Incremental Testing and Regression Testing

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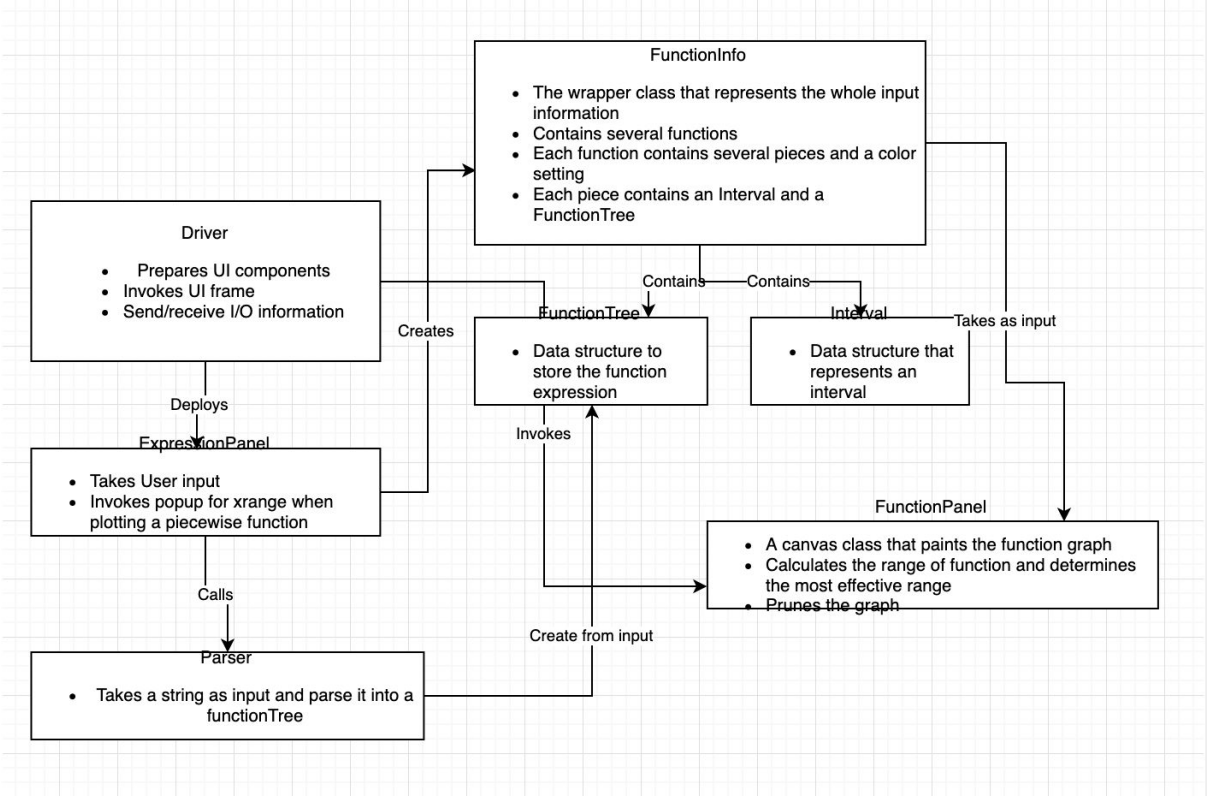
1.Classification of Components

1.1 Components Define



User will input an equation. The program will parse the input into operators and operands, which will be pushed to two stacks. According to the arithmetic precedence, we will build a function tree containing operators as nodes and operands as operands. Function tree will be sent to FunctionPanel, which will read the function tree and repaint the canvas.

1.2 Incremental Testing Form

We use the Bottom-up incremental testing because our project required user input, and then we input parse the input and send to the backend. Finally backend could use the the input to plot the graph the user requested. So we make sure each part of the component works as expected, and then put them together and send information with each other to the whole system.

2. Incremental and Regression Testing

Module	Component A - Driver(GUI)

Incremental Testing

Defect No.	Description	Severity	How To Correct
1	Two Components that were added in the “BoxBagLayout” should not crash or throws “box can’t shared” exception	1	Adding the GridBagContrandstrain to the panel and adjust the position of panel before add each component
2	Using button “+add” Adding more function input panel should display one more TextField	1	Adding “pack” and “repaint”method every time after changing the UI in ActionListener
3	Delete the last “FuncFrame” component and should stops when there is only one left	2	Using the array to track the number of multiple new adding function and access any of them

Regression Testing

Defect No.	Description	Severity	How To Correct

1	Fixing “box can’t be share” makes two components overlapping and neither of them diaplays completely	1	Adjust the grid_x and grid_y in the panel to include both component size before adding two components
3	Fixing the deleting unused “funcFrame” component in Driver makes the Component D-functionPanel still has the deleted graphs	1	Update the new existing “funcFrame” components array and send updated array to the Component D

Module	**Component B - Parser**

Incremental Testing

Defect No.	**Description**	**Severity**	**How To Correct**
1	Program should alert user when user input an undefined operator	1	Check if the operator is defined in Enum or else alert the error
2	Program should alert user when the parenthesis in the equation is not balance	1	Check if the number of right parenthesis is the same as the number of left parenthesis
3	Progaram should properly insert each operator (eg: artan should only be inserted once)	1	Update the index number after insert each operator
4	Program should detect numbers correctly (double and integer)	1	Added a function to extract numbers and used regex to check if it is an operand
5	Program should properly detect bioperator and unioperator(eg: +,-,*,/ are bioperator. log,sin, cos.., are unioperator)	1	Add a function to check if an operator is uniopertor or bioperator. stack should pop twice if it is a bioperator

6	Program should calculate equation according to correct precedence	1	Each operator is assigned precedence in ENUM class, when the precedence of a new operator is less than stack peek(), calculate the high precedence operator before adding the new operator
7	Program should calculate what inside a parenthesis first	1	When read a right parenthesis, stack should pop until its corresponding left parenthesis is popped out
8	Program should take a varaible as an operand	1	An variable should be added to operand stack and the value of the Node should be set to true

Regression Testing

Defect No.	**Description**	**Severity**	**How To Correct**
1	Update the index number after insert each operator will cause index of bound	**1**	new index should be old index + length of string -1
2	Extract double number might loos the digits after dot	1	Add condition “keep extracting if it is a digit or it is a dot”
3	Set left parenthesis as highest precedence and right parenthesis as lowest precedence would nullStack error	1	Check parenthesis separately from operators rather than set precedence for parenthesis
4	Make stack pop until its corresponding left parenthesis would cause nullStack	1	After pop out the operator stack, the new operator should be pushed.

Module	Component C - FunctionTree

Incremental Testing

Defect No.	Description	Severity	How To Correct
1	Printing functionTree doesn't show the error if a unary operator has 2 childs.	**3**	Didn't correct.(this method is only visible to test cases)
2	A leave node containing the variable might have uninitialed childs	**2**	Initialize the childs of leaves to be null when creating

Regression Testing

Defect No.	Description	Severity	How To Correct
1	Evaluating division by zero doesn't give out an exception	**1**	Add an analyzer to tackle with the problem
2	Evaluating log of a negative doesn't give out an exception	**1**	Add an analyzer to tackle with the problem

Module	Component D - FunctionPanel

Incremental Testing

Defect No.	Description	Severity	How To Correct
1	Graph should correctly show the data from the input functiontree between x and y in the graph, instead of pixels.	1	Check with algoritm, and come up with conversion from real point to pixel points.

2	The value of y given x should be correctly send from the functiontree, when divided by 0, the graph show nothing.	1	Check the value() function in functiontree, if it's divided by 0, return no value.

Regression Testing

Defect No.	Description	Severity	How To Correct
1	Variable are initialized in a messy way that causes scaling problems, also causes the size of the graph cannot be changed easily.	**1**	reinitialized several variables and simplified the structure of looping and scaling.
2	The pixel points are too few, which didn't make it to be a line, but a group of dots.	**1**	Connect every 5 pixel dots with line using drawline().
3	The label of the graph range should adjust according to the range that is setted up.	**1**	Check the algorithm of range adjustment, and reset the conversion of range and pixels.
4	Variable range should not be confused with variable LENGTH and HEIGHT.	**3**	Comment out the variable range so that it won't be confused with other variables.
5	The default scale is not correct because in our graph, there should be both positive quadrant and negative quadrant.	**1**	Divide the default scale by 2 so that it has both the positive side and the negative side.