Computational Methods in Physics-I

Lab -1

1) Write a code to check for induced instability in

$$I_n = \int_0^1 \frac{x^n}{x+5} dx \text{ , } 1,2,3,4, \ldots 10$$

2) Define a =2 as int and long int, make a loop and multiply it by 2. Run the loop for 36 times and discuss.

3) Decompose 16.17 into its Mantissa and exponent. Use frexp function
Also check logb in C++
https://en.cppreference.com/w/cpp/numeric/math/logb

4) Get the machine epsilon for single precision and double precision on your system using C++ or python.

5) Fill an array with random integers and now make algorithm to assort them in ascending order.

6) Check for associate law with X= 5.7834242, Y=0.0531451, Z=5.9898978

X+Y)+ Z = X+ (Y+Z)
*(X*Y)*Z = X* (Y*Z)*
X(Y+Z) = (X*Y) + (X*Z)*
(X+Y)-Z = (X-Z)+Y
X(Y-Z) = XY-XZ Single and double precision

7) Compare the Taylor series of f(x) = sin x at x =$\pi/3$ with base point at $\pi/4$ with original function by keep adding the next term till fourth order. h= $\pi/3$ - $\pi/4$