td>
<td><strong>Practical 1</strong> Wednesday 14:00-17:00</td>
<td>IT Red Lab</td>
</tr>
<tr>
<td></td>
<td><strong>Practical 2</strong> Thursday 08:00-11:00</td>
<td>IT Green Lab</td>
</tr>
</tbody>
</table>

Students are advised to attend practical sessions. You should attend, complete and upload all the exercises. With some exercises an automated marking system (called Fitchfork) will be used to assess the work on C++ programs. This system will compare output of programs to expected output. You must therefore follow specifications and instructions to the letter!

4.5 Tutorials

Tutorials will be presented on a weekly basis covering the content of the lectures of the previous week.

<table>
<thead>
<tr>
<th>Group</th>
<th>Tutorial Session</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>G101</td>
<td>Thursday 14:00 - 16:00</td>
<td>C2</td>
</tr>
<tr>
<td>G102</td>
<td>Friday 12:00 - 14:00</td>
<td>C1</td>
</tr>
<tr>
<td>G103</td>
<td>Wednesday 09:00 - 11:00</td>
<td>C5</td>
</tr>
<tr>
<td>G104</td>
<td>Tuesday 12:00 - 14:00</td>
<td>C6</td>
</tr>
<tr>
<td>G105</td>
<td>Tuesday 15:00 - 17:00</td>
<td>C6</td>
</tr>
<tr>
<td>G106</td>
<td>Tuesday 09:00 - 11:00</td>
<td>C5</td>
</tr>
<tr>
<td>G107</td>
<td>Friday 10:00 0 – 12:00</td>
<td>C5</td>
</tr>
</tbody>
</table>

5 Study Material

Prescribed textbook
Starting out with C++ From Control structures through objects
5.1 Software

If you wish to install Linux on your personal computer. Install the Debian distribution which has most packages/software available to perform everything required of you in the course. The software is free of charge and ISO files (can be written to installation discs) will be available. The environment for practical evaluation will be as in the laboratories (a Linux environment with GNU C++ compiler) unless specified otherwise. Work that does not compile/run in this environment will not be evaluated.

5.2 Assessment

There is a strong emphasis on both practical and theoretical evaluation in the course. To assess theoretical understanding there are two semester tests throughout the semester as well as a tutorial mark and a practical mark.

An examination will also be written at the end of the semester.

<table>
<thead>
<tr>
<th>Semester mark:</th>
<th>Assessment Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Test 1</td>
<td>30%</td>
</tr>
<tr>
<td>Semester Test 2</td>
<td>30%</td>
</tr>
<tr>
<td>Tutorial Tests</td>
<td>20%</td>
</tr>
<tr>
<td>Practical Exercises</td>
<td>20%</td>
</tr>
</tbody>
</table>

The subminimum requirement is 40% of the final semester mark. This implies that a student with lower than 40% will not be allowed to write the final exam and would have failed the module.

<table>
<thead>
<tr>
<th>Final mark:</th>
<th>Assessment Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Mark</td>
<td>60 %</td>
</tr>
<tr>
<td>Examination Mark</td>
<td>40 %</td>
</tr>
</tbody>
</table>
6 Schedule

1. Arrays
2. Searching and Sorting Arrays
3. Pointers
4. Characters, C-Strings, and More About the string Class
5. Structured Data
6. Advanced File Operations
7. Introduction to Classes

The Assignment will be C++ project that will be due at the end of the semester.

Semester Test 1: Saturday 12 September 2015, 8:00 to 10:00, Arena.

Semester Test 2: Friday 23 October 2015, 14:00 to 16:00, Arena.