Simpson Rule Integration

In[110]:=

```
SRI[a0_, b0_] :=
 Module[{},
  a = a0;
  b = b0;
  h = (b - a)/2;
  SI = (h/3) * (f[a] + 4 * f[a + h] + f[a + 2 * h]);
  Print["Integration by Simpson 1/3 rule : ", N[SI]];
  (*Direct Integration*)
  DI = Integrate[f[x], {x, a, b}];
  Print["Integration by Direct : ", N[DI]];
  Print["Error : ", N[SI - DI]];
 ]
```

In[111]:=

```
f[x_] := x^5 + 2 x^4 + x + 1;
SRI[1, 2]
```

```
Integration by Simpson 1/3 rule : 25.4792

Integration by Direct : 25.4

Error : 0.0791667
```

In[113]:=

```
f[x_] := 1/x;
SRI[1, 2]
```

```
Integration by Simpson 1/3 rule : 0.694444

Integration by Direct : 0.693147

Error : 0.00129726
```

Trapezoidal Rule Integration

In[115]:=
```
TRI[a0_, b0_] :=
 Module[{},
  a = a0;
  b = b0;
  h = (b - a);
  SI = (h/2) * (f[a] + f[a + h]);
  Print["Integration by Trapezoidal Rule rule : ", N[SI]];
  (*Direct Integration*)
  DI = Integrate[f[x], {x, a, b}];
  Print["Integration by Direct : ", N[DI]];
  Print["Error : ", N[SI - DI]];
 ]
```

In[116]:=
```
f[x_] := x^5 + 2 x^4 + x + 1;
TRI[1, 2]
```

```
Integration by Trapezoidal Rule rule : 36.

Integration by Direct : 25.4

Error : 10.6
```

In[118]:=
```
f[x_] := 1/x;
TRI[1, 2]
```

```
Integration by Trapezoidal Rule rule : 0.75

Integration by Direct : 0.693147

Error : 0.0568528
```