

EE 315 Lab Assignment for Week 07

Important Note: The problem below is to be solved individually by each student.

- Download the project folder.
- The project assembly code is "EE315Week07.s".
- Go over the comments of the code. You will realise that the main function calls "sinx" subroutine.
- As we know from Calculus, the Taylor Series of sin(x) is

$$\sin x = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{2n+1} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots \quad \text{for all } x$$

- This routine calculates sin(x), x being the input at R0
- The output will be in R5 and it will 256 times larger the real output (for precision)
 - o So for example if you calculate sin(x=1). we should find: 256*0.84=215 -> 0xD7 at R5
 - o **DON'T FORGET! X should be RADIAN**
 - o This subroutine calls Factorial and Power subroutines

$$256 \sum_{n=0}^5 (-1)^n \times \frac{x^{2n+1}}{(2n+1)!}$$

o **THE FORMULA WE WILL USE FOR SINX IS:**

This is called fixed-point decimal!

- Write the necessary codes for the "sinx" subroutine yourself.
- During the lab session, go over the main part of the program and debug the calls to both of these functions. Verify that the subroutine is working by checking the register values during debugging.