COMORGA Machine Project#1 **3rd Term, 2015-2016**

Floating point operation using x86-32 assembly language

Objectives: **Programming floating point operation using x86-32 assembly language**

Deadline: **Submission of source code (.asm file) via CANVAS on July 21, 2016**
Deadline: **Submission of documentation on July 21, 2016 (Thurs) class time**
Demo: **July 21, 2016 (Thurs) class time**

Guidelines:
- During demo, the group should be able to discuss and point out the salient point of their source code.

Documentation:
- Introduction of the algorithm
- Pseudo-code of the algorithm
- Discussion of your implementation of the algorithm. Show the input, process and output. Discuss the salient point of your implementation

List of topics:
1. Taylor series for $\frac{1}{(1-x)^2} = \sum_{n=1}^{\infty} nx^{n-1}$ (a) Input: $|x| < 1$; b.) result using computed and Taylor series; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
2. Arithmetic mean: a.) input: # of FP number and the FP numbers; b.) output: the arithmetic mean of the FP numbers.
3. Taylor series for $\frac{1}{(1-x)} = \sum_{n=0}^{\infty} x^n$ (a) Input: $|x| < 1$; b.) output: result using both computed and Taylor series c.) process: use mathematical series up to 32 terms. Show the result and the running total for each iteration
4. Taylor series for $\frac{x}{(1-x)^2} = \sum_{n=0}^{\infty} nx^n$(a) Input: $|x| < 1$; b.) output: result using computed and Taylor series; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
5. Geometric mean $(\prod_{i=1}^{n} a_i)^{\frac{1}{n}}$: a.) input: # of FP number and the FP numbers; b.) output: the geometric mean of the FP numbers.
6. Taylor series for $\frac{2}{(1-x)^3} = \sum_{n=2}^{\infty} (n-1)nx^{n-2}$ (a) Input: $|x| < 1$; b.) output: result using computed and Taylor series; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
7. Taylor series for $\frac{2x^2}{(1-x)^3} = \sum_{n=0}^{\infty} (n-1)nx^n$ (a) Input: $|x| < 1$; b.) output: result using computed and Taylor series; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
8. Quadratic mean $\sqrt[2]{\frac{1}{n}\sum_{i=1}^{n} x_i^2}$: a.) input: # of FP number and the FP numbers; b.) output: the quadratic mean of the FP numbers.

9. Exponential function $e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!}$: (a) Input: x; b.) output: result using computed (if applicable) and Taylor series; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
10. Natural logarithm function $\ln(1 - x) = -\sum_{n=1}^{\infty} \frac{x^n}{n}$ (a) Input: $|x| < 1$; b.) output: result using computed (if applicable) and Taylor series x; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
11. Cubic mean $\sqrt[3]{\frac{1}{n}\sum_{i=1}^{n} x_i^3}$: a.) input: # of FP number and the FP numbers; b.) output: the cubic mean of the FP numbers.
12. Natural logarithm function $\ln(1+ x) = \sum_{n=1}^{\infty}(-1)^{n+1}\frac{x^n}{n}$ (a) Input: $|x| < 1$; b.) output: result using computed (if applicable) and Taylor series x;; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
13. Trigonometric function Sin $x = \frac{(-1)^n}{(2n+1)!}x^{2n+1}$: (a) Input: x in radian; b.) output: result using computed (if applicable) and Taylor series x; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.
14. Trigonometric function Cos $x = \frac{(-1)^n}{(2n)!}x^{2n}$: (a) Input: x in radian; b.) output: result using computed (if applicable) and Taylor series x; c.) process: use mathematical series up to 32 terms. Show the value and the running total for each iteration.