Computer Engineering and Mechatronics Project: Developing software for a drawing robot

Part 2: Final Project Submission

Introduction

Full details of the project were supplied in the project planning document, Computer Engineering and Mechatronics Project Planning v5.0. For the remainder of the project you should develop the software as planned in the project planning assignment. In addition, you should create your own 'custom' shape with the name CUSTOM_SHAPE, add it to the ShapeStrokeData.txt file and then update the DrawShapes.txt file to use that shape.

Testing of your application

A basic simulator (for Windows) is available at https://nraynaud.github.io/webgcode/ to allow you to verify the commands intended to be sent to the drawing robot.

Make sure that you test your code with drawing instruction files with different combinations of shapes and positions and both with and without drawing the grid.

Testing of your code with the real robot will take place on **Monday 5thth, Friday 9th and Monday 12th December** in AMB C09/10. A spreadsheet will be circulated closer to that date to allow booking of a time slot. During this session you will be provided with two drawing instruction files to be executed by the robot.

The rest of this document explains what is required for the final project submission.

Submission

Software Project Final Submission (20%)

Learning outcomes:

- To write robust code for a mechatronics problem using a specification (as developed in the project planning submission)
- To develop the documentation required to allow the project to be developed by a team

Learning outcomes will be demonstrated in the submission documents by:

- Developing the code to fulfil the project brief, which is well structured and follows software engineering good practice (e.g. well named variables, error trapping).
- Providing a system manual which could be used by a software development team to maintain or continue to develop the code including the following:
    - A clear explanation of what the program does, including sample emulator output (which should show your custom shape).
    - Description of files used in the program
        - Describe all .c and .h files used in the project.
        - Indicate where configuration changes may be needed during development.
    - Description of functions used in the program including:

        - Function declarations (prototypes)
        - A brief description (one or two lines) of what the function does
        - Parameter definition and their types
        - Show whether parameters are input and/or output, whether they are changed and the return value, if any.
        - Include functions which you have written yourself, not the ones which are supplied in the program template.
    - Specification of the main data items used in the program.
        - Give data type and why this has been chosen.
    - Test data which will validate the program, confirming conformance of the program/function to its specification.
        - Ensure that all routes through the program are covered.
        - Include input data with expected outputs.
    - Flowcharts which show the structure of the program
        - Include blocks to indicate function calls and separate flowcharts for functions where appropriate

Note: If your code development followed your project planning accurately then the system manual will be largely the same as your project planning submission. If, in the process of developing your code, you found that you needed to diverge from your plan then you should update the system manual and flowcharts to reflect your final code.

A template is provided for the system manual on Moodle (SystemManualTemplate22-23.docx). Save this as **SystemManualXXX_ID.pdf** where **XXX** are your initials and **ID** is your student ID. The flowchart(s) may be submitted in a separate pdf saved as **SystemFlowchartXXX_ID.pdf** (do not submit a drawio file, use the export function in draw.io to save to pdf).

You will be required to upload a single zip file named **SoftwareProjectXXX_ID.zip** containing:

- Your VSCode project folder named **RobotWriterXXX_ID** which should include:
    - All project files
    - Shape data file including your custom shape
    - Drawing instruction file
- System manual
- Flowcharts

The deadline for submission to Moodle of this document is **15:00 Thursday 15th December.**