ECE 3153 Microprocessors

Description	Equation
NUMBER REPRESENTATION A base ten number *n* represented as an *m* bit two's complement number with *b* being individual bits value	$n = -b_{m-1}2^{m-1} + \sum_{i=0}^{m-2} b_i 2^i$
LOOK UP TABLE Index *i* range from 0 to some number *n-1*, and the starting address of the table is table_addr, the address of the ith entry	Address= table_addr + i*size_of_entry
DAC: change the **VALUE**(10-bit digital value) field in **DACR** (DAC Register).	The Analog voltage on AOUT pin is calculated as ((**VALUE**/1024) * VREF).
I2C: The frequency and duty cycle of SCL is decided using I2C0SCLL and I2C0SCLH. I2C0SCLH contains the TON (High) time and I2C0SCLL contains the TOFF (Low) time	. The frequency is calculated as follows: $I2CBitFrequency = \frac{F_{pclk}}{I2C0SCLL + I2C0SCLH}$
PWM: A period of a pulse consists of an **ON** cycle (HIGH) and an **OFF** cycle (LOW). The fraction for which the signal is ON over a period is known as **duty cycle**.	$Duty\ cycle\ (in\ \%) = \frac{T_{ON}}{T_{ON} + T_{OFF}}$
Real time clock	PREINT = int (PCLK/32768) – 1 PREFRAC = PCLK – ((PREINT+1) * 32768)
Timer Counter	Time of one clock period = 1 / clock frequency External clock frequency = count of clocks / one second
UART0 baud rate	$UART0Baudrate = \frac{P_{CLK}}{16 * (256 * U0DLM + U0DLL) * \left(1 + \frac{DIV\ ADDVAL}{MULVAL}\right)}$