FINAL PROJECT REPORT

LAB BATCH : 221

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2-D Function Graph Plotter

Introduction:

The aim of our project was to design a command-language based graph plotter which plots graphs of functions of the type y=f(x). The language would consist of simple commands using which user can provide information regarding what to plot. As an additional utility , we've also extended this idea to histograms.

Project Description:

For the completion of this project we divided our team into 4 modules.

- Module 1 The Input Sub-Team

This team first of all designed the command language that the user would use. These commands are to given in a separate .txt file contained in the same sub-directory as of main program. A lot of file handling had to be done in order to give sufficient flexibility to the commands used.

(for e.g. there is no fixed order of giving commands once the function expression is given) After reading this data from file it was stored in a struct data type "function". Next big job was to parse and evaluate the function expression (using fparser 4.4.3 library) at 1000 points in x-range given so that computation team can use it.

This team developed the functions to be used in the main program.

reset() :to reset the flags

mygetc,setbf,setright: to navigate in text file when reading.

read():main reading program to read the text file commands

validate():to validate input and display appropriate error msgs.

Parseit(): to evaluate function expression .

Debug():to make sure input algo was working fine.

The members who contributed to the module are Ashish Sonone, Anshul Purohit and Ashutosh Upadhyay.

- Module 2 The computation engine

The purpose of this team was to make all the calculations on the input given by module 1 and pass it on for plotting module. The various aspects of this engine included absolute maxima & minima, local maxima & minima, tangent , normal , inflection point , area and integral.

The various functions developed by this module are:

Near() : given an input ,finds the nearest point among the 1000 divisions of x range and returns i the index no.

Tanslope : it calculates the slope of tangent at i.

Xtrgen() : it returns maxima and minima points

Integral : It computes the integral and area between two given points

Inf() : it finds the points of inflection

The members who contributed towards this module are Anshul Avasthi, Anshul Purohit, Ashish Sonone.

- Module 3 The output module

This module handled all the work related to EZWindows API. This included choosing optimum window size, plotting the grid , axes and the function , decide proper scaling, plotting points, tangents, normals, maxima & minima points , ticks and appropriate labeling and color.

The functions prepared by this module are

Converter() : to covert float to string upto 2 decimal places for labeling points

Plotnormal() : to plot normal at given point

Plottangent() : to plot tangent at given point

Plotpoint() : to mark a given point on the graph

Besides a main program was created which later completely integrated with the input and computation engines.

The people who contributed towards this module are Anshul Purohit, Ashish Sonone, Anurag Gautam,Anwar Ahmad Ansari.

- Module 4 The Histogram Module

This module was created to extend the functionality of project to histograms as well. This team was supposed to work on the design, input,computation and output related to histogram parallel to the main graph plotter. Due to lack of time , the integration of the input and output programs of the histograms could not be integrated properly.

Two final files were made by this unit, histo.h and histogram.cpp.

The people who worked in this unit are Anurag Gautam, Ashish Agrawal and Anshul Avasthi.

STATUS OF COMPLETION

We have successfully completed all the work in module 1,2,3.

Most of the work of module 4 is complete. The final code could not be merged and tested from the two files due to lack of time. The extension of graph plotter could not be fully completed to histograms.

The graph plotter is functioning perfectly as per our design. It has been thoroughly tested for all the different types offunctions of the required form. For more details regarding the plotter , refer to the user manual.

IDEAS FOR FUTURE WORK

Given more time, we would have extended the utility of the graph by including the following features.

- Finding the roots of a given equation

- Plotting multiple curves on the same window and finding the area between them

- Activation mouse click zoom in and zoom out functions

- Removing the restriction of displaying origin centred graphs

- Improving the accuracy by using double type instead of float

- Reducing the compilation time by improving the algorithm

- If possible to plot 3D Curves of form f(x,y)

INDIVIDUAL CONTRIBUTION:

Ashish Sonone: Did the whole input module including design, coding ,testing & debugging. Read fparser 4.4.3 documentation to understand how to compile and use it to evaluate function expression.Tested it for various input. Assisted Anshul A and Anshul P in the computation part. Worked together with Anshul

P and Anwar in output module.Worked actively in documentation and discussion.

Anshul Purohit: Defined all the commands of the input language. Assisted Anshul A and Ashish S on writing of the computation functions. Did most of the designing and coding of the output. It included scaling and plotting algorithm. Made functions for tangent,normal,maxima,minima plotting . Extensive testing of the output was done for many functions. Worked with Ashish for integration of input computation and output modules along with active participation in discussion and documentation.

Anshul Avasthi: Active discussion initially in general design of the project including alogorithms and API to be used. For easy integration ,he suggested using global struct .Participation in documentation of the first SRS. Worked mainly in computation module and wrote cetain function to be used in main program.Lastly he assisted Ashish A and Anurag in Histogram program.

Anurag Gautam: Initially in the output team.Seeing that he made really good sample programs and looking forward he was put in the Histogram Team to design the graphics .Present in all team meets and discussions.

Ashish Agrawal: Initially he was in the input but since he was not comfortable with the functioning of the parser he preferred to work parallel with Anurag Gautam in the Histogram Team.Both of them mainly worked together for Histogram.He was also present in all team meeting and discussions .

Anwar Ahmad Ansari: He contributed very little to the output module.He only made a sample program while learning EzWindows.He was busy with make up assignments,quiz and mid-sem.But he did turn up in lab sessions and occasionally in meetings

Ashutosh Upadhay : He was initially in the input module but showed little interest in coding work. Little contribution in any of the modules .He did participate in labs and team meets.

NOTE : All the above is based the discussion held during peer review with the consent of all team members.Please refer to Peer Review sheet (BELOW) that has been signed duly by all for verification.

Anshul Avasthi	11D260002	8.5	*signature*
Anshul Purohit	110050002	10	*signature*
Anurag Gautam	110040089	7.5	*signature*
Anwar Ahmad Ansari	115280019	3	*signature*
Ashish Agrawal	110040059	7	*signature*
Ashish Lonone	110050022	10	*signature*
Ashutosh Upadhay	110040119	2	*signature*

→ Today we had a team meet to discuss about the peer review for each team member. The meet lasted for about an hour. The total quantive and qualetative contribution from each member towards the project.

- Me and Ashish S were given 10 by all as we both had contributed maximum for the project.
- Anshul A was given 8.5 for his active participation in histogram and computation module for graph plotting.
- Ashish A & Anurag G were given 7 & 7.5 respectively. Ashish A made average contribution in histogram module and design for input module. Anurag G also made average contribution for histogram module and made sample program & design for output module.
- Ashutosh was given 2 as he showed little intrest for coding. Made very less contribution towards any module. But showed up in labs and discussion.
- Anwar was also given 3 because he contributed very less to the output module. He only made a sample program while learning EZwindows. He was busy with make up assignments, quizzes and mid-sems.

No of hours given by each member :

	Discussions	Design	Programming	Testing	Documentation	Misc
Anshul A	1:30	6:30	5	0	1:30	0
Anshul P	5:30	4:30	15	5	5	1
Anurag G	4	2	9	2:30	0	0
Anwar A	0:30	0	1:30	0.30	0	0.30
Ashish A	4	1	5	1:30	0	0
Ashish S	6	5	17	6	6	3
Ashutosh U	1	0	0	0	0	1.5