2DX4: Microprocessor System
PreLab 1

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As a future member of the engineering profession, the student is responsible for performing the required work in an honest manner, without plagiarism and cheating. Submitting this work with my name and student number is a statement and understanding that this work is our own and adheres to the Academic Integrity Policy of McMaster University and the Code of Conduct of the Professional Engineers of Ontario. Submitted by **[Junbo Wang wangj430 400249823]**

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Prelab

1.

We are both done with the Lab Safety Quiz.

2.

a). Cortex-M3/M4F Instruction Set

b). MSP432E4 SimpleLink™ Microcontrollers Technical Reference Manual

3.

Machine language is the code to be understood by the computer directly, and op codes are specific commands of machine language to accomplish functions. Mnemonics are abbreviations of op code to make the coding of programmers easier.
For example, the operation “start” in operation code is 0000, while in machine language is “ORG”.

4.

In the MSP432E401Y board, the core processor is ARM Cortex-M4F and has a 32-bits register. R0 to R12 are all “General Purpose Registers” that carry data and addresses. R13, SP, is the “Stack Pointer”, R14, LR, is the “Link Register”, and R15, PC, is the “Program Counter”. The rest are called special registers. R16 is PSR standing for “Program Status Register”. R17 to R20 are exception mask registers called PRIMASK, FAULTMASK, BASEPRI, respectively. R21 is the control register.

5.

Flow chart

1. Set up the corresponding bit for the (**RCGCGPIO**) register to activate the clock of GPIO Port , and wait for the status bit (PRGPIO) register to be set to 1.

2. If unlocking is needed, unlock the port.

↓

3. Disable analog function (**PTCL**) of the pin by clearing (set to zero) corresponding bit in GPIO Analog Mode Select (**GPIO AMSEL**).

↓

4. Clear corresponding bit in the GPIO Port Control (**GPIO PTCL**)register for regular GPIO function.

↓

5. When setting the port and pin as the output pin, we need to set bits in the **GPIO Port direction register** as 0 is for input and 1 is output.

↓

6. Clear corresponding bits in the GPIO Alternate Function (**GPIO AFSEL**), to disable the alternate function on the pin.

↓

7. We enable pins for digital function by setting bits to 1 for the corresponding bits in the **GPIO Port Digital Enable Register**.