# PRACTICAL -12
# SIMPSON'S METHOD
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In[29]:=
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a = Input["Enter the left end point"];
b = Input["Enter the right end point"];
n = Input["Enter the number of sub intervals to be formed"];

(*n MUST be even for Simpson's Rule*)
If[OddQ[n], Print["n must be even for Simpson's Rule. Increasing n by 1."];
  n = n + 1;];

h = (b - a) / n;

f[x_] := Log[x];

(*Generate points*)
y = Table[a + i * h, {i, 0, n}];

sumodd = 0;
sumeven = 0;

(*Odd indexed terms:coefficient 4*)
For[i = 2, i ≤ n, i += 2, sumodd += 4 * (f[x] /. x → y[[i]]);];

(*Even indexed terms:coefficient 2*)
For[i = 3, i ≤ n - 1, i += 2, sumeven += 2 * (f[x] /. x → y[[i]]);];

Sn = (h / 3) * ((f[x] /. x → a) + sumodd + sumeven + (f[x] /. x → b));

Print["For n=", n, ", Simpson estimate is: ", Sn];

(*True value*)
in = Integrate[Log[x], {x, a, b}];
Print["True value is ", N[in]];
Print["Absolute error is ", Abs[Sn - N[in]]];
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For n=10, Simpson estimate is: 1.82785

True value is 1.82785

Absolute error is 5.46211×10^-9
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