Write a program that asks the user for a text file which has the x and f(x) values. It then reads the data from this file creates and creates a divided difference table and uses that to create the interpolating polynomial. Print the polynomial in both the Newton's form and Lagrange's form. The example below only shows the Newton's form polynomial and the simplified polynomial but not the Lagrange's form. You have to print polynomial in all three forms (Newton's, Lagrange and Simplified)

The sample output of your program for this input file (download the txt file here Download here) should print out the divided difference table and the interpolating polynomial as shown below:

x	f[]	f[,]	f[, ,]	f[, , ,]
1	3			
		1/2		
3/2	13/4		1/3	
		1/6		-2
0	3		-5/3	
		-2/3		
2	5/3			

Interpolating polynomial is:

$3 + 1/2(x-1) +1/3(x-1)(x-3/2) - 2(x-1)(x-3/2)x$

Simplified polynomial is:

$-2x^3 + 5.334x^2 - 3.334x + 3$

Your program should work on any data (at most 50 node points) and not just the above sample data. If you are struggling to print the divided difference table in the above pyramid format, you can print it in the simpler triangular format instead. Also, you don't have to use fractions, you can convert them to decimal numbers and use those instead.

Points distribution: 50% for printing out the correct divided difference table, 25% for printing the correct polynomial in un-simplified form and 25% for printing the polynomial in simplified form.

Submission details:

Submit a report that shows screenshots of the output of your program with a data file different from the one provided here. Your test data should at least have 5 data points(nodes). Make sure that your report also shows these data points as a table followed by the screenshots of your execution that show the interpolating polynomial in all three forms.

Upload the source code of your program and the report (PDF format).