IDC101 (Introduction to Computation) :
Lab Exercise 9 :

General Instruction :
First decide how you will solve the problem on paper. Only after this, you should start writing your program.

Here's the checklist :
a) Read the problem carefully. Decide the inputs required.
b) Then, write your program following the appropriate algorithm.

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1. Write a program in python to evaluate integrals using the mid-point method.

2. Write two different programs to evaluate integrals using (*i*) mid-point rule and (*ii*) Trapezoidal rule.

NOTE : All these programs should be general enough to evaluate any integral of any function *f(x)*. Give some thought to how you will write the program and what are its inputs.

3. Using the programs written in problems 1 and 2, evaluate the following integrals;

(a) $\int_0^3 e^{-x}\ dx$

(b) $\int_0^{2\pi} \sin^2(\omega t)\ dt, \qquad \omega = 3.0$

(c) $\int_{-\pi}^{\pi} \sqrt{x^2 + \cos^2(x)}\ dx$

(d) $\int_{-\infty}^{\infty} \exp(-x^2)\ dx$

(e) $\int_0^{10} \frac{1}{\sqrt{1+x^4}}\ dx$