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Practical: Newton Interpolating Polynomial

In[1]:=
```
NthdividedDiff[x0_, f0_, startindex_, endindex_] :=
 Module[{x = x0, f = f0, i = startindex, j = endindex, answer},
  If[i == j, Return[f[[i]]], answer = (NthDividedDiff[x, f, i + 1, j] -
       NthDividedDiff[x, f, i, j - 1]) / (x[[j]] - x[[i]]); Return[answer]]]
x =
 {0,
  1,
  3}
```
Out[2]= {0, 1, 3}

In[3]:=
```
f = {1, 3, 55}
```
Out[3]= {1, 3, 55}

In[9]:=
```
NthdividedDiff[x, f, 1, 2]
```
Out[9]= 2

In[10]:=
```
NthdividedDiff[x, f, 1, 1]
```
Out[10]= 1

In[11]:=
```
NewtonDDPoly[x0_, f0_] := Module[{x1 = x0, f = f0, n, newtonPolynomial, k, j},
  n = Lenth[x1]; newtonPolynomial[y_] = 0;
  For[i = 1, i ≤ n, i = i + 1, prod = 1;
   For[k = 1, k ≤ i - 1, k = k + 1, prod[y_] = prod[y] * (y - x1[[k]])];
   newtonPolynomial[y_] + NthdividedDiff[x1, f, 1, i] * prod[y];
   Return[newtonPolynomial[y]]
```