

“Computer Principles for Programmers (CPR101/BTP105)” Final Project

Introduction

Students, working in teams of 4 to 5, will create a console application to demonstrate various operations with null-terminated C strings.

Application Modules

Module #1 – Fundamentals (`fundamentals.h`, `fundamentals.c`)

Module #2 – Manipulating (`manipulating.h`, `manipulating.c`)

Module #3 – Converting (`converting.h`, `converting.c`)

Module #4 – Tokenizing (`tokenizing.h`, `tokenizing.c`)

Each module is divided into three blocks:

| | | | |
|---------------------------|--|---|---|
| Fundamentals -> | 1) Indexing | 2) Measuring | 3) Copying |
| Manipulating -> | 1) Concatenation | 2) Comparison | 3) Search |
| Converting -> | 1) Converting to <code>int</code> | 2) Converting to <code>double</code> | 3) Converting to <code>long</code> |
| Tokenizing -> | 1) Tokenizing Words | 2) Tokenizing Phrases | 3) Tokenizing Sentences |

Each team has three “junior” programmers responsible for modules 1-3, one “senior” programmer (team leader) responsible for module 4, synchronizing and integrating modules into the main application, and one tester. If there are 4 students in a team, the team leader does the testing as well. On project completion all the team members will have the same mark.

Application Versions and Deadlines

In Version #1 students implement first blocks of code only, in Version #2 – the first and the second blocks, in Version #3 – all three blocks. Each version takes one week approximately to complete.

Project Details

Students will not develop modules (we are not IPC144). All the modules versions will be provided by the teacher as `.png` (graphics) files. So, students will have to ***type*** code, ***comment***, ***compile***, ***test***, ***stage*** and ***commit*** versions using `git` program; they will ***communicate*** and ***collaborate*** through MS Teams. The programmers will send modules to the tester. The tester will develop test cases as an Excel spreadsheet. After the modules testing is done, the team leader combines all the sources in one app. Only the team leader will submit the source files, the test cases and screenshots (if needed) through the Blackboard.

Rubrics

A teacher may mark the final project with a C/C+ if version #1 was completed, a B/B+ if version #2 was completed, and an A/A+ if students team reached the final version #3. The final project mark may also depend on the quality of students’ comments, efficiency of their communications monitored by the teacher, ability to meet deadlines and on application testing results.

Appendix A Standard Library C Functions used by Modules

Fundamentals Module

strlen() // length

strcpy() // copy

Manipulating Module

strcat() // concatenation

strcmp() // comparison

strstr() // search

Converting Module

atoi() // string to int

atof() // string to double

atol() // string to long

Tokenizing Module

strtok() // tokenizing

Appendix B Students' Responsibilities, Versions, Marks, and Tools Used

| | Version #1 Grade: "C/C+" Tools: cl/gcc | Version #2 Grade: "B/B+" Tools: cl/gcc, git | Version #3 Grade: "A/A+" Tools: cl/gcc, git |
|--|---|--|--|
| Junior Programmer #1 Fundamentals Module | Indexing | Add measuring | Add copying |
| Junior Programmer #2 Manipulating Module | Concatenating | Add comparing | Add search |
| Junior Programmer #3 Converting Module | Converting to int | Add converting to double | Add converting to long |
| Senior Programmer/Team Leader Tokenizing Module | Tokenizing words | Add tokenizing phrases | Add tokenizing sentences |
| Tester | Spreadsheet v1 | Spreadsheet v2 | Spreadsheet v3 |

Appendix C Deliverables and Deadlines

Version #1 - "C/C+" grade (week 1)

1. fundamentals.h
2. fundamentals.c
3. manipulating.h
4. manipulating.c
5. converting.h
6. converting.c
7. tokenizing.h
8. tokenizing.c
9. main.c
10. test_cases_v1.xls

Version #2 - "B/B+" grade (week 2)

1. fundamentals.c
2. git_status_log1_screenshot.txt
3. manipulating.c
4. git_status_log2_screenshot.txt
5. converting.c
6. git_status_log3_screenshot.txt
7. tokenizing.c
8. git_status_log4_screenshot.txt
9. main.c
10. test_cases_v2.xls

Version #3 - "A/A+" grade (week 3)

1. fundamentals.c
2. git_status_log1_screenshot.txt
3. manipulating.c
4. git_status_log2_screenshot.txt
5. converting.c
6. git_status_log3_screenshot.txt
7. tokenizing.c
8. git_status_log4_screenshot.txt
9. main.c
10. test_cases_v3.xls