Name: Abhishek Verma
Roll no. 2138118
Practical: Euler's Method

Ques.1: Approximate the solution of

$\frac{dy}{dx}$ = x + 2 y, with 0 ≤ x ≤ 1, y(0) = 0 using four steps.

In[34]:=
```
euler[f_, {x_, x0_, xn_}, {y_, y0_}, steps_] :=
 Block[{xold = x0, yold = y0, sollist = {{x0, y0}}, x, y, h}, h = N[(xn - x0) / steps];
  Do[xnew = xold + h;
    ynew = yold + h * (f /. {x → xold, y → yold});
    sollist = Append[sollist, {xnew, ynew}];
    xold = xnew;
    yold = ynew, {steps}];
Return[sollist]]
euler[x + 2 y, {x, 0, 1}, {y, 0}, 4]
```

Out[35]= {{0, 0}, {0.25, 0.}, {0.5, 0.0625}, {0.75, 0.21875}, {1., 0.515625}}

Ques.2: Approximate the solution of dy/dx = 1 + y / x, with 1 ≤ x ≤ 6, y(1) = 1 using 10 steps.

In[36]:= `euler[1 + y / x, {x, 1, 6}, {y, 1}, 10]`

Out[36]= {{1, 1}, {1.5, 2.}, {2., 3.16667}, {2.5, 4.45833}, {3., 5.85}, {3.5, 7.325},
    {4., 8.87143}, {4.5, 10.4804}, {5., 12.1448}, {5.5, 13.8593}, {6., 15.6193}}