Goal: software and (minimal) hardware to create 'Wavy', a low-frequency waveform generator based on the P24/STM32F407 hardware platform.

Requirements:

Waveform generator (common function):

Operator interface:

- 7-segment display: amplitude/rate/count/trigger/status (under-/over-,range, ...)
- LEDs: operating mode(single, repetitive, triggered, ...)/operating status (ready/running, ...)
- sw1-8: set displayed values
- sw9-12: mode select
- sw13: run/stop
- rotary encoder: increase/decrease

Implementation features:

- wave generation: by DAC DMA.
- data display: in TimerN interrupt.
- waveform data input: by USART2 IRQ
- task scheduling:
    - SysTick time-sliced task switches
    - SVC for task switch requests
    - PendSV-implemented task switches setup by SysTick and SVC.

Specialized function (your choice):

Each project will additionally implement a unique specialized function using one of the STM32F407 device features not used in the common function. If one of the timers is selected then it must be used in one of its special modes (pulse-width modulation, etc.). An API able to configure and operate the specialized function must be defined and used in the device demo.

Assembly-language drivers:

All code which interfaces with internal or external hardware must be written in assembly language. Assembly language is preferred for all other code but C may be used with permission (must ask Hawkins) for selected parts of your program.

Documentation:

Your project-report should be submitted in a .zip file and will contain four documents -- readme, user manual, maintainer document, and acceptance test procedure -- plus the build directory and code.

- readme: lists and briefly describes the contents of the .zip submission and the context and directions for their use.
- maintainer document (PDF): audience is other engineers who might work on the device either to modify or to service it. It must contain a table of contents and an abstract, and should have figures (flow charts, state diagrams, data diagrams, schematics) to assist in the description.
- user's manual (PDF): audience is a technical user who will use the device on a laboratory bench or in the field. It must contain a table of contents and operating instructions for all modes of use of the device.
- acceptance tests (PDF): audience is the in-house testing department who will determine if the device will ship or needs rework.