DAC/ADC Interfacing Homework
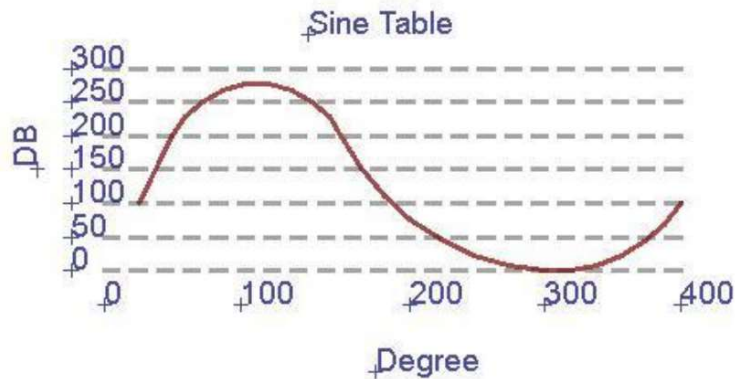
Problem 1:

Develop an assembly language program to generate square waves of 2 KHz frequency with 50 per cent duty cycle using a DAC interfaced to an 8086 processor via 8255 chip through Port A.
Hint: Assume a 12 MHz crystal, so that each instruction cycle would consume 1 microsecond.
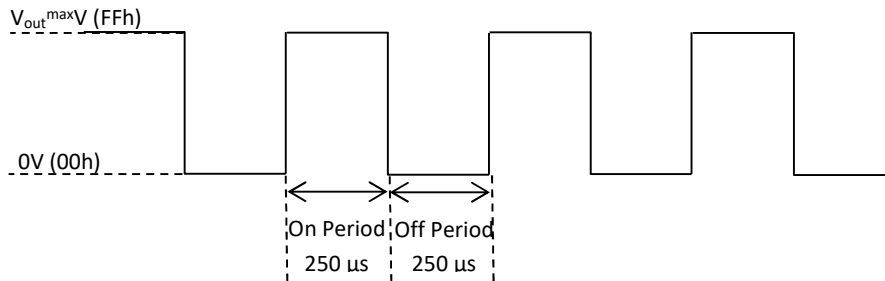
Problem 2:

Develop an assembly language program to generate the following sine wave to a DAC interfaced to an 8086 processor via 8255 chip through Port A.

Problem 3:

For an 8-bit R-2R DAC, assume that $R_f = 5$ K ohms and $R = 1$ K ohms. Calculate V_{out} for the following binary inputs.

(a) 11000010

(b) 01000001

(c) 00101100

(d) 11111111

Problem 4:

An 8-bit digital ramp type ADC uses a 500 kHz clock. Find the minimum and maximum conversion times.

Problem 5:

Consider a 4-bit digital ramp ADC with 5V reference voltage. Find the output if the input voltage is 3.217V.

Problem 6:

Draw the output of the DAC in a 5-bit successive approximation ADC if the reference voltage is 7 V for an input voltage of 3.33 V.

Problem 7:

Examine the ADC804 connection to the 8255 of the PC Interface Trainer show in Figure. Write a program to monitor INTR (End of Conversion) and bring in analog input into register AL from the I/O address 300H (where the PC Trainer starts, i.e., Port A address). Note that Port B and Port C addresses are 301h and 302h,respectively, and the control port address of PC Trainer is 303h.