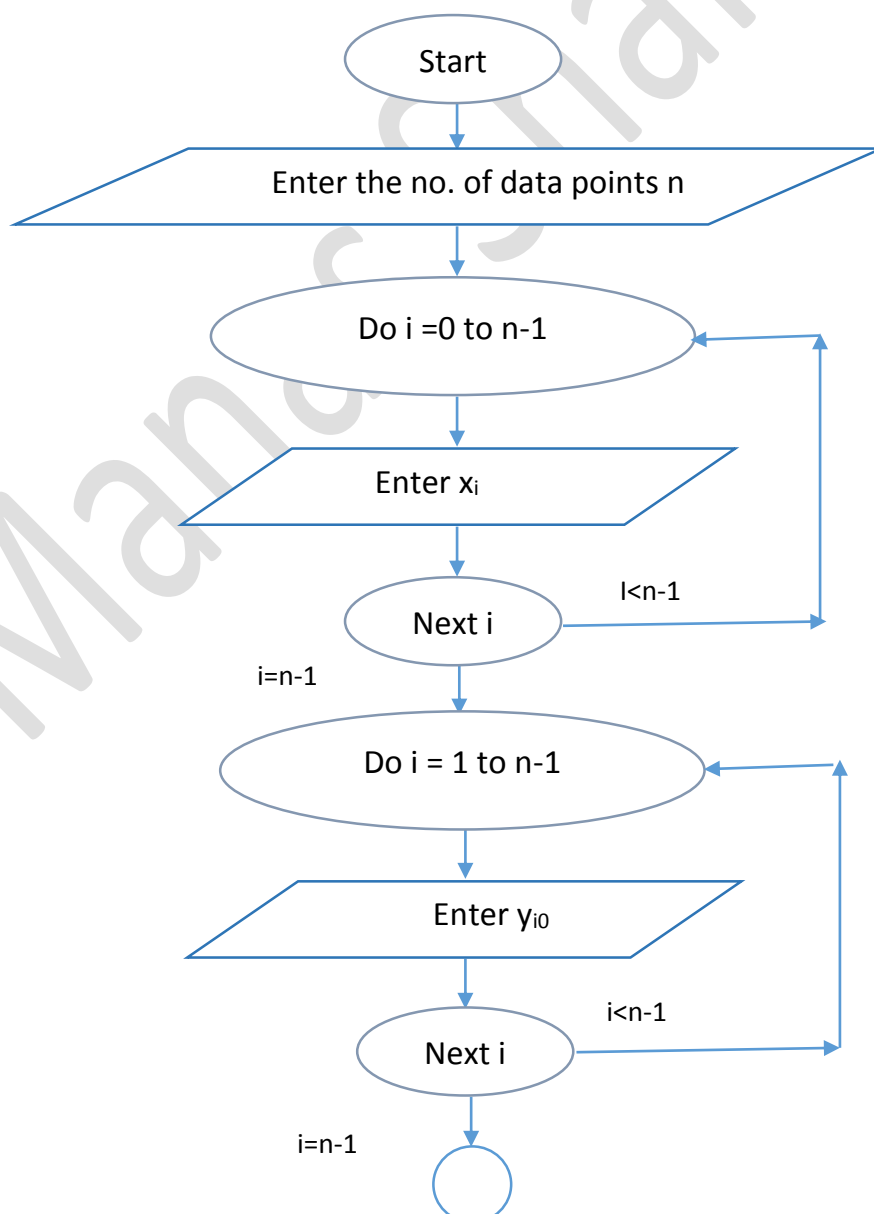


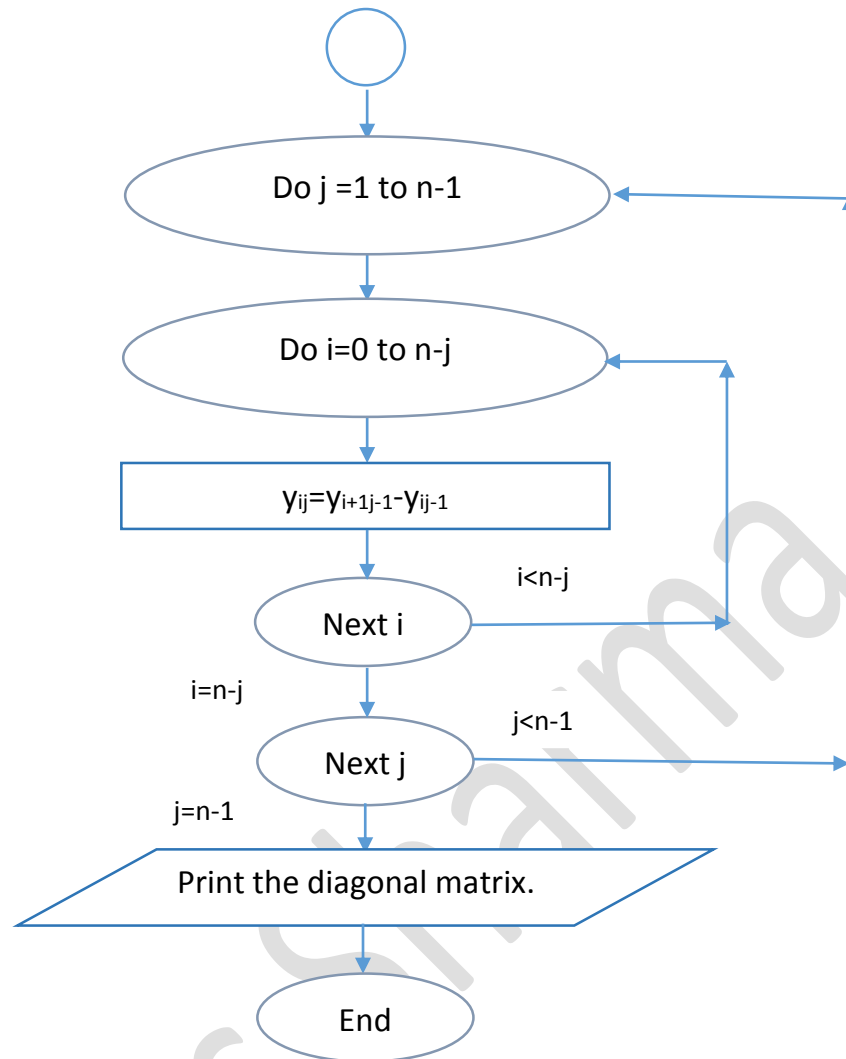
Aim: To find the Forward Difference Table from a given set of data values.

Algorithm:

1. Enter the no. of data values to be entered, 'n'.
2. Declare an array 'x' of size 'n' for the x-values and 'y_{nxn}' for y-values and the difference table.
3. For i=0 to n-1
Enter x_i.
4. For i=0 to n-1
Enter y_{i0}.
5. For j=1 to n-1
For i=0 to n-j
 $Y_{ij} = Y_{i+1j-1} - Y_{ij-1}$.
6. Print the diagonal matrix.

Flow Chart:





Program:

```

//Forward Difference Table

#include<iostream>
#include<iomanip>
using namespace std;
int main()
{
    cout.precision(2);          //set precision
    cout.setf(ios::fixed);
    int i=0,j=0,n,k;
    cout<<"\nEnter the number of values to be entered.\n";
    cin>>n;
    double x[n], y[n][n];      //make an array for x values and an
    nxn matrix for y and successive difference values, where y[n][0] is for the
    the y values
    cout<<"\nEnter the values of x\n";
    for (i=0;i<n;i++)          //input x values
        cin>>x[i];
    cout<<"\nEnter the values of y\n";
    for (i=0;i<n;i++)          //input y values in the first column of y
    matrix
        cin>>y[i][0];
  
```

```

    for (j=1;j<n;j++)          //loop to calculate the difference and
store them in the matrix
        for (i=0;i<n-j;i++)
        {
            y[i][j]=y[i+1][j-1]-y[i][j-1];
        }
    cout<<"\n The Forward Difference Table is as follows: \n\n";
    cout<<"x"<<setw(10)<<"y"<<setw(10);    //formatting the output and
creating table headings
    for (i=1;i<n;i++)
        cout<<"y"<<i<<setw(10);
    cout<<"\n-----\n";
    -----\n";

    k=n;
    for (i=0;i<n;i++)          //loop for printing the diagonal matrix on
the screen
    {
        cout<<x[i]<<setw(10);
        for (j=0;j<k;j++)
        {
            cout<<y[i][j];
            cout<<setw(10);
        }
        cout<<"\n";
        k--;
    }
return 0;
}

```

```

Enter the number of values to be entered.
7
Enter the values of x
100    150    200    250    300    350    400
Enter the values of y
10.63  13.03  15.04  16.81  18.42  19.90  21.27

The Forward Difference Table is as follows:
x          y          y1          y2          y3          y4          y5          y6
-----
100.00000  10.63000  2.40000  -0.39000  0.15000  -0.07000  0.02000  0.02000
150.00000  13.03000  2.01000  -0.24000  0.08000  -0.05000  0.04000
200.00000  15.04000  1.77000  -0.16000  0.03000  -0.01000
250.00000  16.81000  1.61000  -0.13000  0.02000
300.00000  18.42000  1.48000  -0.11000
350.00000  19.90000  1.37000
400.00000  21.27000

```

Enter the number of values to be entered.

5

Enter the values of x

40 50 60 70 80

Enter the values of y

31 73 124 159 190

The Forward Difference Table is as follows:

x	y	y1	y2	y3	y4
40.00000	31.00000	42.00000	9.00000	-25.00000	37.00000
50.00000	73.00000	51.00000	-16.00000	12.00000	
60.00000	124.00000	35.00000	-4.00000		
70.00000	159.00000	31.00000			
80.00000	190.00000				

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