



DESIGN DOCUMENTATION

Synoptic assignment Task 1b

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Client needs and Feedback methods

The clients' needs will be established through a series of meetings, interviews, and Email conversations.

Once the requirements are locked down and agreed upon, the development will start, once prototypes or alpha versions are ready, feedback will be gathered from the client, if any new features are wanted than their cost will need to be evaluated, once a cost has been agreed upon the requirements can be altered accordingly.

If the client ever needs to contact the developer than they can do so through email, and if needed a meeting can be arranged.

Throughout the development a weekly update/review will be held with the client, this is a minimum of communication, some weeks will require more communication. This will ensure that the application is on track and that any feedback from the client can be gathered quickly and efficiently, preventing any miscommunication issues.

Development method and process

Method

I will be using visual studio 2017, writing in C# for classes and page code, pages/forms will be created using Windows Presentation Foundation (WPF) and xaml to write the code-behind ().

WPF and xaml will allow the application to layout controls anchored to specific grid/row locations making the app flexible in its size, for example it will fit both phone and tablet screen sizes with the controls being aligned correctly for easy use. I have chosen this over windows forms because an application like this will be best used if it can run on mobile devices allowing the customers employees to log their expenses on the go.

Visual studio 2017 is a great Independent Developing Environment (IDE) that will provide me with many great features for testing and building the application. Such as using break points to pinpoint what is happening at specific points, the debugging tools in visual studio are extremely powerful and will provide great support for the testing and building of this application.

There are other IDE's, but I am most familiar with visual studio and it is accepted as a professional IDE and held in high regard.

Process

Proposed life cycle (SDLC)

For the development of this application prototype I will be using a waterfall development life cycle model, this will be effective because I have been provided with a very clear and concise brief providing me with the requirements of the application and the client needs in a clear and simple way. It is unlikely for the client needs and requirements to change during the development process and so the water fall models linier approach to development isn't going to hinder any necessary changes.

This is effective in terms of budget also as I won't be spending time on additional reviews or requirement analysis, this leads to a very quick and easy to plan finish date, providing the client with a prototype relatively quickly.

Alternatively I could have used the Agile model, this would involve going through multiple iterations of development, Planning – requirement analysis – designing - building – reviewing, and repeat, for this project I would probably only iterate it twice, This would likely result in a higher quality product at the end of the process, but at the expense of extra time and money, if I was creating a finished product then I would have chosen this model or the prototype model, but due to the client wanting a prototype the waterfall model will be effective in providing the client with what they need.

Progressing from the prototype the agile or prototype models would be my suggestion. Dependent on time and budget for the application. This will be discussed in the review.

The stages of development

1 Requirement gathering and analysis

The clients brief was detailed and concise, much of the information needed was provided in the brief, I did a bit of research into the current VAT rates to implement them into the application, this was done prior to creating this design document.

2 Design

Designing the prototype application will involve creating sketches to establish a professional and practical layout for controls, Diagrams will need to be created to layout the flow of data and the logic of the application this will make the implementation phase much easier resulting in a smoother process.

A UML diagram will be created to plan out the necessary classes for the application identifying Data members and method members needed. This will speed up the process of creating the classes for the app.

A Test plan will be made, this plan will be used in Task 2 to test the application throughout its development.

Gantt chart to allocate time for tasks, this will help to keep the development on track.

3 Implementation

Creating the application in visual studio 2017, the design documentation will be used to create the application in accordance to the client needs and the designs created, throughout the process testing will be done to ensure full functionality of features, logging any issues found and any action taken to fix them.

Technical documentation will be created containing, screen shots of the application during all stages of use, the test plan/log, and the code for the application.

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4 Testing

Once the app is created a final test will be done to ensure it meets the client needs fully, this will be done through an observation form by my manager

5 Review

A review will be done looking at the development process, discussing decisions and making recommendations for future development creating the full version of the prototype for the client if they so wish.

6 Deployment/Maintenance

To be determined, dependent on client satisfaction with prototype and then the development of the full version, this will be reviewed at the end of this project.

Purpose of the application

This prototype is going to demonstrate the usefulness of an application that can record Expenses, calculating the NET, Gross, and VAT of each purchase for use in claiming back money for expenses such as fuel and accommodation.

Purchase data will be put into a list box, and a summary page will be able to show the totals for several expenses at a time.

This is going to be a prototype and so data storage will be done locally, the feature complete release version will need a database for data retention.

Application features

The applications features will be discussed one page at a time, going through each feature of the page, and why I plan on implementing it.

*Contents – (covers the controls and layout of the page)

*Features – (covers what the features of the page do and how they will do it)

Login Page

Page used to log employee users in. having users log in will enable

Contents –

This page will have simple login controls, two text boxes one for username and one for password, they will be labeled as such, their will be a Login button, a Clear button and a help button.

Features –

Clear button will empty the text boxes of text, allowing the user to start again, this feature is simply to make the application easier to use, it isn't necessary, but it adds to the usability of the application.

Login Button will go through the authentication process, using the User and Authenticate classes, this will create a User object from class User, assigning the values in the text boxes to the data-members Username and Password. This object will then be used with the authenticate class to validate the user by checking if the username and password match any from the txt file database, if they do then the application will navigate to the next page.

If the username or password are incorrect then a message box will pop up and say, "Username or Password incorrect", if the user hasn't entered a username then "You must enter a Username" will pop up, and the same for password replacing the text Username for password.

A help button will also be placed on this page, for this prototype the functionality of this button will not be implemented, the help will be focused around the employees account system and so it can't be fully completed with my current information, it is their purely to show that help will need to be placed there for the full version later.

Purchase Record

This page is the main body of the application and will hold most of the features.

Contents –

Date Time Picker (Date of Expense), **Combo box 1** (Type of Expense), **Text box 1** (Supplier Name) **Text box 2** (Invoice Number) **Text box 3** (Invoice Value/Price) **Combo box 2** (VAT Exclusive/Inclusive selector)

“VAT” Button (used to calculate the NET, Gross, and VAT content of the invoice)

3 Text boxes for displaying Invoice NET, Gross, and VAT values

Text box for recording comments about the invoice “5litre of fuel” etc.

“Clear Invoice” Button (Used to clear the controls)

“Add Invoice to list” button (used to add current invoice to the list box)

List box (Displays invoice items showing Date, Type, NET, VAT, and Gross, with a comment.

“Show Batch Summary” button (Used to navigate to summary page, parsing all invoice data needed for the summary.)

Features –

Expense Types –

The expense types will be handled through a combo box and text file database, the data base will have the name of the type and the VAT rate, (Standard 20%, Reduced 5%, Exempt 0%, and Zero 0%) this data will be handled through a couple classes, these classes will be PurchaseType and PurchaseTypeDB, PurchaseTypeDB will handle the reading of the text file creating a database object from it to enable the combo box to load the names of the types, and PurchaseType will be a simple class with only two data members and no methods, these data members will hold the name of the type, and the VAT rate of the type.

This will make selecting VAT rates automatic making the application quick and simple to use, meaning employees don't need to know all the different VAT rates for every expense.

Calculate VAT –

The “VAT” button will have an on click action that will make use of two classes to calculate the NET, Gross, and VAT content for the invoice, this will be displayed in the 3 Text boxes for NET, Gross, and VAT. The classes will be Calculator.cs and VATSplit.cs, the calculator handles the algorithms for the math's and VatSplit has three data members one for each element of the price. An object of vatSplit will be created to be used in holding the values that will be loaded into the text boxes for viewing.

Clear invoice –

Clears all the controls for recording invoice, setting all text boxes to "" and combo boxes to a default. This makes it easier for the user to create multiple purchases quickly, having to manually clear the controls would waste their time.

Add invoice to list box –

This feature allows the user to view the expenses as a list before finishing and viewing total summary, having this feature will reassure the user that the purchase has gone through correctly.

A class will be created to handle the creation of the items for the list, this class will be called PurchaseLineItem and it will use a string builder to concatenate the various elements of the invoice into a string for the list box.

Show Batch summary –

Button for navigating to the summary page. Parses the data to summary page.

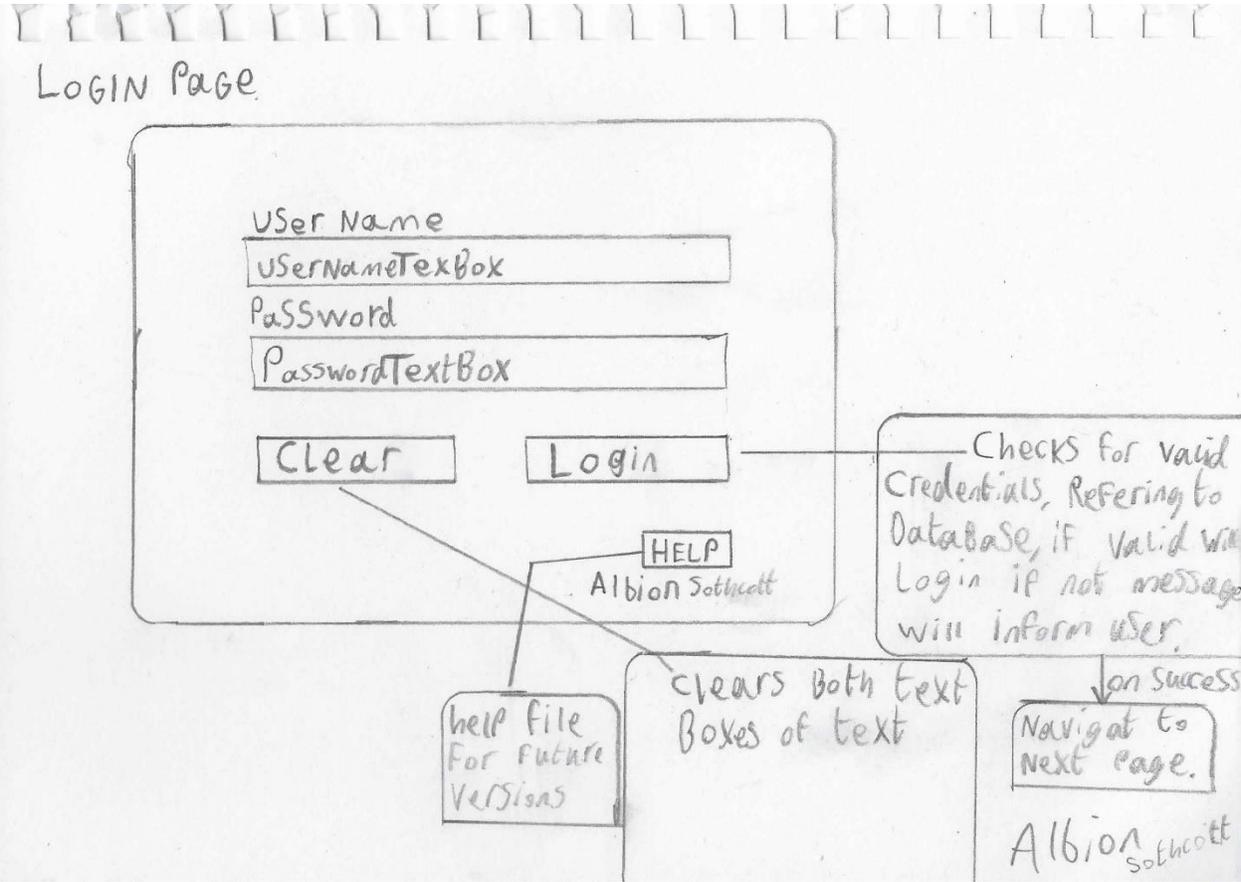
[Summary Page](#)

The summary will be displayed using text blocks, showing the Number of Purchases, Total NET Value, Total VAT Value, Total GROSS Value.

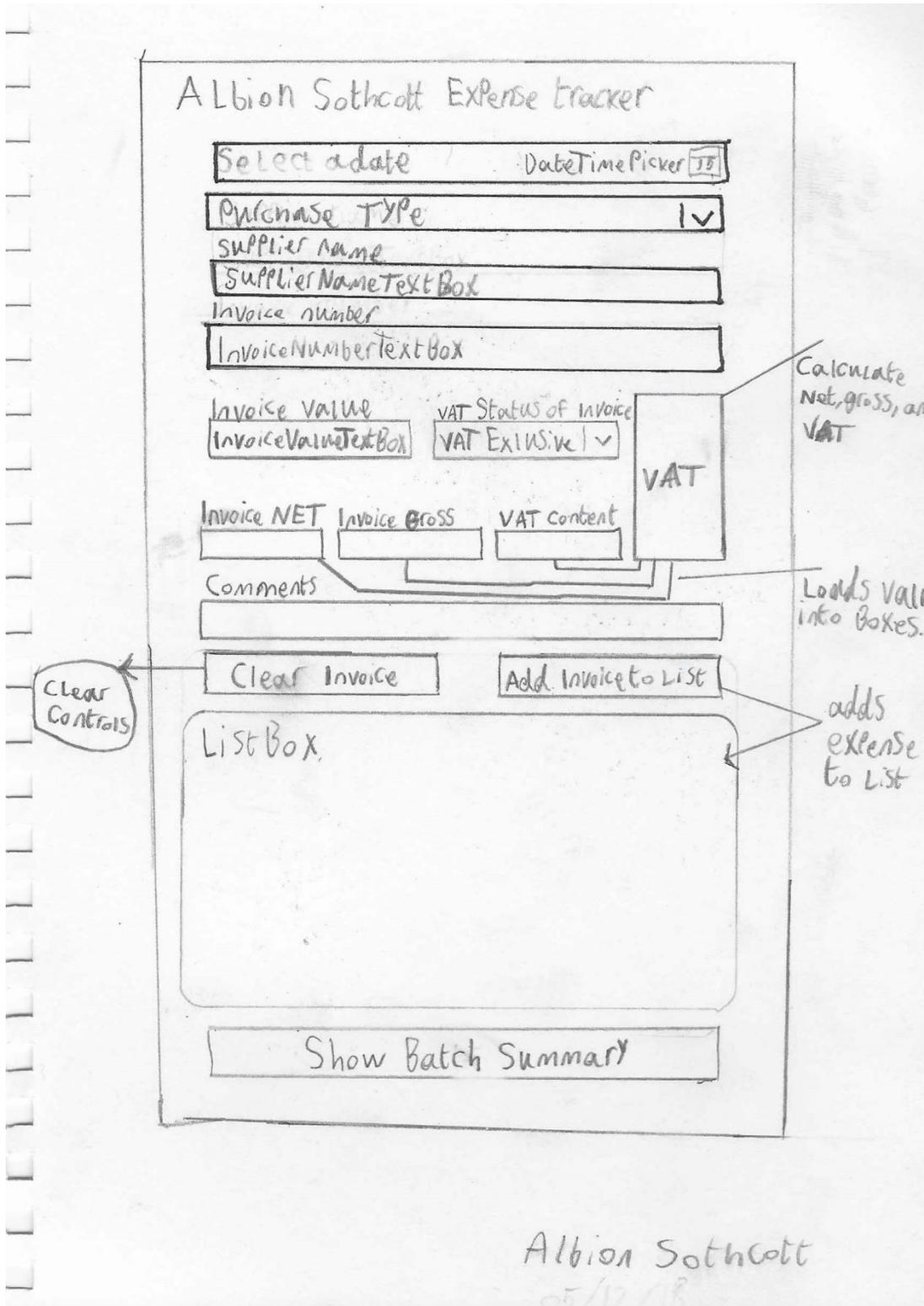
Values will be loaded on initialization.

Design Sketches

Login Page



Purchase Record Page



Summary Page

Summary Page

Batch Summary	
Number of purchases	5
Total NET value	250.00
Total VAT value	50.00
Total GROSS value	300.00

Number values all assigned to BatchSummary class data members, to show totals.

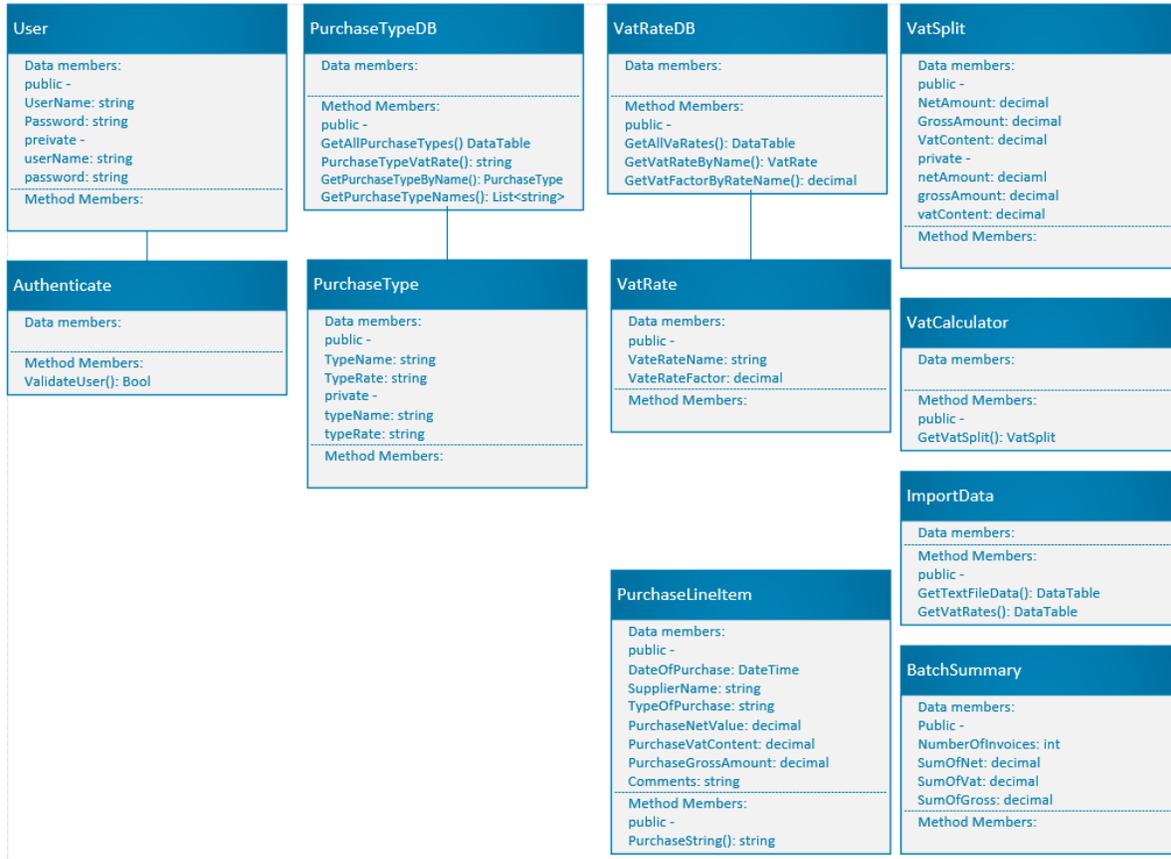
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Design diagrams

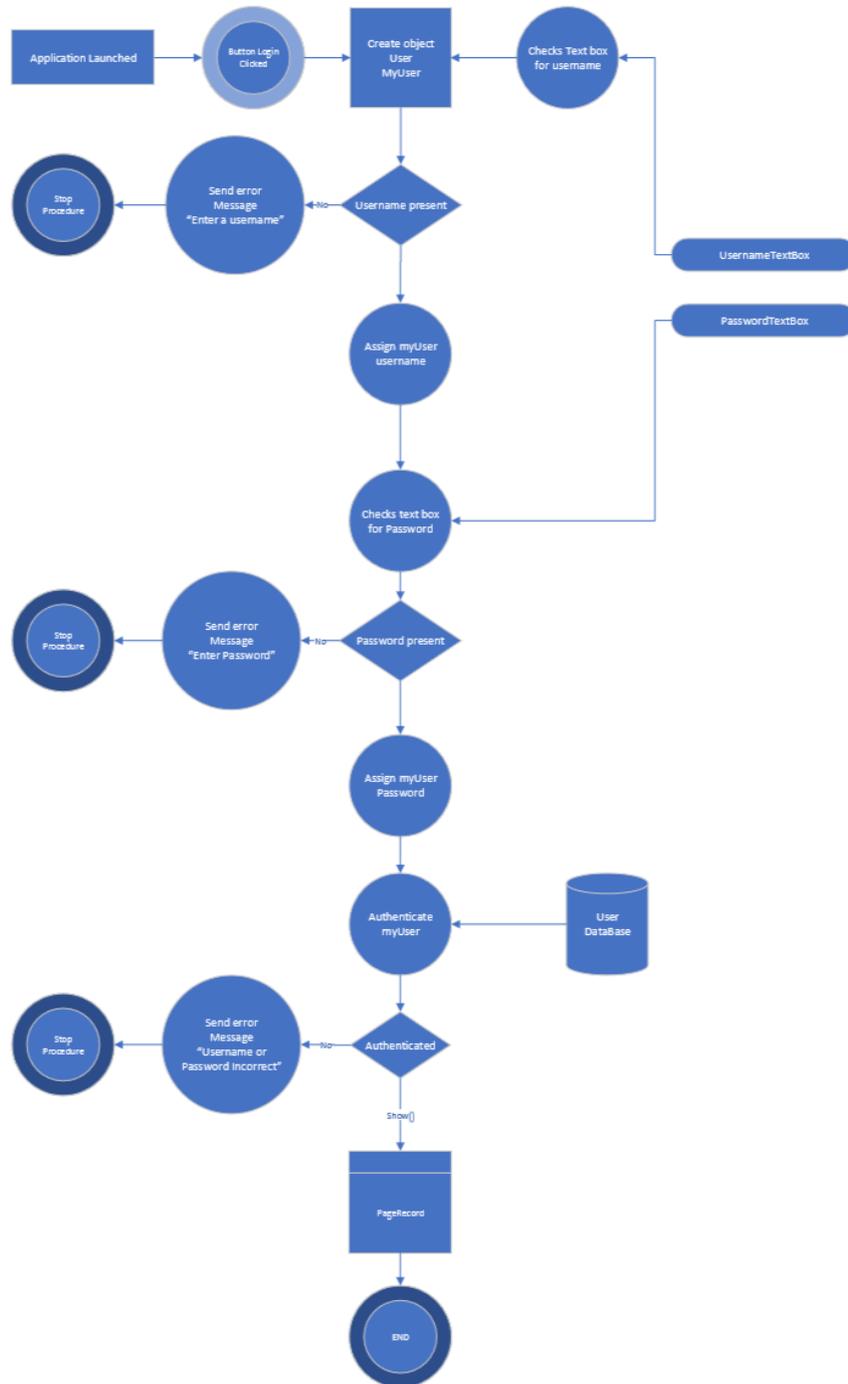
UML Diagram

Classes to be created, including data members and method members.



Data Flow Diagram

Process for employee login



Test Plan

White box testing will be done throughout, looking at both the in-put, out-put, and the internal workings (Code).

Login Page				
Item	Expected in-put	Expected out-put	Proposed Testing Method	Possible Bug/Issues
Clear button	Click, calling ClearControls method	Text removed from text boxes, setting each to ""	Fill text boxes with text and click button,	Errors in finding the text boxes, ensure names are correct in all references.
Login button	Click, receiving strings from the text boxes to work with in methods.	<p>If correct -username and password, navigates to purchase record page.</p> <p>If incorrect – message box shows “Username or Password incorrect”</p> <p>If no username provided – Message box shows “Enter Username”</p> <p>If no password provided – Message box shows “Enter Password”</p>	Test using all 4 scenarios to ensure each is functioning	Errors in reading of text file to create DataTable, errors in the logic of the conditional statements.
Purchase Record Page				
Item	Expected in-put	Expected out-put	Proposed Testing Method	Possible Bug/Issues
Type of expense combo box	Type names from PurchaseType object, gathered with PurchaseTypeDB from txt file database,	Names loaded as items for combo box.	Check if items are there, if not use break point to check what the data members of the purchaseType object are at that point to see if the issue is in reading the file or the code using the object etc.	Errors in reading text file.

VAT button (vat calculator)	Click – Calling click action, Receives all the data from controls for use in calculations and creating objects.	Uses VatCalculator methods to find Net, Gross, and VAT values for invoice, displaying them in text boxes. Values will be different depending on purchase type and VAT being inclusive or exclusive.	Test with a purchase of each VAT Rate, both as inclusive and exclusive, checking to see if the arithmetic is correct.	Errors finding VAT rate from text file. Logic errors in the algorithms.
Clear invoice button	Click calling click action.	Uses ClearInvoice method to set the values of the controls back to default, text boxes to "", and combo boxes to item index [0].	Fill controls and then click "clear" button.	Control name misspellings, ensure the spelling is the same in all references.
Add invoice to list button	Click calling click action, Receives data from various objects and variables.	String created from invoice data and loaded into list box, showing date of purchase, Supplier name, type of purchase, Net, VAT, Gross, and a comment, if none provided comment = "No comment"	Create invoice and click add invoice to list.	Syntax errors, property names etc.
Show batch summary button	Click calling on click action. Takes purchase data from all purchases.	Parsed purchase information from all purchases, is used to work out totals for net, gross, and vat of all purchases, Values assigned to data members in BatchSummary class This data is set as text in text block on summary page initialize.	Test with up to 7 items to ensure It works with the clients needed amount.	Syntax errors, property names etc.
Summary Page				
Item	Expected in-put	Expected out-put	Proposed Testing Method	Possible Bug/Issues
Text blocks successfully showing the totals	Data members from bathcSummary set as the text for text blocks	Text blocks showing totals purchases, total NET, GROSS, and VAT values.	Use application to provide data for page and see if It correctly	Error in Parsing of data from page record to summary page.

sets the text of
text blocks.

Help documentation plan

Help documentation will be needed for the full release version for this prototype project I plan on creating an end user document for one feature of the application, this will demonstrate the need of end user documentation and provide the client with an idea of the end user document they will have for the full release version if they want one.

Project timeline

Gantt chart for project, graphs numbers represent hours, blue section is the time it isn't being worked on and orange is time to complete, the plan follows the time for the synoptic assignment, real life scenario more time would be spent on a few of these sections and the project would be broken down into a few more elements, such as testing being a separate task to implementation for the final test etc.

