

Lab report Part 1 due by October 23, 11:59pm (20 points)

Live demo in VM due by October 29, 9am (25 points)

CANVAS DUE DATE for source and data file(s) and report due by October 30, 11:59pm (55 points)

Purpose

This lab assignment is to provide you with an opportunity to:

- demonstrate your ability to write a C++ program utilizing basic C++ concepts (specific concepts should be listed as part of your report)
- demonstrate understanding of concepts covered in the course, including sorting algorithms

Lab Requirements

This lab assignment requires in-person verification and a lab report. For full credit for this lab, these following files must be submitted via Canvas by the assigned due date (with the live demos completed as stated):

- a lab report which meets the requirements as described below (pdf). Submit SEPARATELY from zip file.
- your source file(s) (zip)
- all data files (txt)

Live Demos

During live demo sessions, I will meet with individual students based on a random list. The list and schedule will be published before 9am on the live demo date. All live demos are required in the VM and are not acceptable in any other IDE.

Missed live demos cannot be made up.

Description

Write a program that will

- a) Check to see if given sentences or phrases are palindromes. (Ex: "A Toyota")
 - a. Store the provided sentence or phrase in a stack, implemented as a linked list.
 - b. Store the provided sentence or phrase in a queue, implemented as a linked list.
 - c. Use pop (or dequeue) appropriately to compare the data
 - d. Create your own lists and do not use the STL list, stack, or queue.
- b) Greet the user by name. Provide the user with a brief description of the program.
- c) Provide the user with choice of input (keyboard or text file)

- d) If keyboard, check the input and provide result.
- e) If text file, provide user with at least 2 choices.
 - a. Text files include sentences/phrases by line. Each line should be checked to see if it is a palindrome
 - b. Check the sentences and phrases for if they are a palindrome.
 - c. Provide an alphabetized list of all the palindromes. Maintain list of palindromes as a linked list and implement `add_in_order()`.
 - d. Ask user if they would like the palindromes output to a separate text file. If yes, allow user to name the file.
 - e. BONUS. Up to 10 points. Be sure you have fully completed all the required functionalities before starting on this. Choose one of the below:
 - Add an option to allow the user to upload a text file. Implement in C++.
 - Add an option to allow the user to check for any and identify all palindromes in any given (multiline) text string. Implement with linked lists. Include a discussion of the time complexity of your algorithm.
- f) Allow the user to repeat or quit.
- g) Be sure that your program frees all the dynamically allocated memory. (Check via Valgrind)
- h) Include basic data validation. i.e. your user is friendly but not perfect.
- i) Name the program files (as best you can) with first 4 letters of your last name + first initial of first name + "pal". Since this is a C++ program, the suffix should be .cpp. (For my file, it would be "chenspal.cpp"). Be sure to use programming practices as discussed in class, and at least 7 meaningful functions outside of main ().
- j) Though not a requirement, this project is a good opportunity to practice encapsulation.

Take screenshots of your program during development and testing. These may be handy for your report. (Other data files may be provided for testing during the live demo.)

Lab Report requirements

The lab report should have these required sections:

- Purpose
- Planning and organization
- Development process
- Product
- Pitfalls
- Possible improvements

The lab report should be submitted as a .pdf in Canvas. You may create the report in a document creation software of your choice. Please ensure that your lab report is cleanly formatted and free of distracting grammatical or other errors. These errors will cost you points on clarity. For more specifics, check Canvas for the grading rubric.

Purpose (submit by October 23)

Provide a few sentences describing the purpose of this assignment (see above), not just the purpose of the program. Also include a description of what your program does. Please use your own words. (I don't need to read my own words again.) This should be in a short paragraph form. (A paragraph includes complete sentences, not a collection of phrases like a series of text messages.)

Planning and organization (submit by October 23)

Describe the process you followed and/or will follow in order to plan out and structure this project. The steps here should be specific enough for others to replicate your process. Provide screenshots, other visuals, urls, etc. as needed. You do not need to reproduce the assignment directions, but provide other information to allow another to be successful in this assignment. All visuals should be titled and discussed, i.e. not just stuck on the page with no context.

This should be mainly in paragraph form, with lists of steps and visuals as needed. Use your own words. The description does not need to include every detail, but, as mentioned above, should provide enough details and information so that your planning process can be replicated.

At least one flowchart to show program flow is required. The flowchart must have a start and an end. All decision points should be represented as a diamond.

Include a timeline to show your plan and how you envision the activities that will contribute to the success of this project.

Development process

Describe the process you followed in order to develop the code for this project. Which parts did you choose to develop first? Why? How did you use the plans you developed?

This should be mainly in paragraph form, with lists of steps and visuals as needed. Use your own words. The description does not need to include every detail, but, as mentioned above, should provide enough details and information so that your planning process can be replicated. Be sure to discuss the development of all key segments of the program.

Product

Describe your program run(s). Include screenshots for clarity. Discussions should include how the test cases show the capabilities and limitations of your program. See the rubric for more details.

Pitfalls

Describe any difficulties and issues you encountered during this assignment. Provide screenshots and other visuals as needed to describe these clearly. Describe how you resolved these issues. If somehow, you didn't have any difficulties, issues, programming errors, or bugs, include an explanation of why this could be the case. See the rubric for more details.

Possible improvements

What could you have done differently to improve your completion of this assignment? Be specific. What could be improved about this assignment overall for you and/or for future students? Be as specific and constructive as possible. See the rubric for more details.

Program file submission requirements

Submit the files via Canvas

Programming practices expected for this course:

- separate compilation with proper header and other source files
- good comments to identify the programmer and the project
- good comments for any significant blocks/lines of the program, comments which explain the purpose of the code and not just what the code does
- do not use "using namespace std"
- function declarations with detailed comments for each function
- concise, specific functions
- professional and user-friendly interactions (with data validation) and output
- clear and concise instructions (2 command lines at most) for compiling and running the program in the VM. These can be provided via Canvas comments for the assignment submission.

A possible start of an execution is below. Yours should be slightly different, but still include the required functionalities.

Hello! What's your name? Amy

Hi Amy! This is a program to check for palindromes. Would you like to try it (y/n)? yes

Great! Would you like to (1) type in a sentence or phrase to be checked, or (2) use examples from text files that I have? 1

Great! Please input your sentence or phrase: A Toyota

Thank you!

"A Toyota" is a palindrome! It reads the same forwards and backwards.

Would you like to try another?

Great! Would you like to (1) type in a sentence or phrase to be checked, or (2) use examples from text files that I have? 2

This is fun! The text files I have are: Sample1.txt and Sample2.txt. Which would you like? Sample2.txt

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