Mini-Project: EN3544 Embedded System

Introduction:

This is an open-ended activity based on the criteria set out below. The work is to be carried out in student's own time though assistance will be given in the last two lecture periods. The work is to be written up in the logbook in form of a report (max limit 3000 words) and a copy of the code is to be uploaded to the assignment Dropbox on CampusMoodle in form of zipped project file.

Project specification:

Aim:

To write a program from scratch using the STM32L476VG-DICO and employing the concepts covered in the laboratory exercises.

Objectives:

- Use at least half of the hardware features of the STM32L476VG-DICO kit:
    - At least one low power mode
    - At least one DMA channel
    - At least one Interrupt
    - At least one Timer
    - At least two from following
        - Analog peripheral
            - ADC
            - DAC
            - COMP
            - OPAMP
        - Communication peripheral
            - UART
            - SPI (optional)
            - I2C (optional)
- Use most or all the programming constructs:
    - Constants and variables
    - Arithmetic and logical operations
    - Serial monitor display
    - Digital I/O
    - Analogue input
    - PWM
    - Control structures
    - Data structures

Submission guideline:

Write up the design, implementation and testing in your EN3544 Logbook. It should address:

- An introduction outlining the general concept of you program and what it is designed to do.
- A statement of all the hardware features used and a table showing their purpose.
- A "user manual" giving the user brief but complete instructions on setting up and running the program, including all the various inputs, and expected outputs.
- A description of the program structure using flowcharts, structured English or similar.
- A critical assessment of the program, addressing any bugs, shortcomings, or areas for improvement.
- A reflective statement addressing your approach to the exercise, what you learned from it and what you might do differently if you were to do a similar project.

For demo and presentation:

- A small video demonstration of working prototype with brief overview of functionality.
    - 3-5 minutes
    - Maximum size 100MB
- An audio overlaid presentation of Mini project (10-12 min). Follow structure as below:
    - Introduction
    - Background
    - Project description
        - Hardware
            - Block diagram
        - Software
            - Flow chart
    - Conclusion
    - Future work

Submit the code for the program to the assignment Dropbox on CampusMoodle. The code should:

- Include a file template with the file name, your name, program creation details. and general program description.
- Include suitable explanatory commenting in the code.
- Have descriptive object names.
- Use constants where appropriate rather than literals.
- Be structured and indented appropriately and consistently.