Milestone 1 for Project

You will demonstrate how close you have got to reaching Milestone 1 during your group's laboratory session in Week 5 (i.e., the week that commences March 19th).

The first milestone you are to attempt to reach is to generate a Tiva program to respond in a real-time and reliable fashion to button pushes and a single analogue input. The analogue input is from the helicopter altitude sensor; the voltage (which is always in the approximate range 1 – 2 V) ***reduces*** by **0.8 V** as the helicopter ***rises*** from landed (0%) to fully up (100%).

In Weeks 4 and 5 you will have access in either the Electronics Labs (during lab sessions) or in the Embedded Systems Lab (at other times) to four 'helicopter mounts', which each incorporate the same altitude sensor as the remote lab rigs. However, you should design your program so that you can first test it using the potentiometer on the Orbit board, which is connected to AIN0, as is used in the Week-4 lab. The Milestone will be assessed using one or other of the helicopter mounts.

The specification to achieve the Milestone is:

M1.1 The input on AIN9, PE4 (J1-05) – the helicopter altitude sensor signal – is sampled at regular intervals.

M1.2 The samples (i.e., ADC outputs) are continually stored in a circular buffer. At regular intervals, the mean value of the samples in the buffer is computed.

M1.3 At the initiation of the program, the mean sample value is recorded as the number corresponding to the 'helicopter landed' altitude (0%). This is required for the calculation of the helicopter altitude.

M1.4 From the time of initiation onwards (c.f., M1.3), the helicopter altitude is displayed on the Orbit OLED display as a percentage, except as indicated in M1.6 below.

M1.5 From the time of initiation onwards, operating the "LEFT" button, SW1 on the Tiva board, repeats the action detailed in M1.3.

M1.6 A single push of the "UP" button, BTN2 on the Orbit board, changes the display of altitude from percentage altitude to the mean ADC value computed as in M1.2; a second push turns the display blank; thereafter subsequent pushes make the display cycle through the same three states: percentage altitude -> mean ADC value -> off, and so on.

M1.7 The source code used to achieve Milestone 1 is pushed to the group's repository.

NB: Your group's program will only be tested on the specifications above. Do not "overdeliver" by adding more features or exceeding the spec. Information about your design and how you have tried to meet the spec should be part of your lab book write up. Examples of the information you should record is how you decided what sampling rate to use and the size of buffer to use. Groups will receive brief feedback on the quality of the M1 source code they have pushed to their repository.