Arithmetic Game

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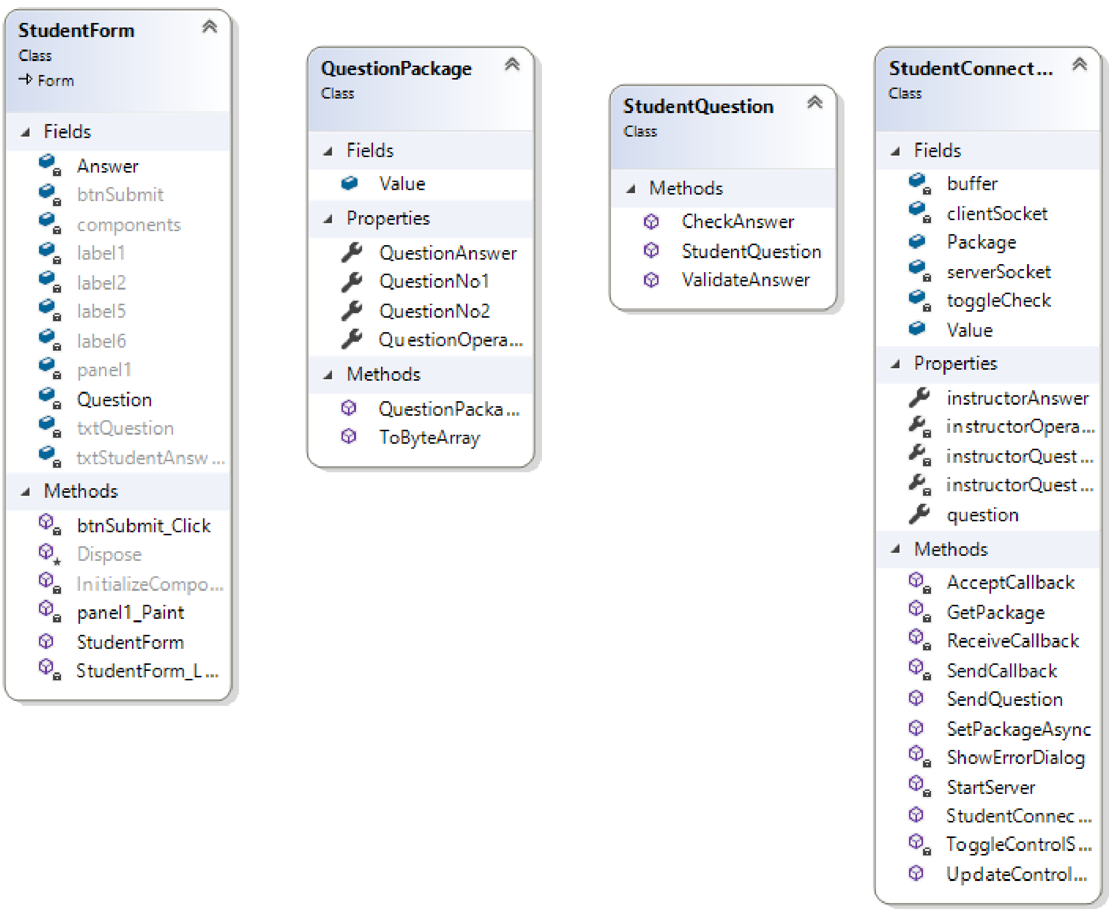
Toe Chart

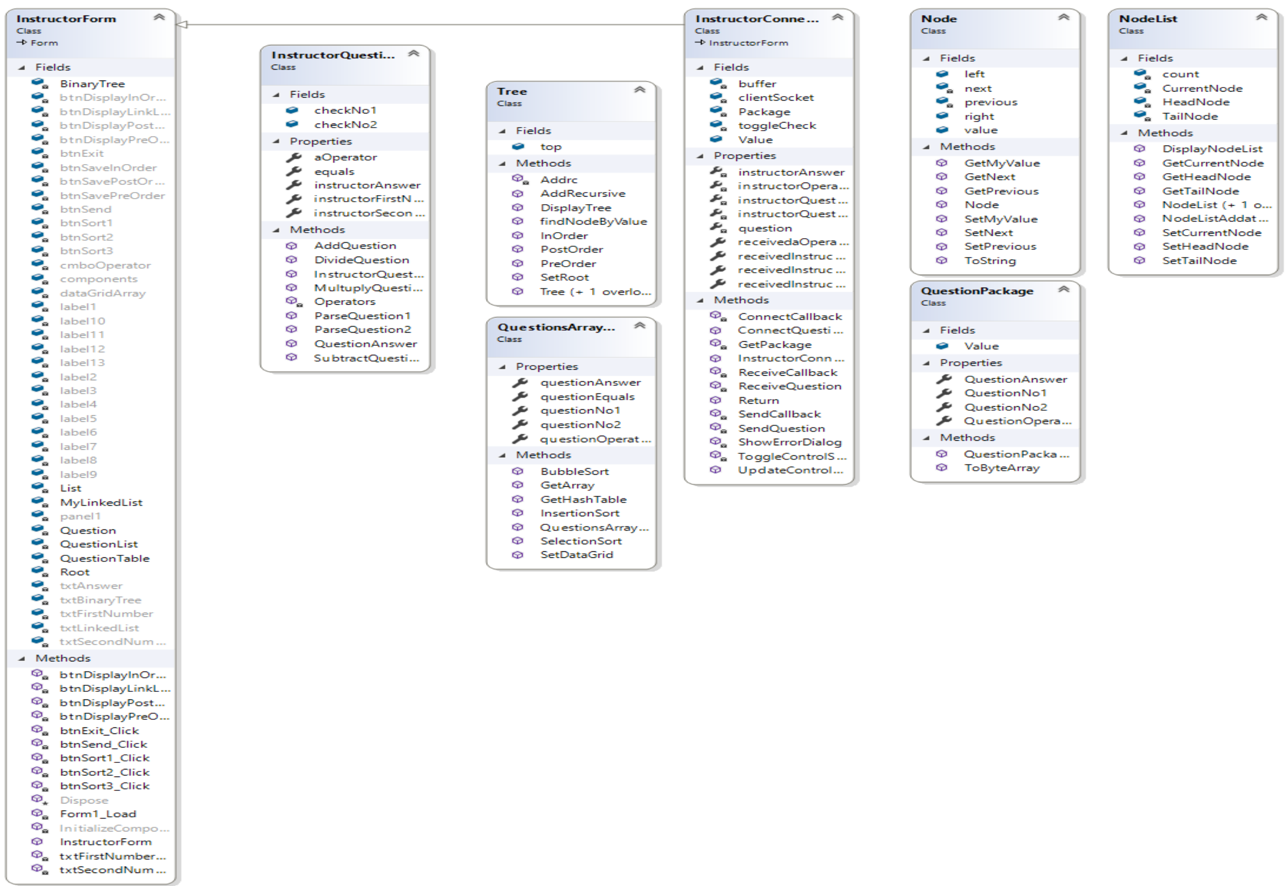
Toe Chart listing the applications functions(tasks), the object used to finish the tasks, and the event involved.

Task	Object	Event
<u>Get/Set Question</u>		
Get/Set Number 1	**txtQuestion1.Text**	**txtQuestion1Change**
Get/Set Number 2	**txtQuestion2.Text**	**txtQuestion2Change**
Get/Set operator	**cmboOperator**	**txtQuestion1 + 2 Change**
<u>Determine operator</u>		
Index 1 = + index 2 = - etc. Etc	**cmboOperator**	**cbmboOperator Index change**
<u>Calculate Answer</u>		
Number 1 (+ - x /) Number 2	**txtAnswer.Text**	**txtQuestion1 + 2 Change**
<u>Submit Question</u>		
Send question to student application	**New InstructorConnection Class**	**btnSubmit.Click**
Student application to grab question	**New StudentConnection Class**	**StudentForm.Load**
<u>Display Question to Student</u>		
Question received and displayed	**txtStudentQuestion.Text**	**StudentForm.Load**
<u>Add Sent Question to DataGrid</u>		
Add question to DataTable	**dataTableList**	**btnSubmit.Click**
DataSource for grid = DataTable	**dataGridViewQuestionList**	**dataGridViewQuestionList**
<u>Send Question to Binary Tree</u>		
Convert Question to Binary Tree	**New BinaryTree class**	**InstructorForm.Intitialzed**
Display Binary tree in one of 3 orders	**btnInOrder, btnPreOrder, BtnPostOrder**	**btnInOrder.Click btnPreorder.Click btnPostOrder.Click**

UML Diagram

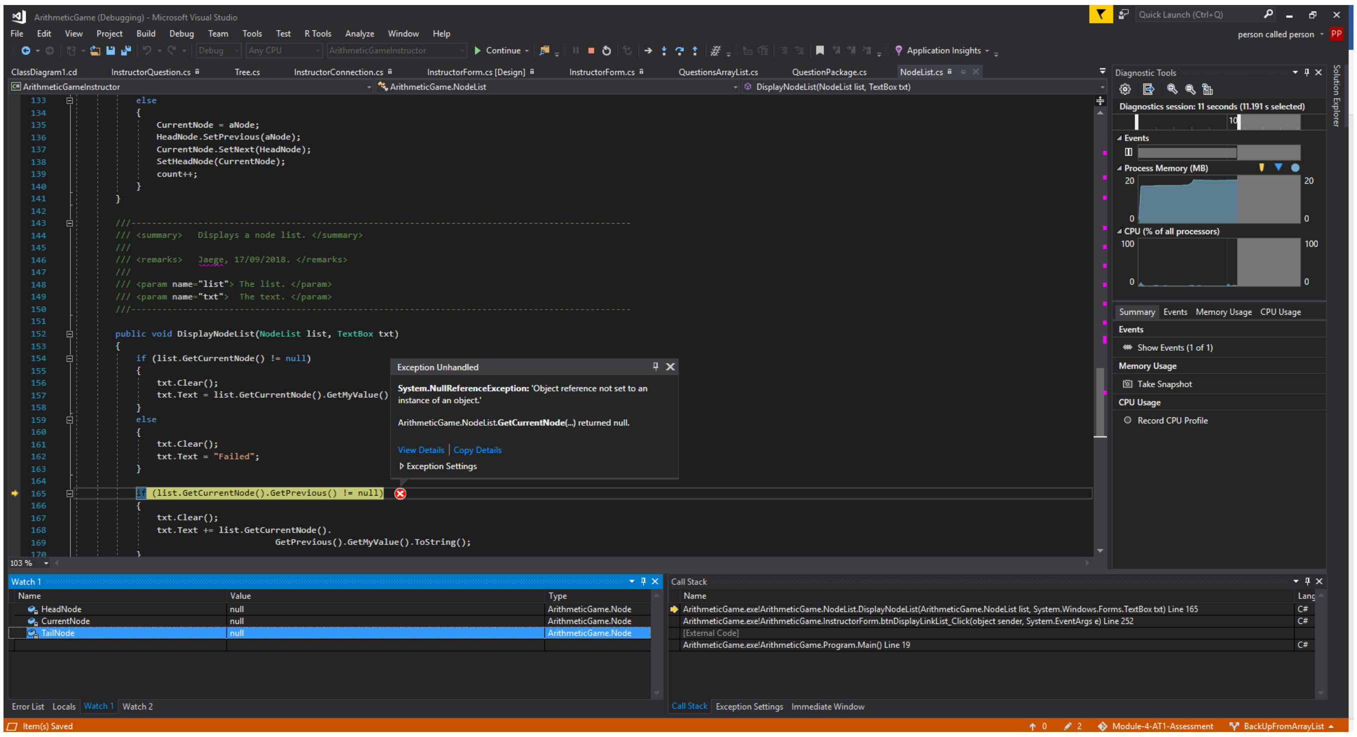
Provided UML Class Diagrams showing all classes, fields, properties and methods for both projects.





Debugging Evidence

Evidence of debugging



```
            else
            {
                CurrentNode = aNode;
                HeadNode.SetPrevious(aNode);
                CurrentNode.SetNext(HeadNode);
                SetHeadNode(CurrentNode);
                count++;
            }
        }

        ///-----------------------------------------------------------------------------
        /// <summary>   Displays a node list. </summary>
        ///
        /// <remarks>   Jaege, 17/09/2018. </remarks>
        ///
        /// <param name="list"> The list. </param>
        /// <param name="txt">  The text. </param>
        ///-----------------------------------------------------------------------------

        public void DisplayNodeList(NodeList list, TextBox txt)
        {
            if (list.GetCurrentNode() != null)
            {
                txt.Clear();
                txt.Text = list.GetCurrentNode().GetMyValue()
            }
            else
            {
                txt.Clear();
                txt.Text = "Failed";
            }

            if (list.GetCurrentNode().GetPrevious() != null)
            {
                txt.Clear();
                txt.Text += list.GetCurrentNode().
                                GetPrevious().GetMyValue().ToString();
```

```
Exception Unhandled

System.NullReferenceException: 'Object reference not set to an instance of an object.'

ArithmeticGame.NodeList.GetCurrentNode(...) returned null.

View Details | Copy Details
▷ Exception Settings
```

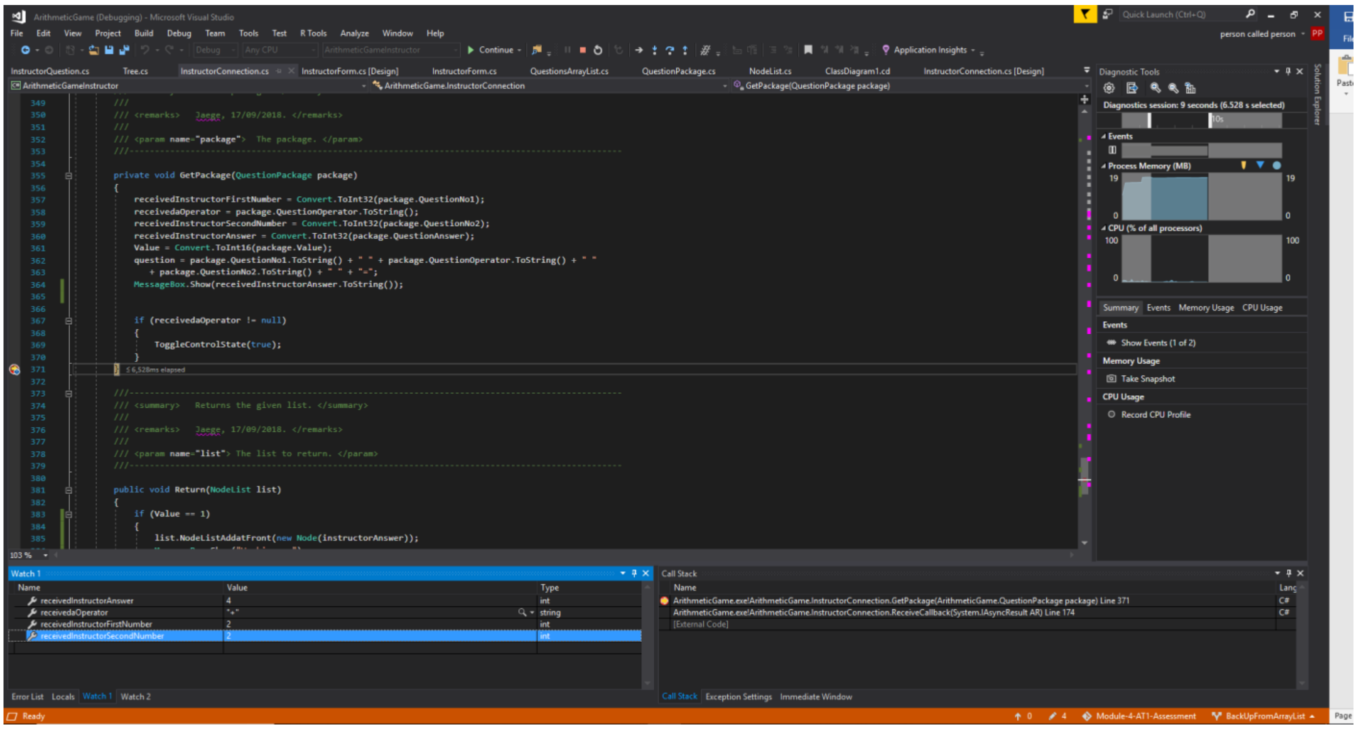
Watch 1

Name	Value	Type
HeadNode	null	ArithmeticGame.Node
CurrentNode	null	ArithmeticGame.Node
TailNode	null	ArithmeticGame.Node

Call Stack

Name	Lang
ArithmeticGame.exe!ArithmeticGame.NodeList.DisplayNodeList(ArithmeticGame.NodeList list, System.Windows.Forms.TextBox txt) Line 165	C#
ArithmeticGame.exe!ArithmeticGame.InstructorForm.btnDisplayLinkList_Click(object sender, System.EventArgs e) Line 252	C#
[External Code]	
ArithmeticGame.exe!ArithmeticGame.Program.Main() Line 19	C#

Handling exception, by placing watches and running through the code to determine where the fault lay.



```
        ///
        /// <remarks>   Jaege, 17/09/2018. </remarks>
        ///
        /// <param name="package">  The package. </param>
        ///-----------------------------------------------------------------------------

        private void GetPackage(QuestionPackage package)
        {
            receivedInstructorFirstNumber = Convert.ToInt32(package.QuestionNo1);
            receivedaOperator = package.QuestionOperator.ToString();
            receivedInstructorSecondNumber = Convert.ToInt32(package.QuestionNo2);
            receivedInstructorAnswer = Convert.ToInt32(package.QuestionAnswer);
            Value = Convert.ToInt16(package.Value);
            question = package.QuestionNo1.ToString() + " " + package.QuestionOperator.ToString() + " "
                + package.QuestionNo2.ToString() + " " + "=";
            MessageBox.Show(receivedInstructorAnswer.ToString());


            if (receivedaOperator != null)
            {
                ToggleControlState(true);
            }
        } ≤ 6,528ms elapsed

        ///-----------------------------------------------------------------------------
        /// <summary>   Returns the given list. </summary>
        ///
        /// <remarks>   Jaege, 17/09/2018. </remarks>
        ///
        /// <param name="list"> The list to return. </param>
        ///-----------------------------------------------------------------------------

        public void Return(NodeList list)
        {
            if (Value == 1)
            {
                list.NodeListAddatFront(new Node(instructorAnswer));
```

Watch 1

Name	Value	Type
receivedInstructorAnswer	4	int
receivedaOperator	"+"	string
receivedInstructorFirstNumber	2	int
receivedInstructorSecondNumber	2	int

Call Stack

Name	Lang
ArithmeticGame.exe!ArithmeticGame.InstructorConnection.GetPackage(ArithmeticGame.QuestionPackage package) Line 371	C#
ArithmeticGame.exe!ArithmeticGame.InstructorConnection.ReceiveCallback(System.IAsyncResult AR) Line 174	C#
[External Code]	

Checking that the variables are receiving values.

Sorting Algorithms

The Bubble Sort is considered one of the worst sorting algorithms available. This doesn’t mean it’s useless though. For one, the Bubble Sort, just like Insertion Sorts and Selection Sorts are some of the easiest Sorting algorithms to understand and utilize. While the Bubble Sort does not sort to the same effect as other Sorting methods, it is still useful. It’s best used in small to medium sized item lists, starting to lose its ability the larger the item list. A Bubble Sort works by comparing the first two values in a data set. When it compares the values if it finds that the first has a greater value than the second it swaps the values. This is repeated until the data set is sorted.

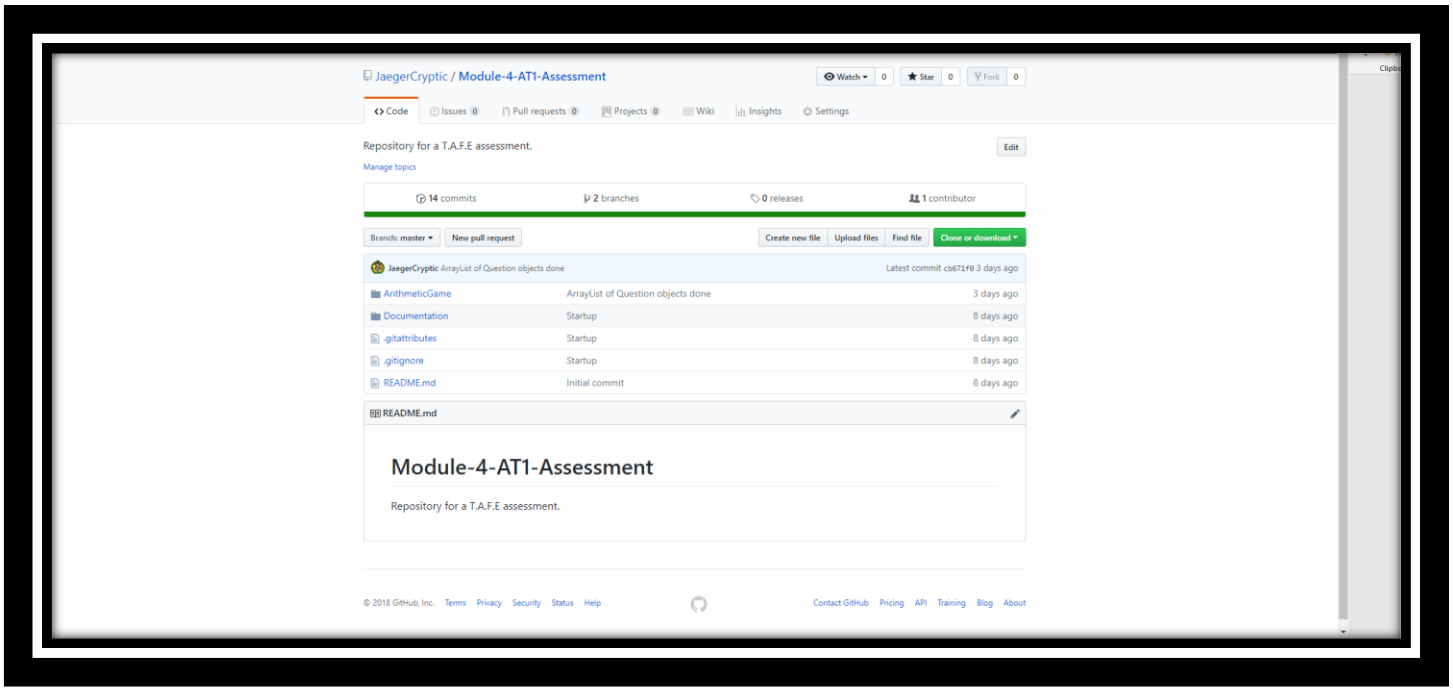
An Insertion Sort is another type of sort and just like the Bubble Sort; is a very basic sorting algorithm, meaning it loses effect the larger the item list. The Insertion sort shines in small data sets and unlike more advanced algorithms, this algorithm only takes a couple of lines to code. In almost all cases an Insertion sort beats a Bubble Sort. Only slightly requiring more code. An Insertion Sort works by taking the values from the selected data set and then, sorting them by value in a new data set. Another disadvantage to the Insertion Sort can be that the sorting algorithm can be taxing compared to other basic sorting algorithms.

Lastly, the Selection Sort. This algorithm is another basic algorithm and suffers from the same drawbacks the other basic algorithms do. While the Selection sort is considered better than a Bubble Sort in terms of efficiency, it stills fails to compare with an Insertion Sort. A Selection sort works by finding the lowest value in a data set and swaps it with the first value. This is repeated until the Selection Sort goes through the entire data set.

Version Control

Version Control was used throughout this project and can be seen Here:

GitHub in conjunction with GitHub Desktop was used while developing this project. All progress was committed and stored with the version control and backups were continuously updated and merged, ensuring the master product was kept intact.



JaegerCryptic / **Module-4-AT1-Assessment**

Repository for a T.A.F.E assessment.

14 commits | 2 branches | 0 releases | 1 contributor

JaegerCryptic ArrayList of Question objects done — Latest commit cb671f0 3 days ago

ArithmeticGame	ArrayList of Question objects done	3 days ago
Documentation	Startup	8 days ago
.gitattributes	Startup	8 days ago
.gitignore	Startup	8 days ago
README.md	Initial commit	8 days ago

README.md

Module-4-AT1-Assessment

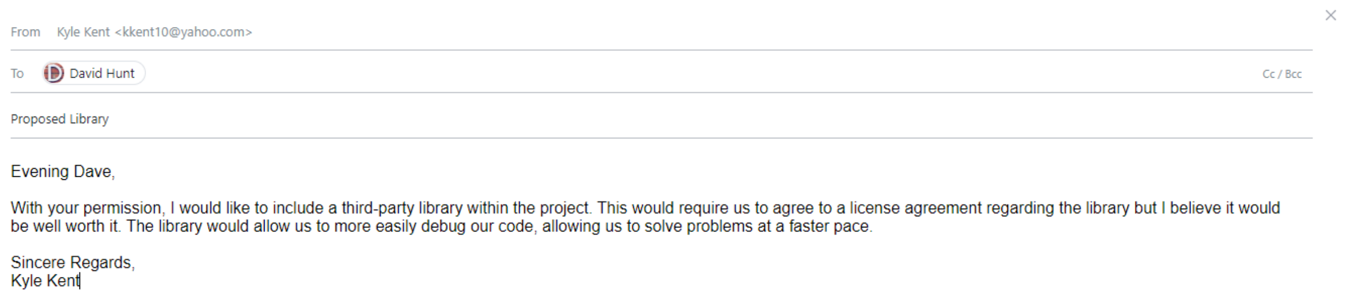
Repository for a T.A.F.E assessment.

Test Plan

Item	Expected Result	Actual Result	Reasons
Submit Instructor	Student grabs data and displays it	Student does not grab data	Program error-checking
Determine value of item x with item y using selected operator	Display result of item x with item y using selected operator	Intended result	Program error-checking
Test connection between both applications to ensure they are both receiving and sending	Send and receive data through both clients	Sending but not receiving	Program functionality
All question to be entered into DataGrid	Array of Question to be used as Data Source for Grid	Intended result	Program error-checking
Incorrect Questions to be entered into Linked List	Incorrect Questions to be entered into Linked List	Call in wrong place, resulting in calling a null object	Program error-checking
Enter questions into Binary tree	Questions entered into Binary tree	Answers are entered but nothing else	Program error-checking

Communication

Evidence of communication between manager and client.



From Kyle Kent <kkent10@yahoo.com>

To David Hunt

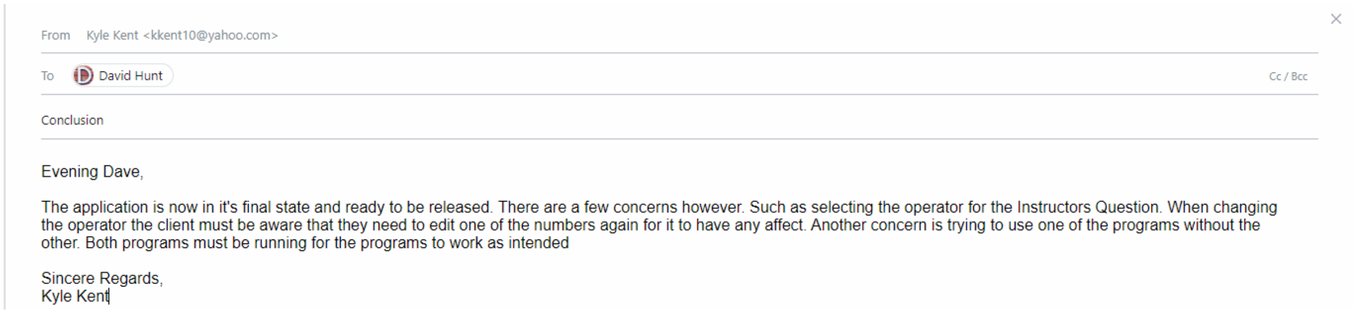
Cc / Bcc

Proposed Library

Evening Dave,

With your permission, I would like to include a third-party library within the project. This would require us to agree to a license agreement regarding the library but I believe it would be well worth it. The library would allow us to more easily debug our code, allowing us to solve problems at a faster pace.

Sincere Regards,
Kyle Kent



From Kyle Kent <kkent10@yahoo.com>

To David Hunt

Cc / Bcc

Conclusion

Evening Dave,

The application is now in it's final state and ready to be released. There are a few concerns however. Such as selecting the operator for the Instructors Question. When changing the operator the client must be aware that they need to edit one of the numbers again for it to have any affect. Another concern is trying to use one of the programs without the other. Both programs must be running for the programs to work as intended

Sincere Regards,
Kyle Kent