EECS 2311 Design Project:

Venn Diagram

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Introduction:

Thank you for your interest in our product! This project was made for EECS 2311 and is the intellectual property of Jorra Singh, Brian Wong, Kaasim Shaikh, and Bart Gisone. The purpose for this project is to create a Java application that encompasses the functionality of a Venn Diagram.

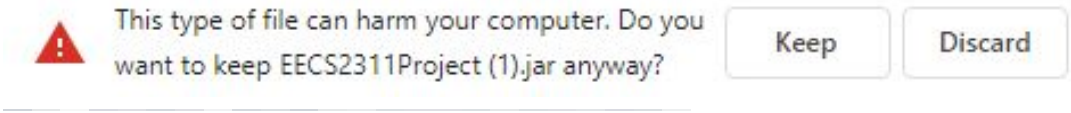
1.0) Downloading Our App:

The first step to running our application is downloading it. To download the application, head to https://github.com/Jorra04/EECS2311Project/releases and download the latest release. The latest release will be shown as in **Figure 1**

As you download the jar file, along with all the other accompanying files, make sure to take note of the directory that you downloaded it to as this will be needed for running the jar. The files will download as a Zip file. Extract the files to wherever you feel comfortable, whilst making note of the directory.

Potential Issues:

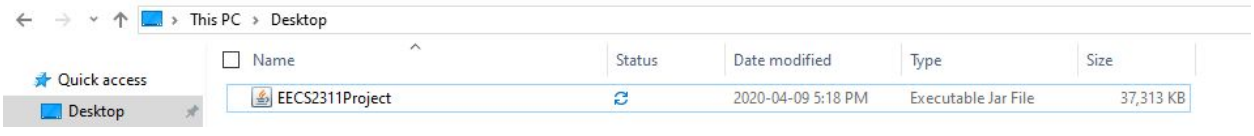
Figure 2 shows a potential disclaimer that you may run into when downloading the application. There are no harmful malware in our project, so you can go ahead and click keep to continue with the download. Your computers Antivirus software will then scan the file and assure you that the file is safe to run.



2.0) Opening Our App:

Until JDK 12, JavaFX was embedded into the Java System Environment. However, this project is built using Java 13. Usually, this would mean that the user would have to run VM arguments in the console when they run the application. However, using the power of Gradle, we have built in the VM arguments such that all the components that the user needs to run our application are present. The following pictorial walkthrough will explain how to run our program…

Step 1) Find the location of the Jar download.



Step 2) Open the command line and navigate to the directory that the Jar is present in. For example if it is in your Desktop like in the example, you would use a series of “cd”, or “cd..” commands to navigate to the specific path.

Step 3) Type the following command into the shell. *Note:* the name prior to the .jar extension will be specific to the name that you saved it under. For example, in our example we would have "java -jar EECS2311Project.jar". **Figure 4** shows the command in practice.

```
java -jar EECS2311Project.jar
```

*Figure SEQ Figure * ARABIC 4 The command for running the jar file. The name prior to the .jar extension is unique to the user's choice.*

Step 3B) There are two potential issued that the user may encounter. They are unlikely to occur however, if one of the following do occur, these are the steps to combat them.

Potential Issue 1: Incompatible JRE

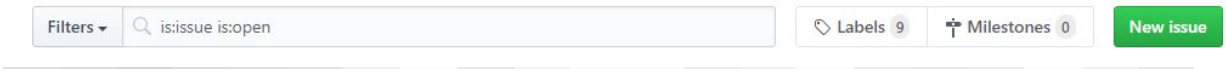
- One possible issue is that the user's JRE is incompatible with the build of the application. In this case, go back to the "releases" page as described in **Section 1.0** and download the jar file specific to your machine's specifications.

Potential Issue 2: Missing VM arguments

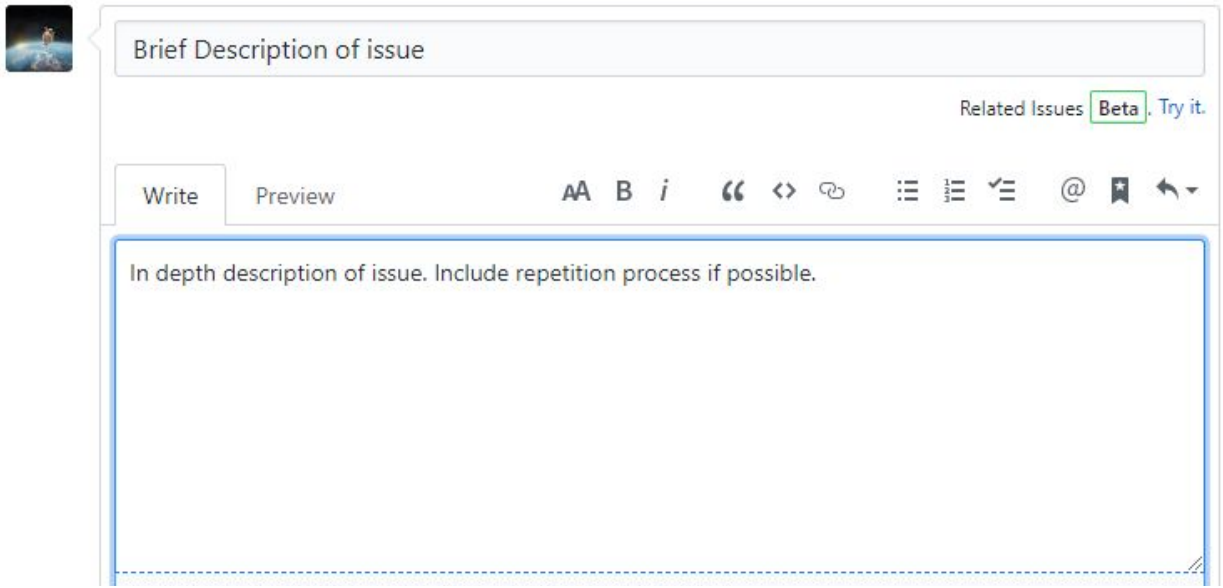
- In the event that the Jar files do not build with the latest downloaded version, or you are downloading a prior version that has not received support, you may need to download the JavaFX sub libraries and make note of their directory. You then must run the following command in the command line. Where ${PATH_TO_FX} is the path to the downloaded modules.

```
java -jar --module-path ${PATH_TO_FX} --add-modules javafx.controls,javafx.fxml EECS2311Project.jar
```

Step 4) Enjoy the application! The application is now yours to use as you please. If you have any issued with this, feel free to create an "issue" tab on the applications repository. The more detailed the issue, the better the fix. **Figure 6** shows how to navigate to the issues tab. Go to the following link and submit the issue. https://github.com/Jorra04/EECS2311Project/issues

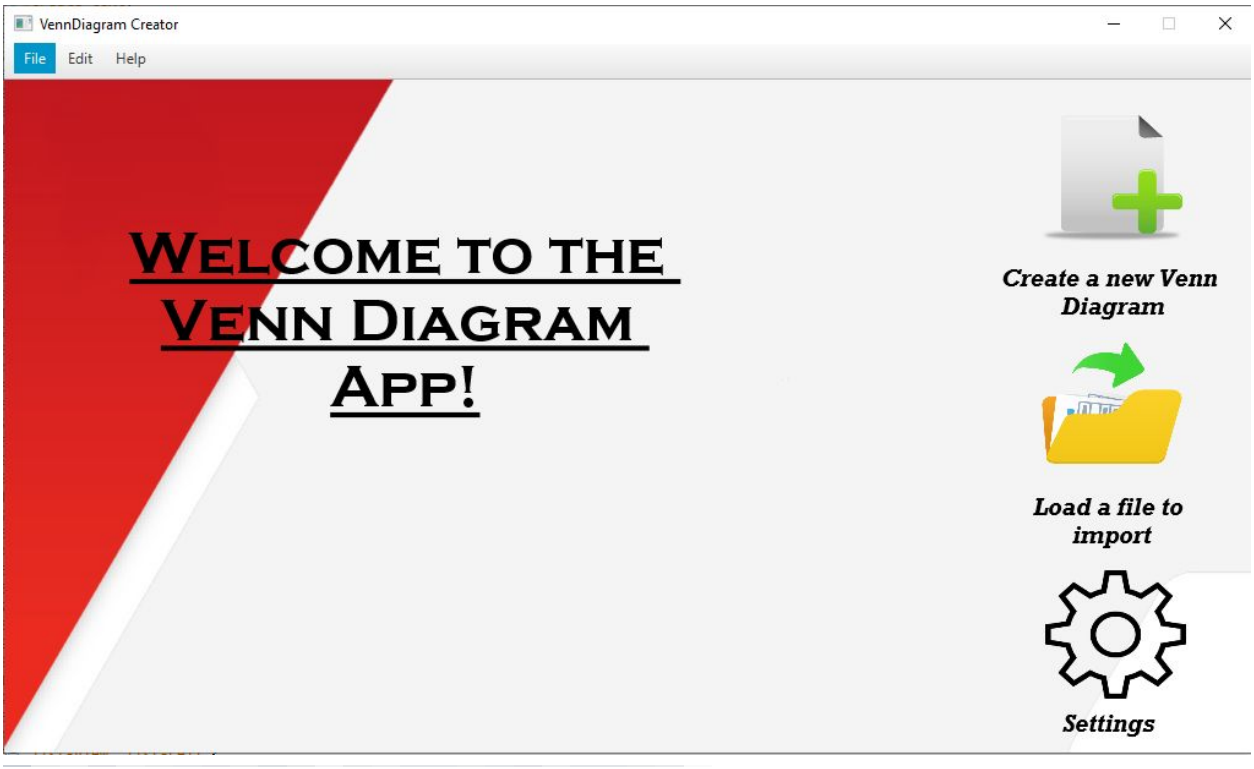


Step 4B) Follow the below instructions on how to add a new issue. Thank you for your support!



3.0) Starting your First Project:

Upon starting the application, you will be prompted with the start screen. This is where you can choose to start a brand-new project, or pickup where you left off on an existing project. If you choose to load in from an existing page, the file explorer will be opened, and you will be asked to navigate to the directory containing your existing project.



To start a brand-new project, bring your mouse over the “Create a new Venn Diagram” button and you will be taken to a blank canvas containing two circles and your empty word bank. You can apply some advanced settings as required. This can be done by clicking the “Settings” button. This will take you to your own window, where you can choose between some built in start up states. More on this in **Section 4.0**.

Open From Existing Project:

An important feature that this project includes is picking up a project from where the user last left. To do this the user should follow the next few steps.

Step 1) From **Figure 7** select the “Load a file to Import” button. Once this is done, the file explorer will be opened, and the user will be asked to choose from a selection of previous files.

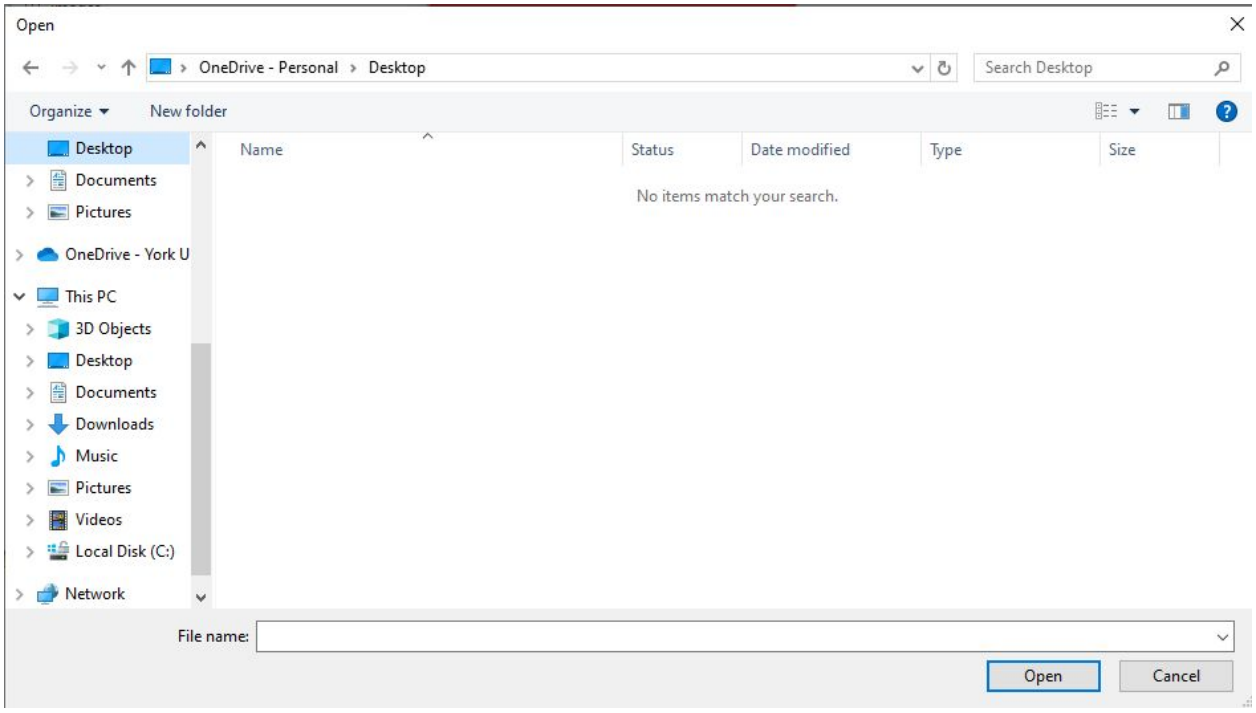


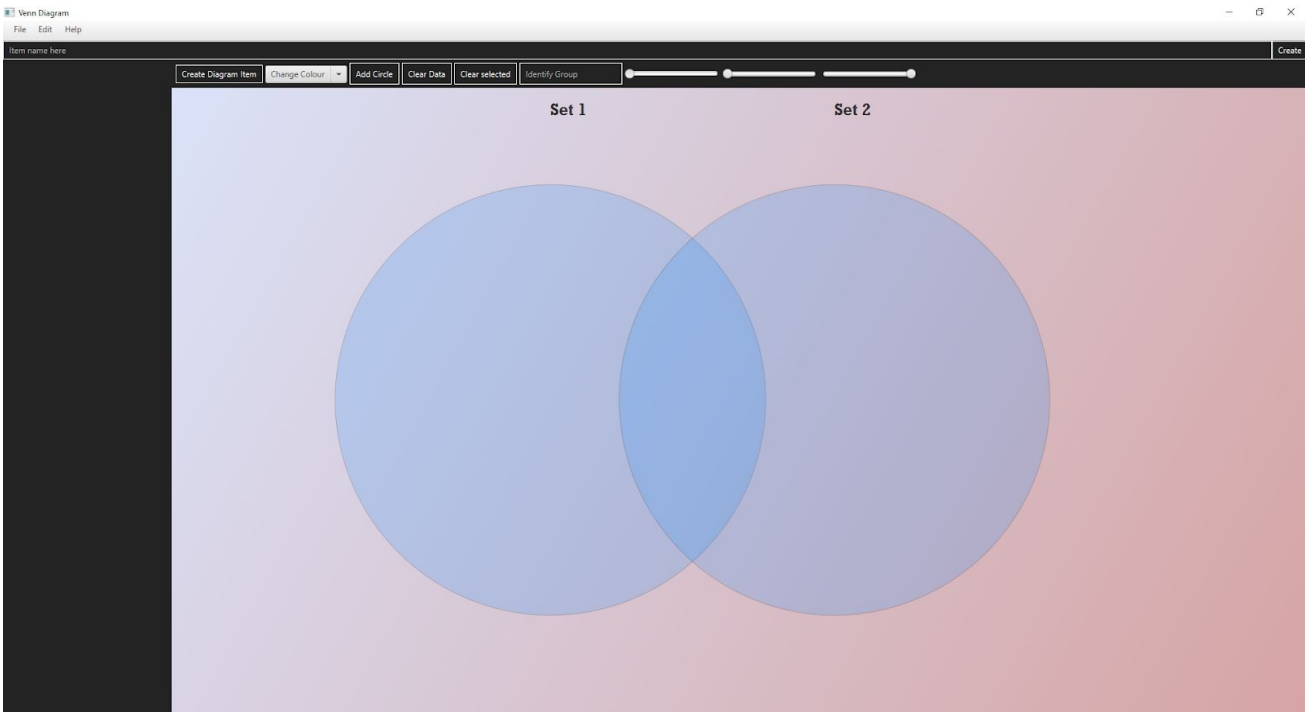
Figure 8

Once the user has selected from the previous save states, they can then begin their project. To see the main features and how to use the project effectively, see **Section 5.0** and beyond.

Start a Brand-New Project:

To be able to load an existing file, the user must have started a brand-new project at least once. Here we are going to learn how to do that.

Step 1) From **Figure 7** select the “Create a new Venn Diagram” option. Once this is done, the user will be greeted with the main menu. This is where all the computations and set manipulations are done. **Figure 9** shows the main screen.



4.0) Configure Your Settings:

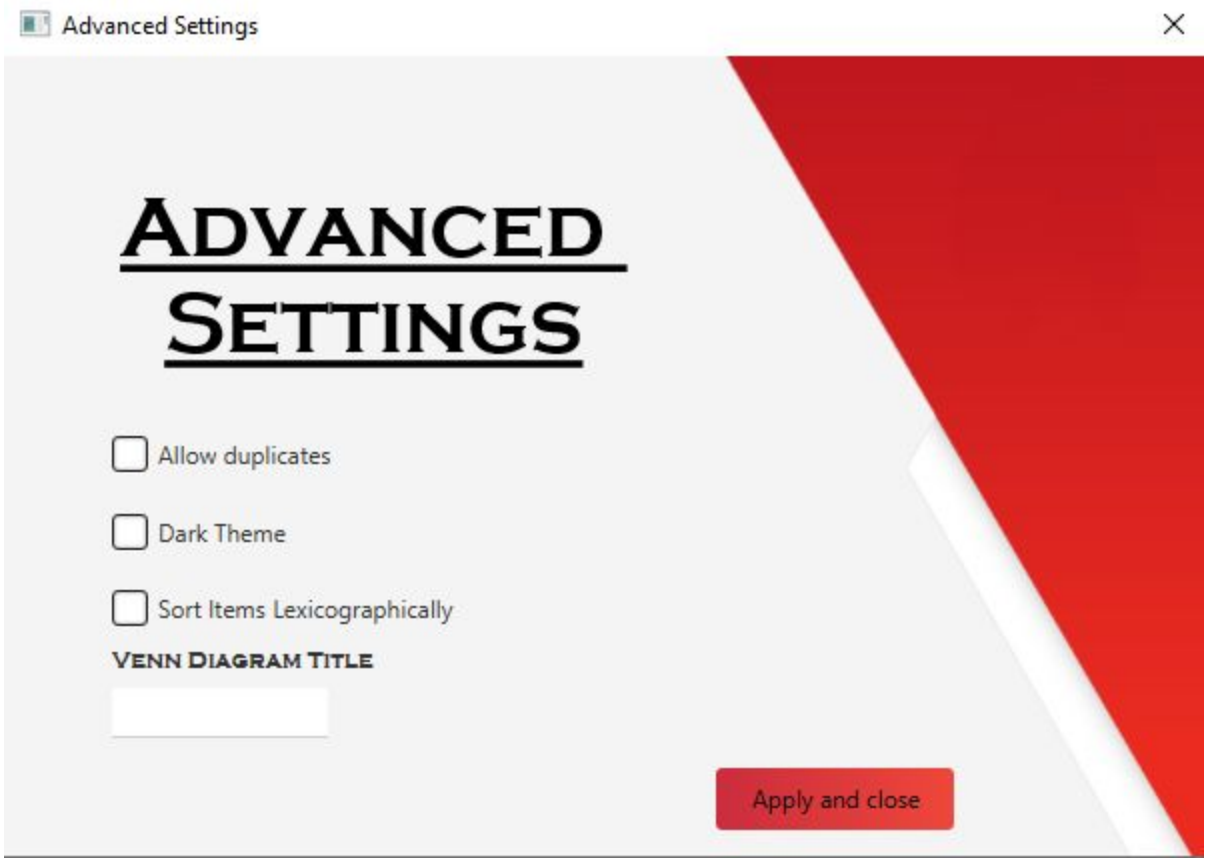


Figure 10 Shows the advanced setting page the user can access from the main menu.

Allow Duplicates: This option does as the name describes. It sets the project up so that the project automatically allows for duplicate items to be created. As **Section 7.0** describes, the addition of duplicate Word Bank items is not permitted. Duplicate Diagram Items are permitted.

Dark Theme: Selecting the "Dark Theme" option sets the style of the project to be easier on the eyes. The contrast of the colours is reduced, and the colour pallet takes on a darker theme.

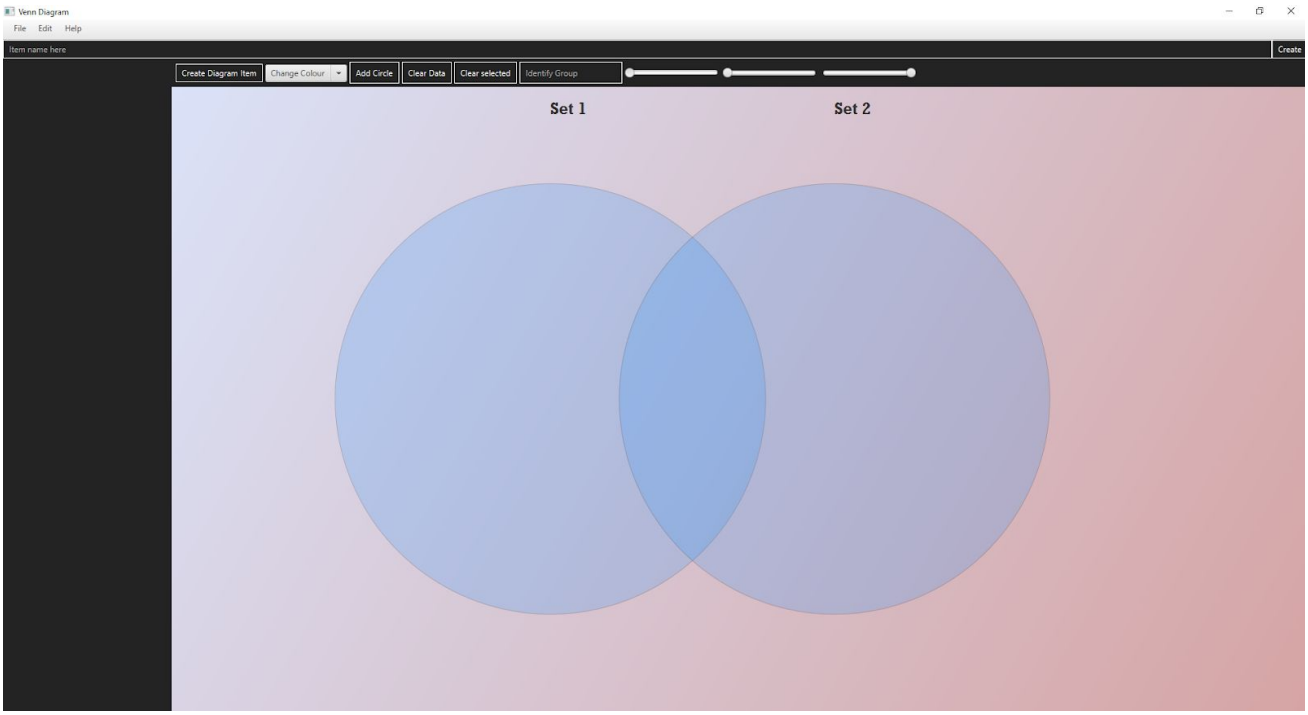
Sort Items Lexicographically: This option configures the project in such a way that the when the items are added, they reorganize themselves to appear in dictionary order. Capital letters take precedence over all others, so ensure the first letter of your item is either always a capital, or always a lower-case letter.
Lexicographically

Venn Diagram Title: As the name suggests, this option sets the project title to whatever the user puts in the text field. If there is no text entered, the project takes on the default title.

5.0) Main Features:

Creating Your First Item:

If you are starting for your first time, you may need some help creating the set elements. Presuming that you are starting with a new project, your canvas will be blank, and so will your word bank. **Figure 9** shows the default state of the project.



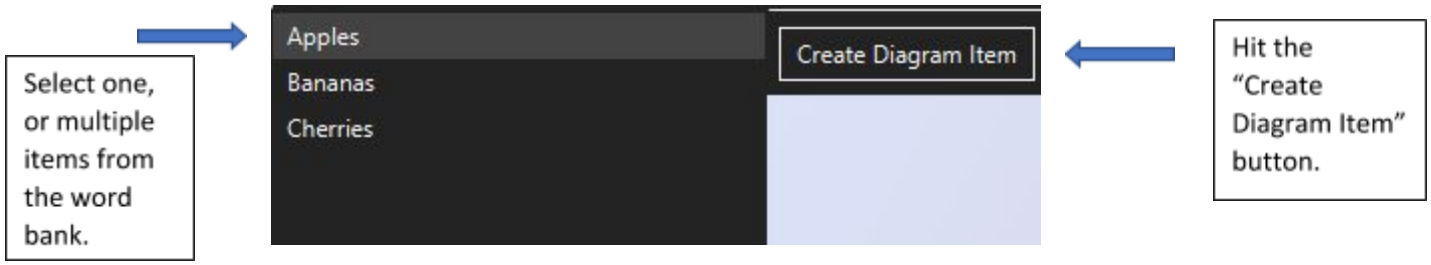
To create your first element, you must type the element's name into the text field with the prompt text "Item name here". Once you type this in, you must then click the "Create" button. These steps are shown In **Figure 10**

The Word Bank:

The word bank is designed to allow the user to keep track of all the elements that they have. The word bank is initialized with a scroll feature, so feel free to enter as many items as you see fit. Once the item is created in the way described in the previous section, the element will be added to the word bank. **Figure 13** shows the state of the word bank when three elements are added. The elements we will be adding are "Apples, Bananas, Cherries"

Creating a 'Diagram Item':

We are now in the most important section. Creating the diagram item allows the user to drag and drop the created item within the bounds they choose. To create the diagram item, the user must have followed all steps up until this one. Once they have a word bank filled with *at least* one item, we can begin. There are two main ways to create diagram items. The first way is to select one item from the word bank and then click the "Create Diagram Item" button. **Figure 14** shows this in detail.



The same process can be done with all the items. A more efficient way to insert the items - if you know you want all of them included – is to click the first element, hold the shift key, and click the last element. After this is done, you should see all elements in the word bank highlighted. This means we're ready to hit the "Create Diagram Item" Button. Creating the elements will place them on the main screen, and then the user can decide which set they belong to.

If the user wants to add more than one element, but not ***all*** the elements, the user can use the control key. Press the first element desired and hold down the control key for the remainder of the selection process. After the user is done selecting, they should see that only the desired elements are highlighted. This means they are ready to create the diagram items and place them in their corresponding sets.

Adding to the Sets:

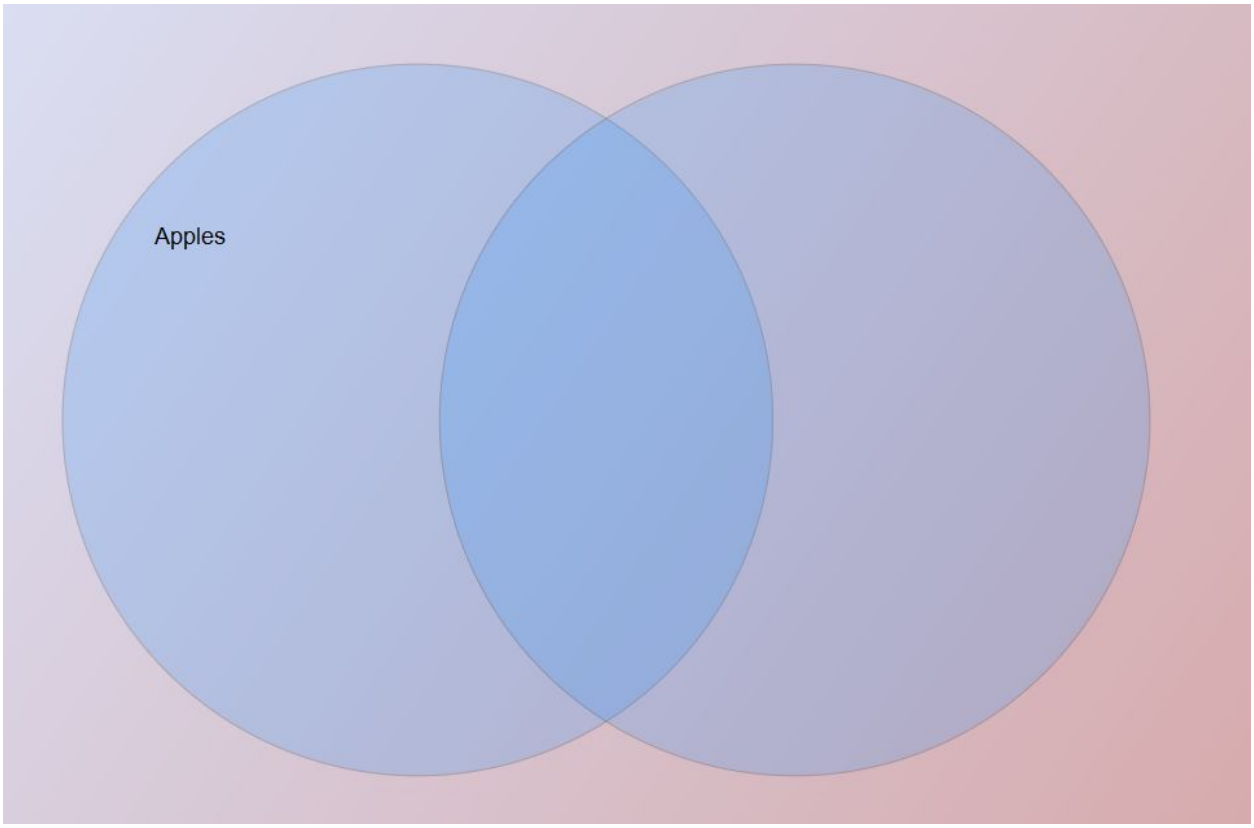
The set names will be in their default state unless otherwise specified by the advanced setting page. More details on this can be seen in **Section 4.0**. once the diagram item has been created, you may have a project that looks similar to **Figure 15**.

This project supports full drag and drop functionality. To begin the drag, the user must press and hold the primary mouse button while hovered over the diagram item. After this is done, the diagram item will be attached to the mouse until the item is dropped. The item can be dropped within the bounds of the diagram. If the item is dropped outside of the bounds, the item will be brought back to it's last valid position. This is done to ensure that the user can get the maximum functionality out of their project. More on this control in **Section 7.0**.

Identifying Which Set an Element Belongs To:

When the diagram item is created, it can be dragged anywhere within the diagram. We understand that the user may want to do all kinds of set computations with this application, so we have tried to make

this application as flexible as possible. When an item is placed inside of a set, a calculation is done to see which set an element belongs to. **Figures 16, 17, and 18** show how this is done.



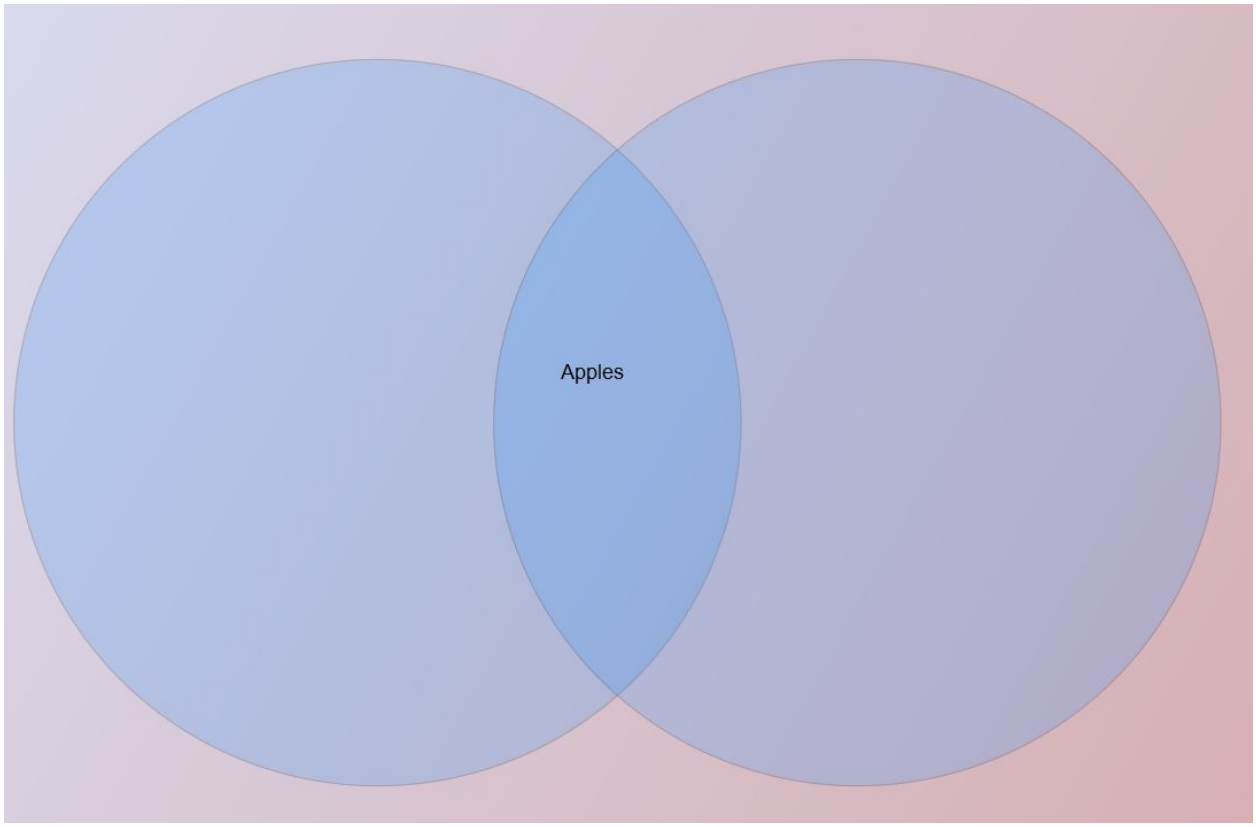
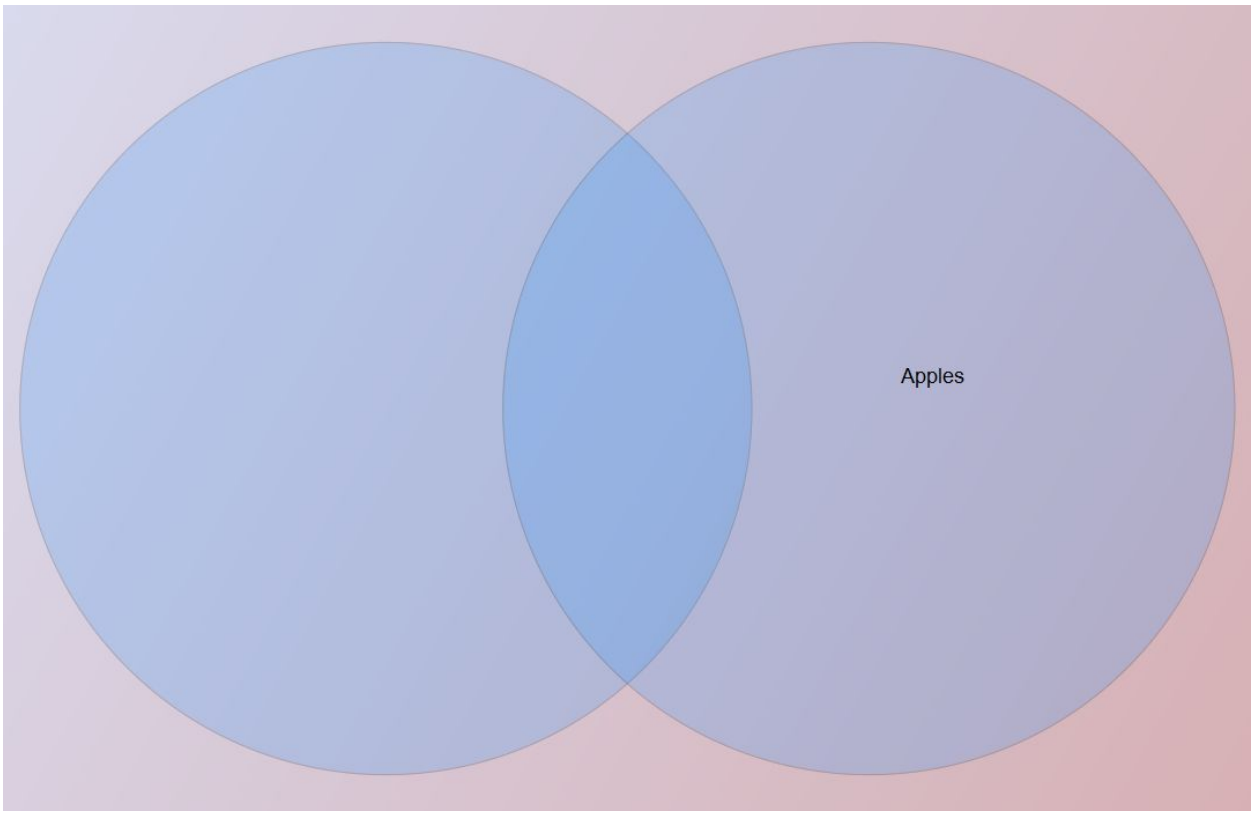


Figure 17 Adding the element "Apples" to the middle set.


Apples

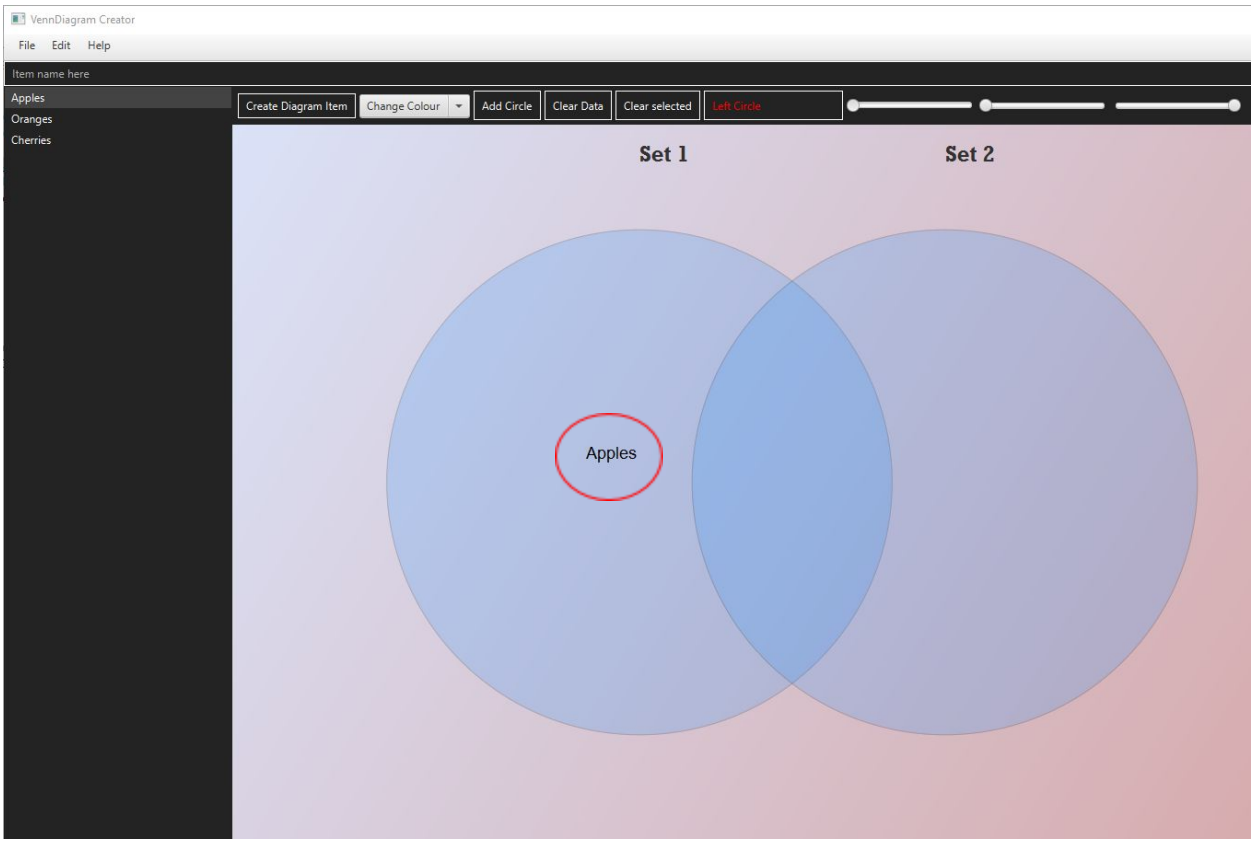

Right Circle

Removing From a Set:

Naturally, when using a Venn diagram, the user may want to remove elements that they have added. We understand the way in which a user may want to remove from a set can be unique to the, so we have added as many possibilities as we could. As of right now, the application supports removing from a set via item to item deletion, supports removing from a set via word bank, and lastly supports removing from a set by dragging the element out of the set. The last option will not remove the item from the diagram, just from the set it was present in.

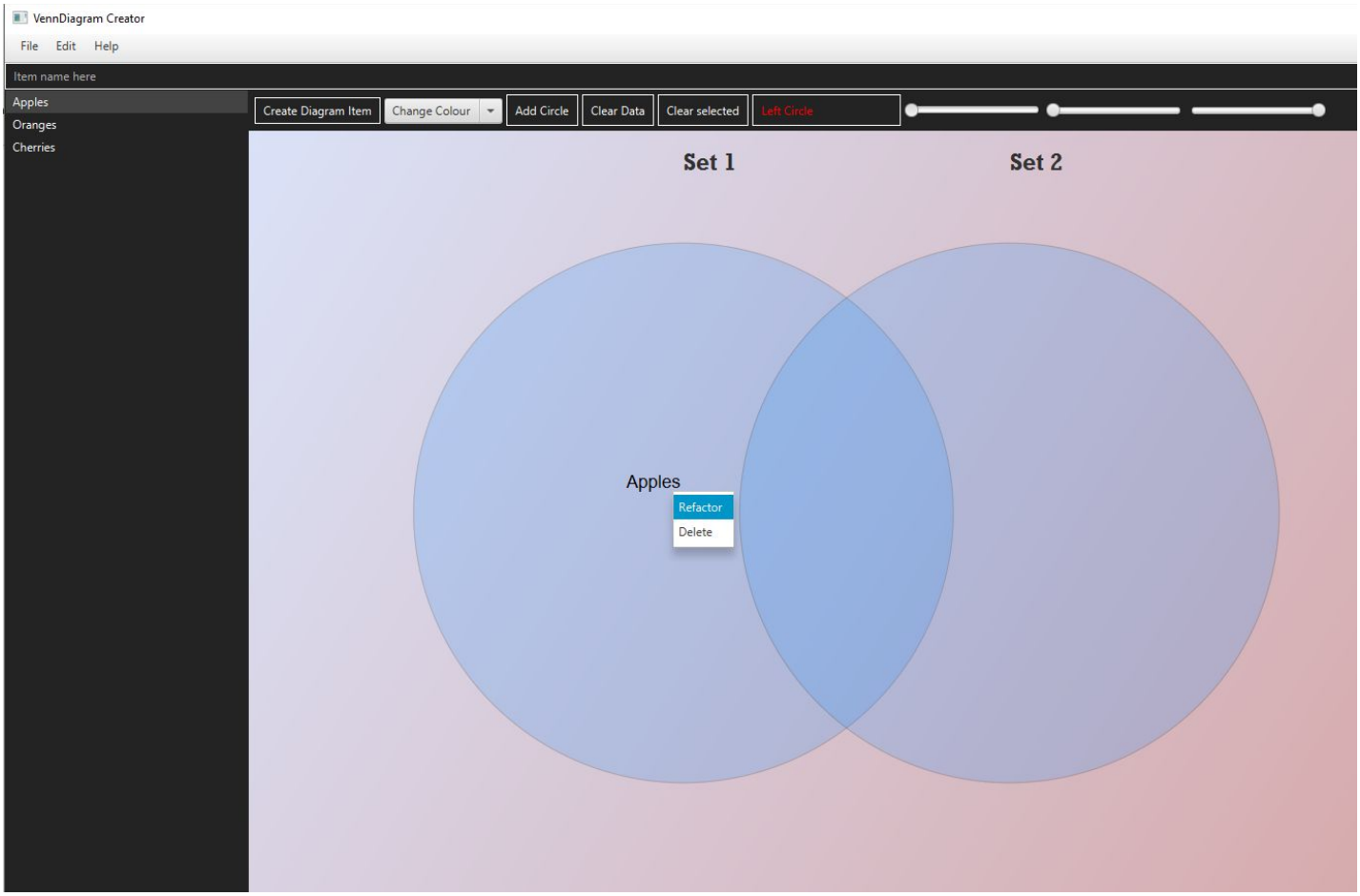
Removing from Set (Right click):

Step 1) Create the item using the steps above. Drag the element into the desired set. For this example,



we dragged the item to the left set.

Step 2) Right click on the item you desire to delete. You should see a right click menu appear. After this, choose the “Delete” option as shown in **Figure 19.1**.

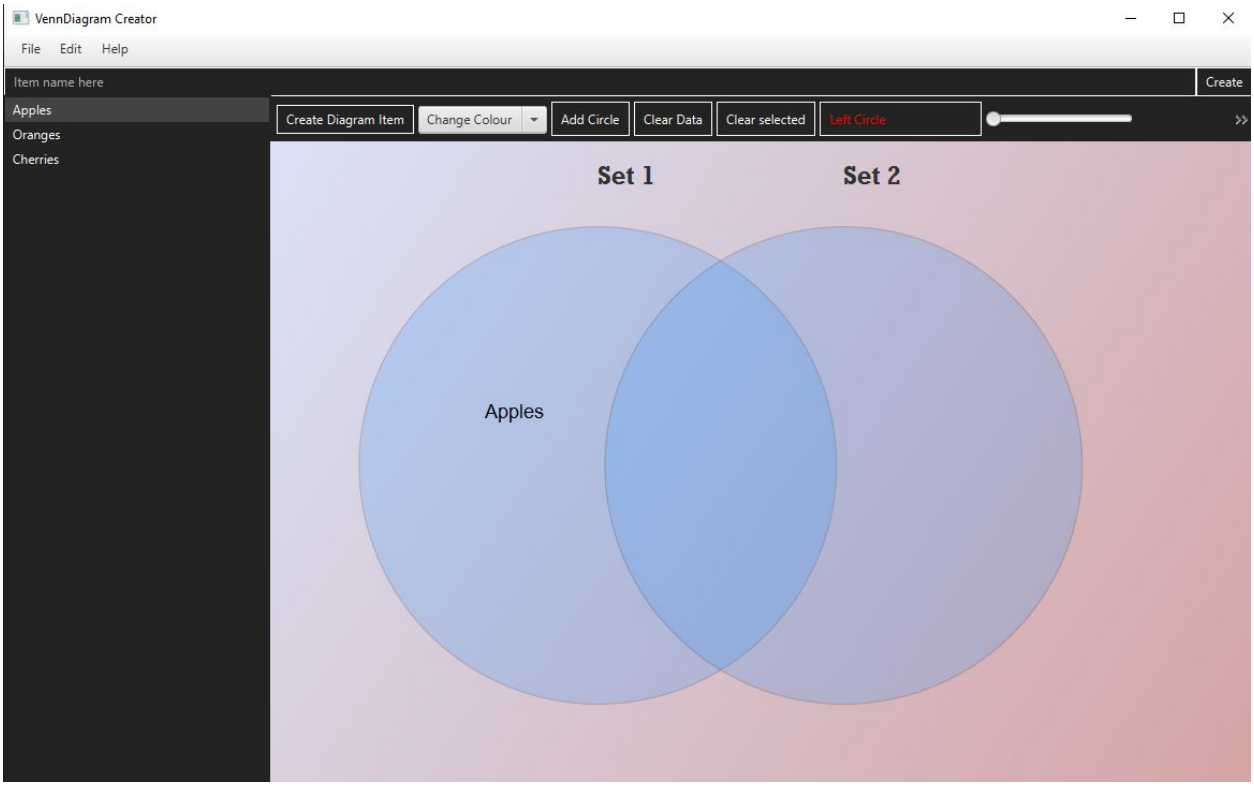


Once the element is deleted from the Venn Diagram, it will be removed from the word bank as well. If there are multiple copies of this element, copies will be left in, but the element will still be removed from the word bank, not allowing for copies. See **Section 7.0** for more information on allowing duplicates.

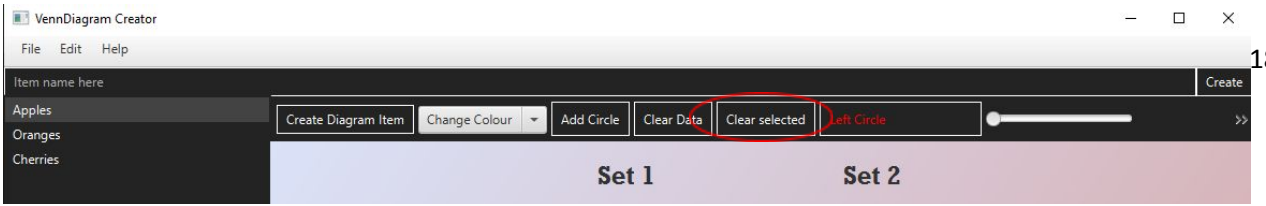
Removing from Set (From Word Bank):

Another way that a user can remove an element is to click on the element in the word bank and press the “Clear Selected” button. Steps are as shown.

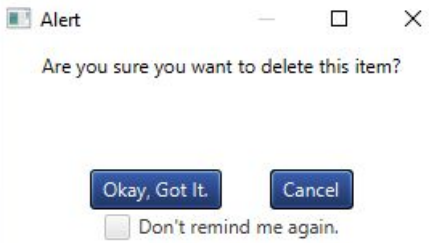
Step 1) Select the item you intend to remove from the word bank.



Step 2) On the toolbar, select the button that labeled “Clear Selected”. This will find the selected item and remove it. This button also allows the user to select and delete multiple items. So be aware that if you have selected more than one item, they will all be deleted.



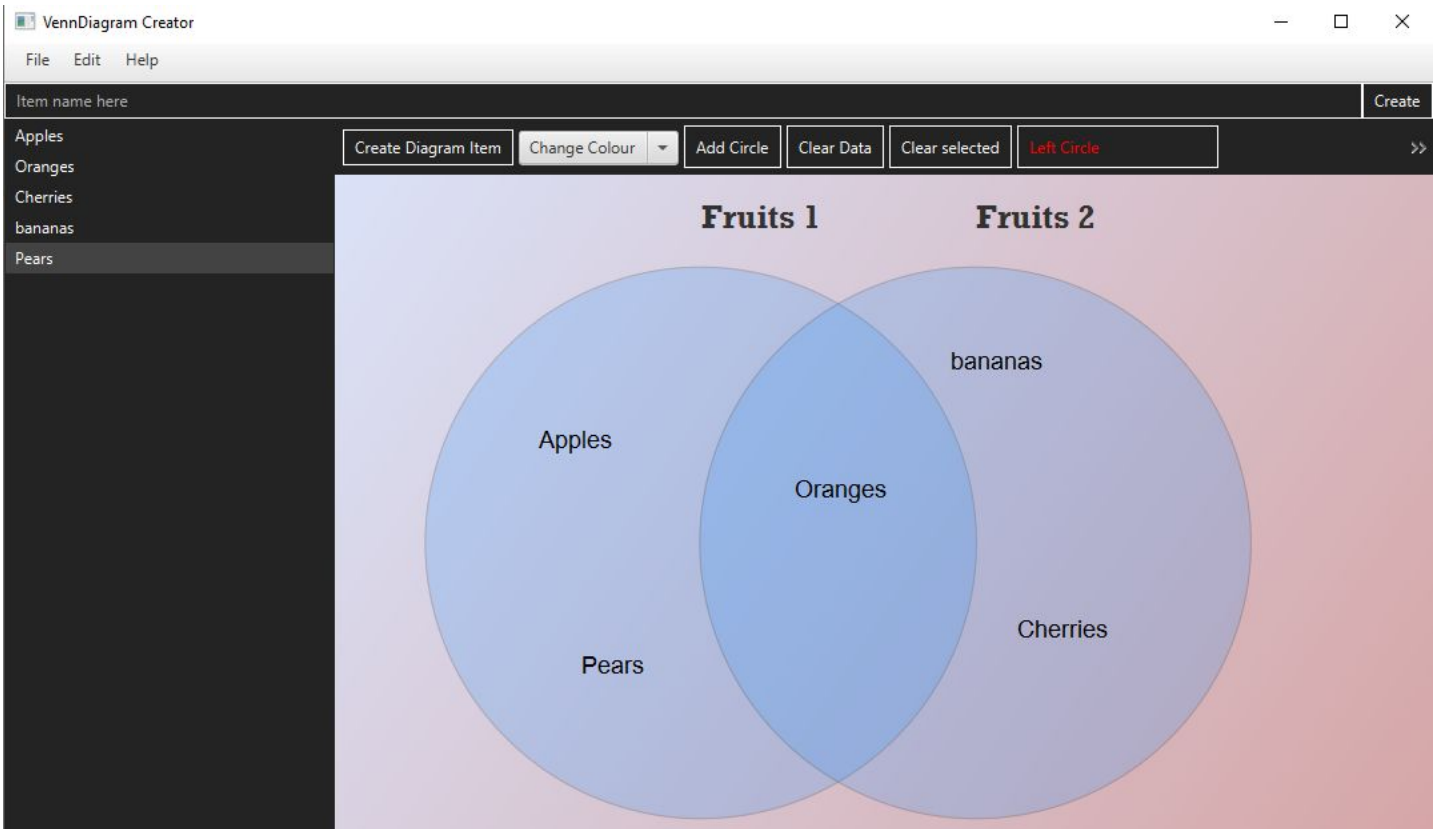
Because there are many steps involved in this, and the chance of a random act engaging this activity is small, we have chosen not to have repeating warnings for this deletion. That being said, there will be repetitive warnings about deletion until the user selects the option to stop them. **Figure 18.2** shows this process.



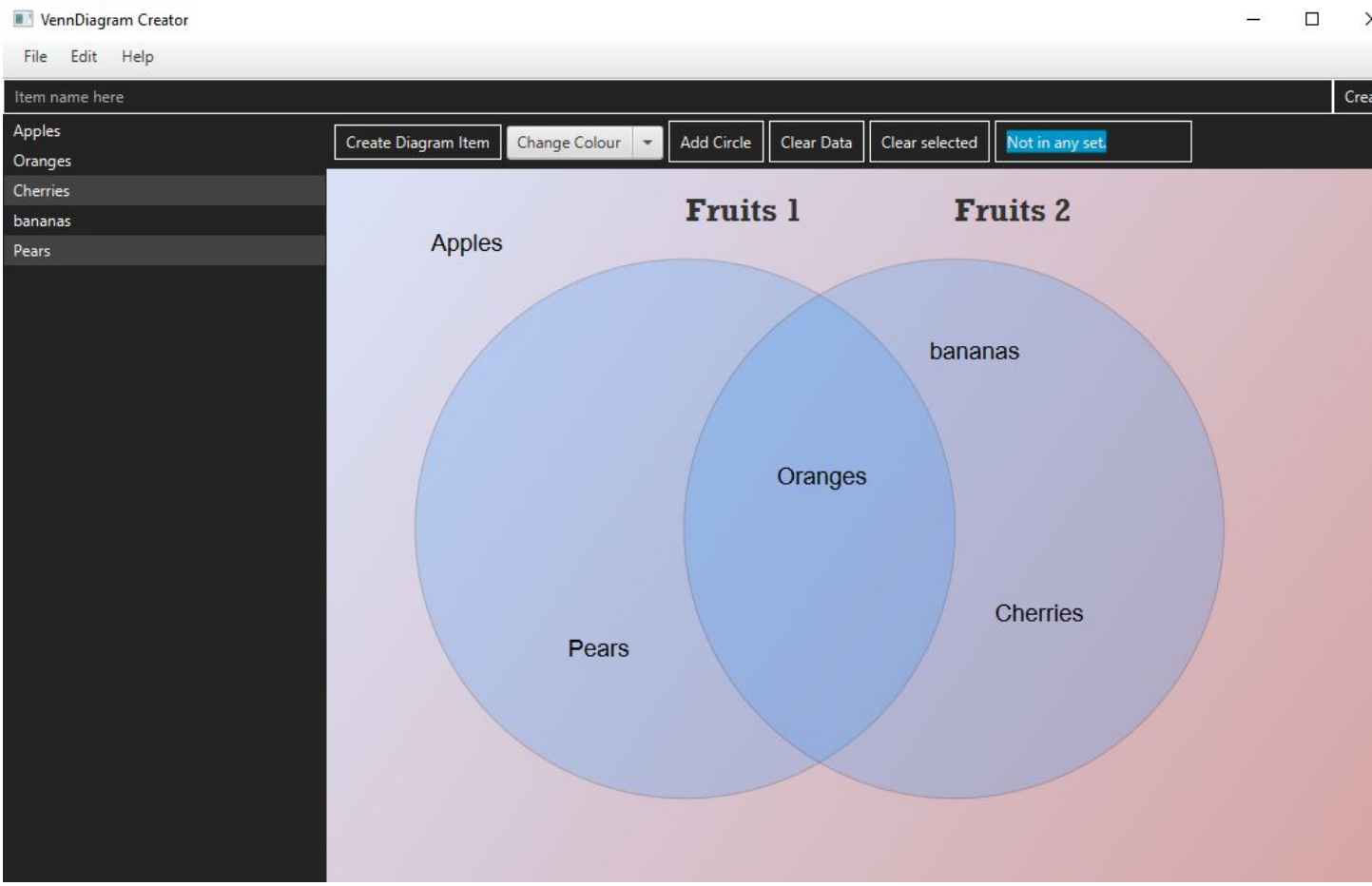
Removing from Set (Dragging away from set):

This last method of removing from the sets is a trivial one, however, necessary. Some users may need to remove an element temporarily, save their work, and continue with another project. For this, we have the ability for the sets to be automatically updated whenever an element is dragged outside the circles. **Figures 21** and **21.1** show this functionality.

Step 1) Provided the user has added multiple items to each set, it may closely resemble **Figure 21**. All elements are placed in the set that they were dropped into.



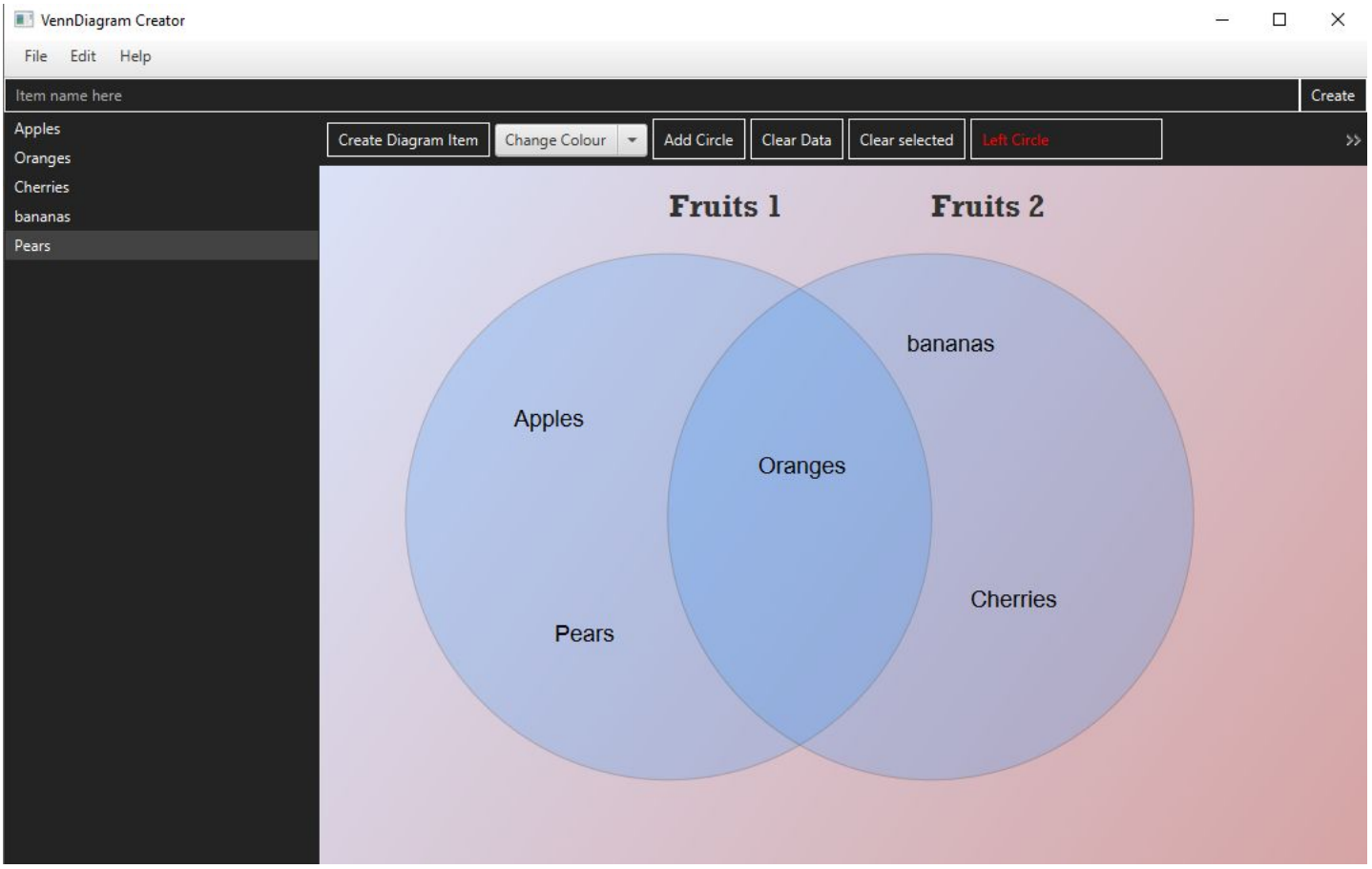
Step 1) For the user to remove the element from the set, both visually and logically – all that needs to be done is to drag the element out of the set it was in and place it outside the other sets.



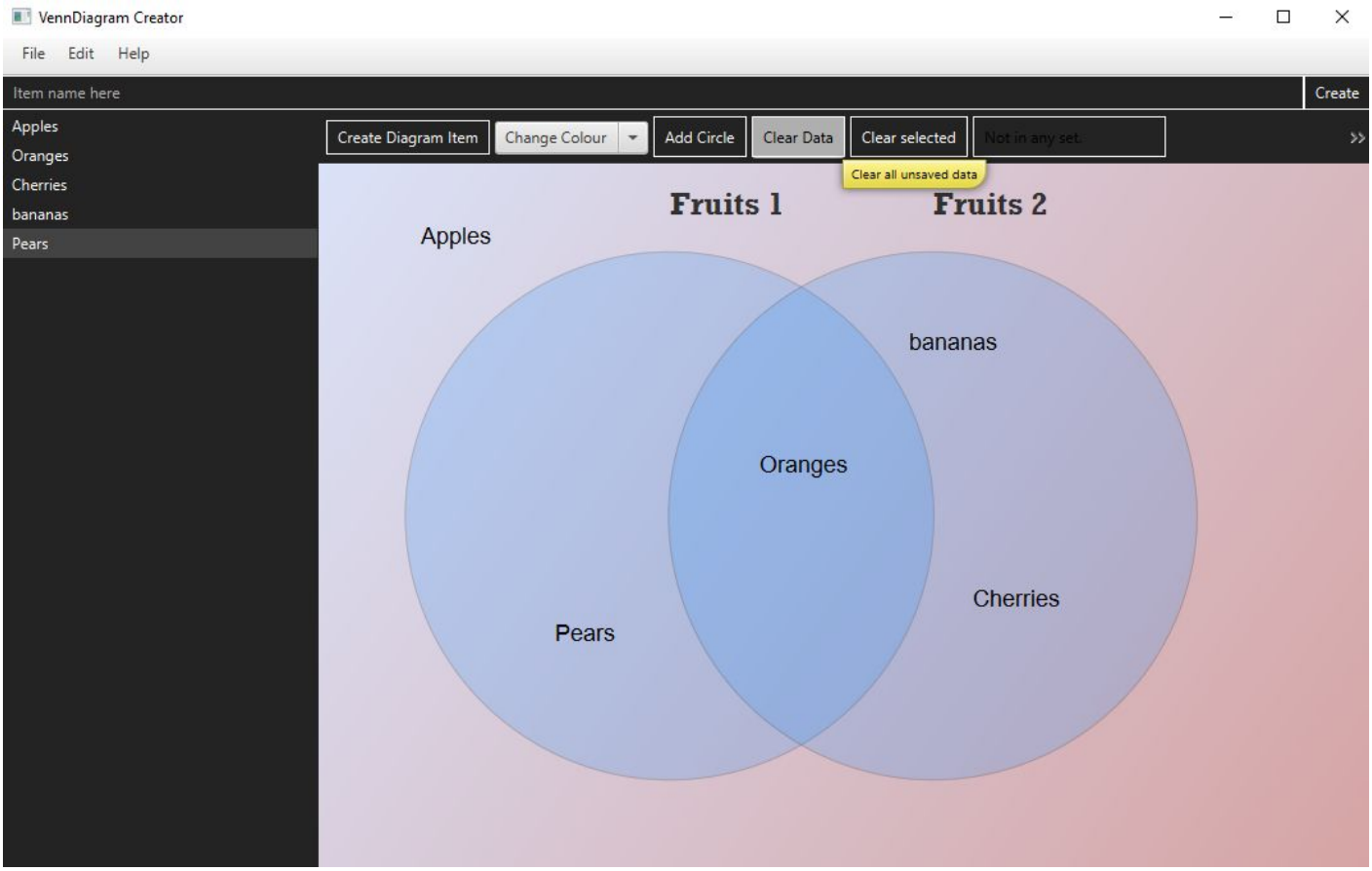
Removing All Items From a Set:

The user may encounter a scenario in which they need to remove all elements from the diagram. This is a very common occurrence for starting a new project or starting an existing project from scratch. In our application, removing all elements will clear the word bank, and remove all diagram items from the diagram. Follow the steps and figures below to replicate this process.

Step 1) Provided the user has added multiple items to each set, it may closely resemble **Figure 22**. All elements are placed in the set that they were dropped into.



Step 2) Once the user has populated either the word bank or the diagram with items (or both) they may then want to remove all items and start again. This can be done by clicking the "Clear Data" button. This can also be done by clicking "Restore Default" in the menu, however, that is not advised if all that's needed is to remove the elements (Restore Default restored the project to its factory settings.) More on Restore Default can be found in **Section 5.8**.

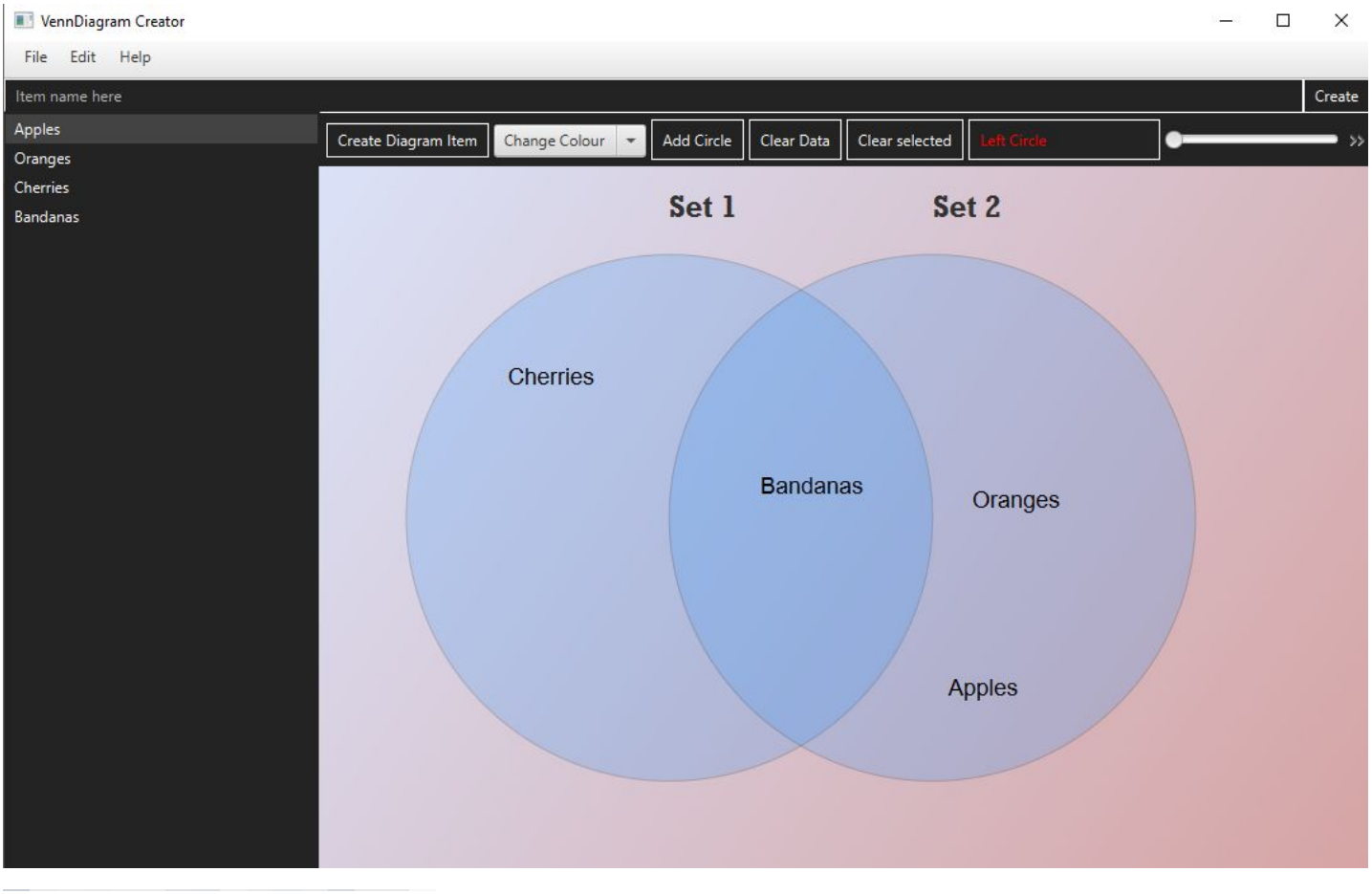


Step 3) Upon clicking the "Clear Data" button, provided there is data to be cleared, the user will be prompted with the following alert. Clicking cancel or exit will result in a cancellation of the delete request. Clicking "Delete all!" will remove all items from the diagram. Shown in **Figure 20.2**

Refactor an Element:

For refactoring, we tried to make this process as fluid as possible as we know that mistakes happen. Because of this, we have added two ways for the user to refactor their items. The refactor is used in the event that there is a mistake made, or just a change that needs to be made. The first way that the user can issue a refactor is by clicking on the item in the word bank and selecting the refactor option from the menu. **Figures 23 – 23.2** shows this step by step.

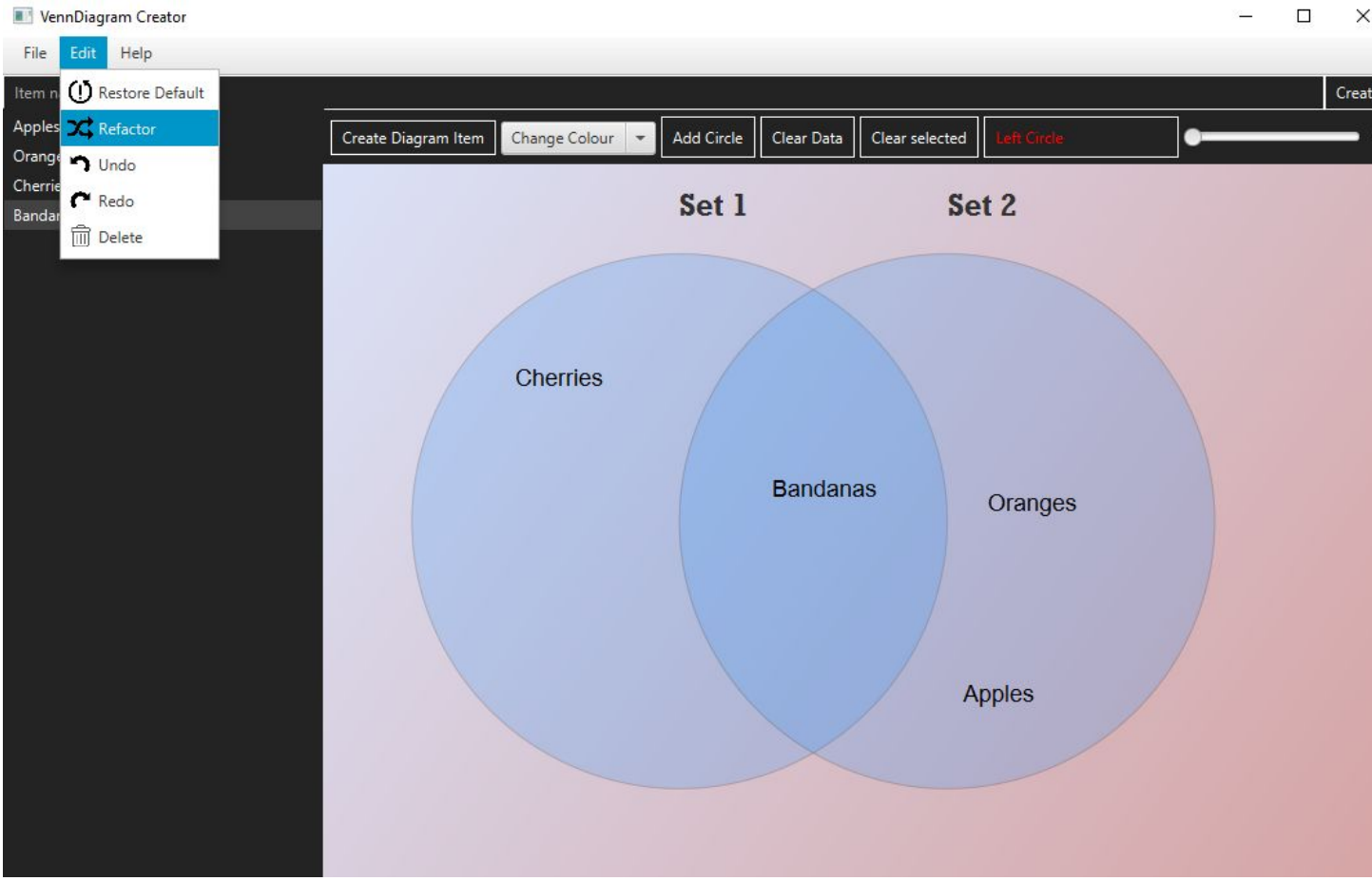
Step 1) Provided the user has added multiple items to each set, it may closely resemble **Figure 23**. All elements are placed in the set that they were dropped into.



Step 2) If you noticed, we made a mistake in **Figure 23**. We put “Bandanas” rather than what we intended, “Bananas”. This is a common mistake and shouldn’t require much effort to fix. Thankfully in this project, rectifying this mistake is as simple as clicking a few buttons. Steps 2 through 4 show this in great detail.

The remainder of this can be done in two fashions. Firstly, through the word bank, and secondly through each individual item.

Step 3 (Using the word bank): The user needs to select the item they want to refactor. Make sure to only select one item, if multiple items are selected, only the last item will be changed. After the desired item is selected make your way to the edit menu as shown in **Figure 23.1-a**. (Edit->Refactor).

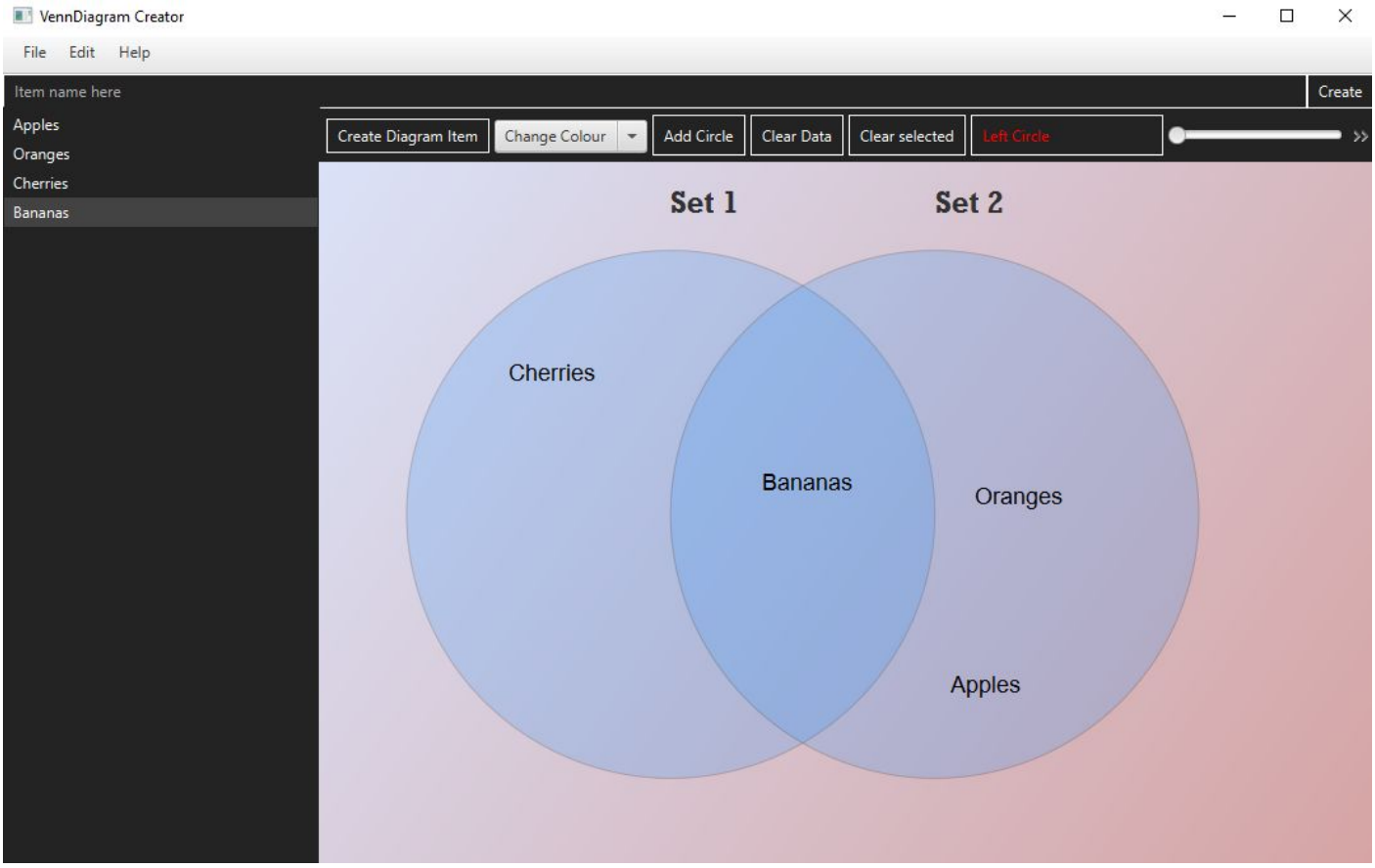


Step 4 (Using the word bank): After the user has completed the above step, they will be prompted with the “Refactor Page” as shown in **Figure 23.1-b**. The page has many options for

customization, including text color and description. For this portion we will only be discussing the text refactoring. For more information on the additional customization options, head to **Section 4.0**.

Step 5 (Using the word bank): After all the previous steps have been completed, the diagram and word bank will adjust accordingly to the changes you made. Note – See **Section 4.0** to see the effects of the advanced customization options.

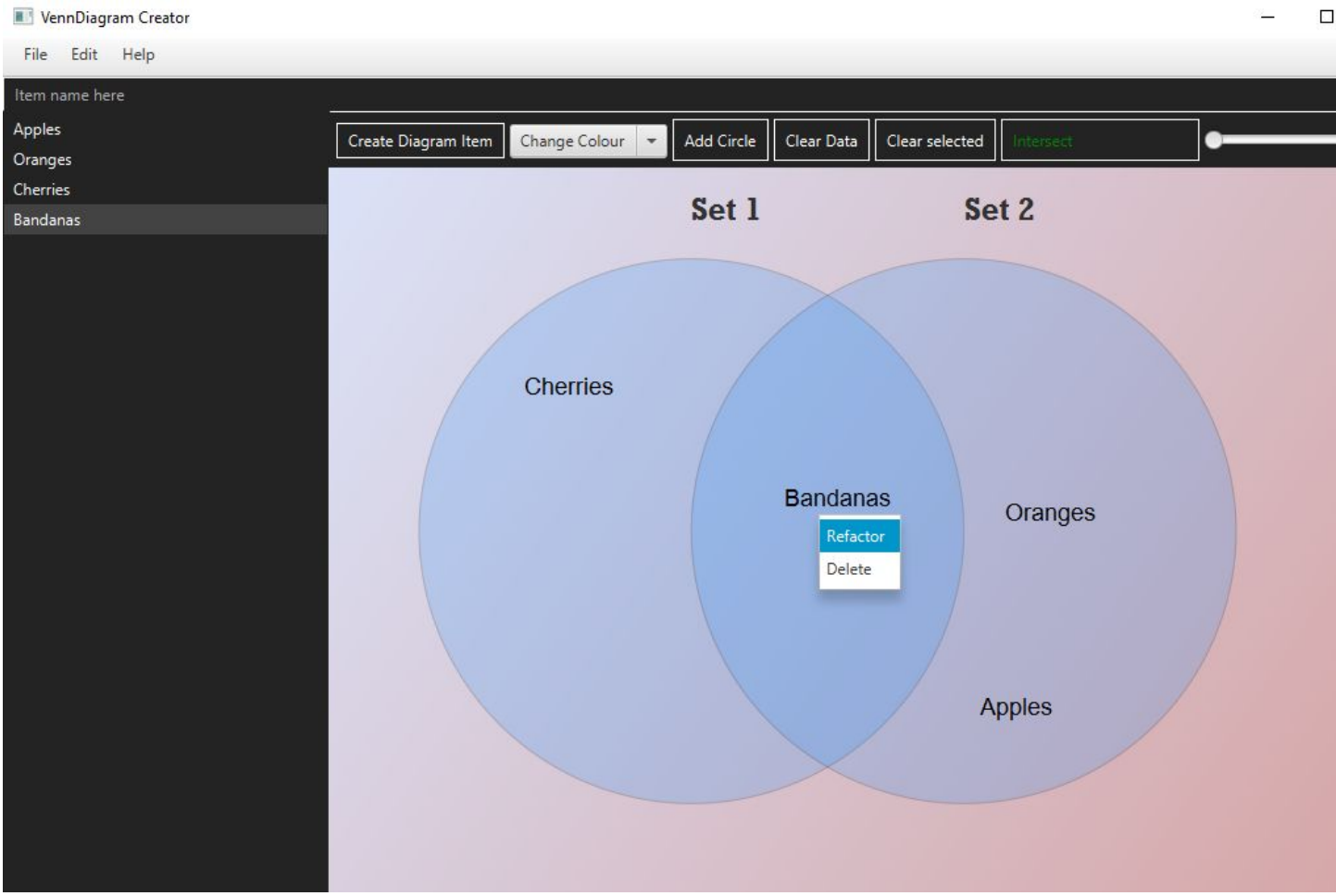
Figure 23.1-c shows the updated project after the refactor has been completed.



Refactor an Element (Using Item):

Step 1 - 2) Follow steps 1-2 inclusive from **Refactoring an Element** to get to the same state as **Figure 23**

Step 3 (Using Item): To complete this step, the user must bring their mouse over the desired item and right click the item. After this is done, the user should see a menu pop up, similar to **Figure 23.2-a**.

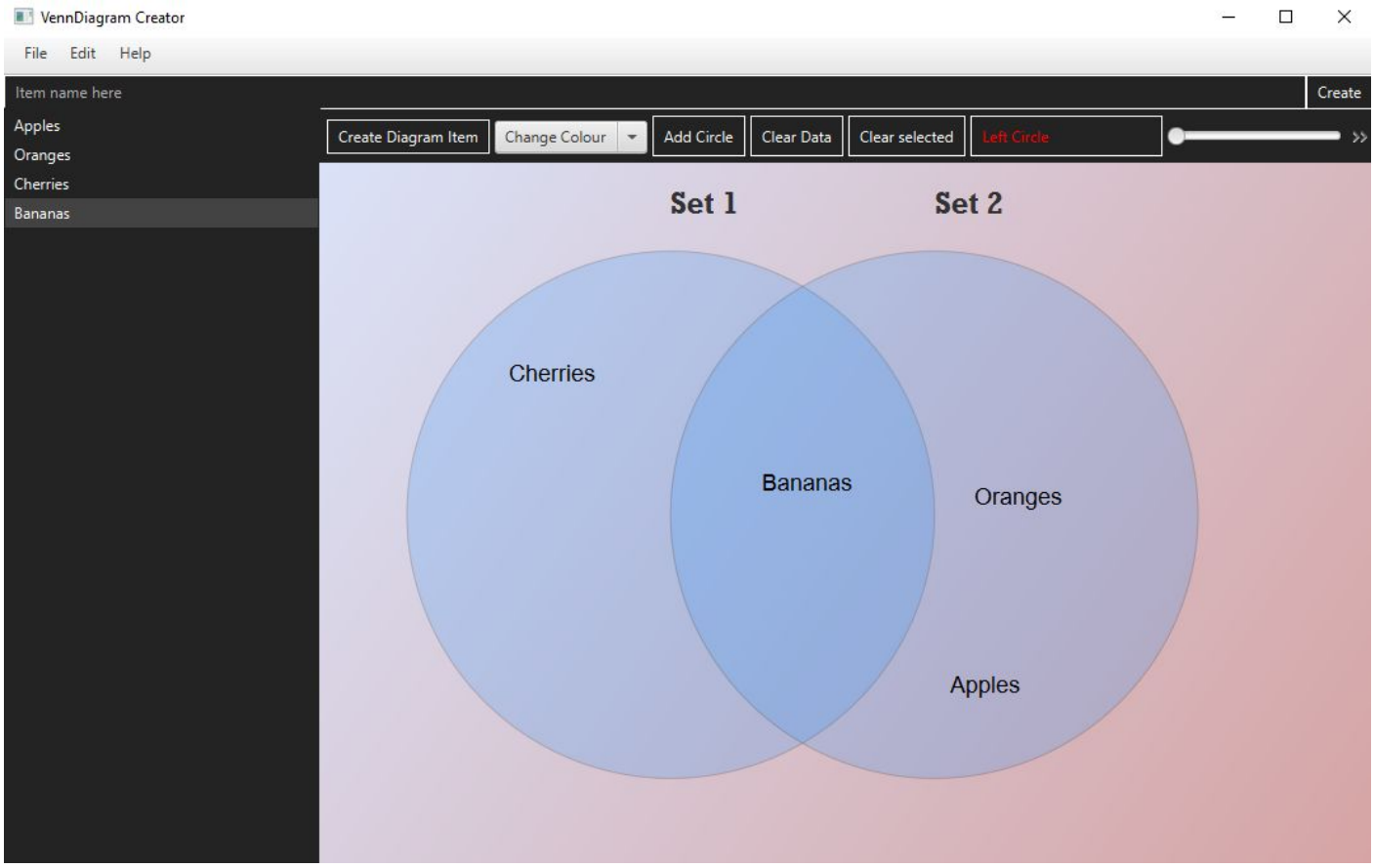


Step 3 (Using Item): Provided the previous steps were followed, the user should then be prompted by a refactor window. An example is shown in **Figure 23.2-b**. The page has many options for customization, including text color and description. For this portion we will only be

discussing the text refactoring. For more information on the additional customization options, head to **Section 4.0**.

Step 5 (Using Item): After all the previous steps have been completed, the diagram and word bank will adjust accordingly to the changes you made. Note – See **Section 4.0** to see the effects of the advanced customization options.

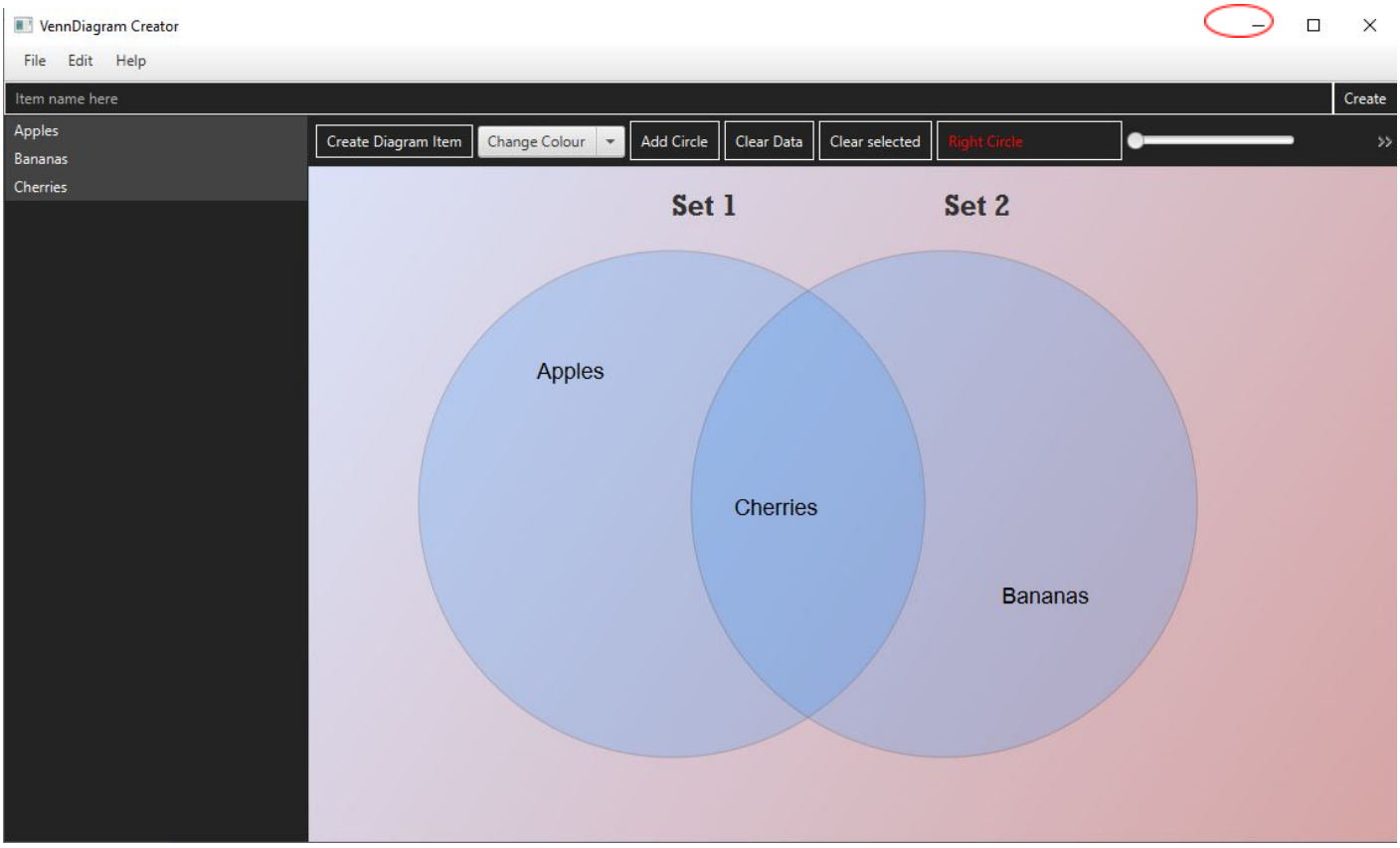
Figure 23.2-c shows the updated project after the refactor has been completed.



Resizing Your Project:

We understand that your project is your own, and you want to be able to customize it as much as possible. For that, we've designed the project to be as versatile as possible. One of the ways we have done this is with adding the ability for dynamic resizing of the elements. **Figure 24** shows how this is done.

Step 1) The first step to resizing your project is to have an existing project open. Once this is done, the user can either press the maximize window to reduce the size of the window, or if the window is already out of its full-screen state, the user can drag the corners of the screen to make the project resize accordingly. **Step 2** shows how to drag the window to a smaller size.

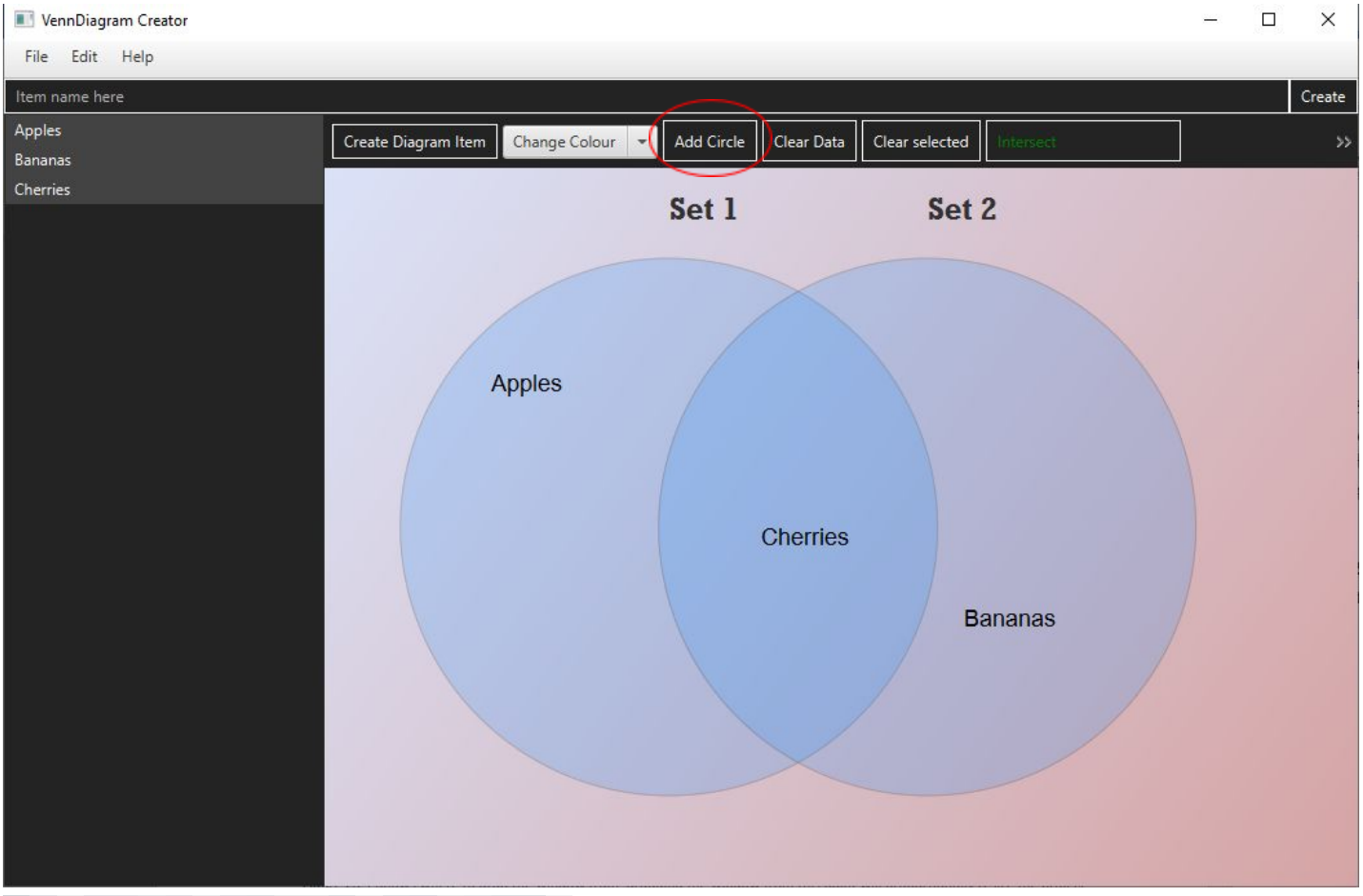


Step 2) If the window is not in full screen mode, and the user wants to reduce the size even more, **Figures 24.1 -24.2** will demonstrate this.

Adding an Additional Set:

Sometimes computations must be made with more than two sets in mind. There is often times when including a third set may help to complete some of these complex set calculations. To help with these computations, we have added the ability to include up to three sets in one's project. Adding a new set is as simple as clicking one button.

Step 1) When the user feels that an extra set needs to be introduced, all they must do is locate the "Add Circle" button on the toolbar. **Figure 25** shows how to do this.



Step 2) Enjoy the project. The project now has full functionality for three sets. All of the additional functionality the user gains here will be discussed in **Section 5.8**, the extra features section. Controls that govern the set functionality can be found in **Section 7.0**, the controls section.

Removing the Additional Set:

Just as adding an additional set is an essential function, removing that set is also essential. This can be done by ***Restoring Default Settings*** which can be seen in **Section 5.8**. But this is not the only way to remove the additional set. Once the additional set is added, the user may right click on the set, and click the “Delete” button. The user will not receive a warning for this action because adding the set back is as simple as clicking a button (See the above section).

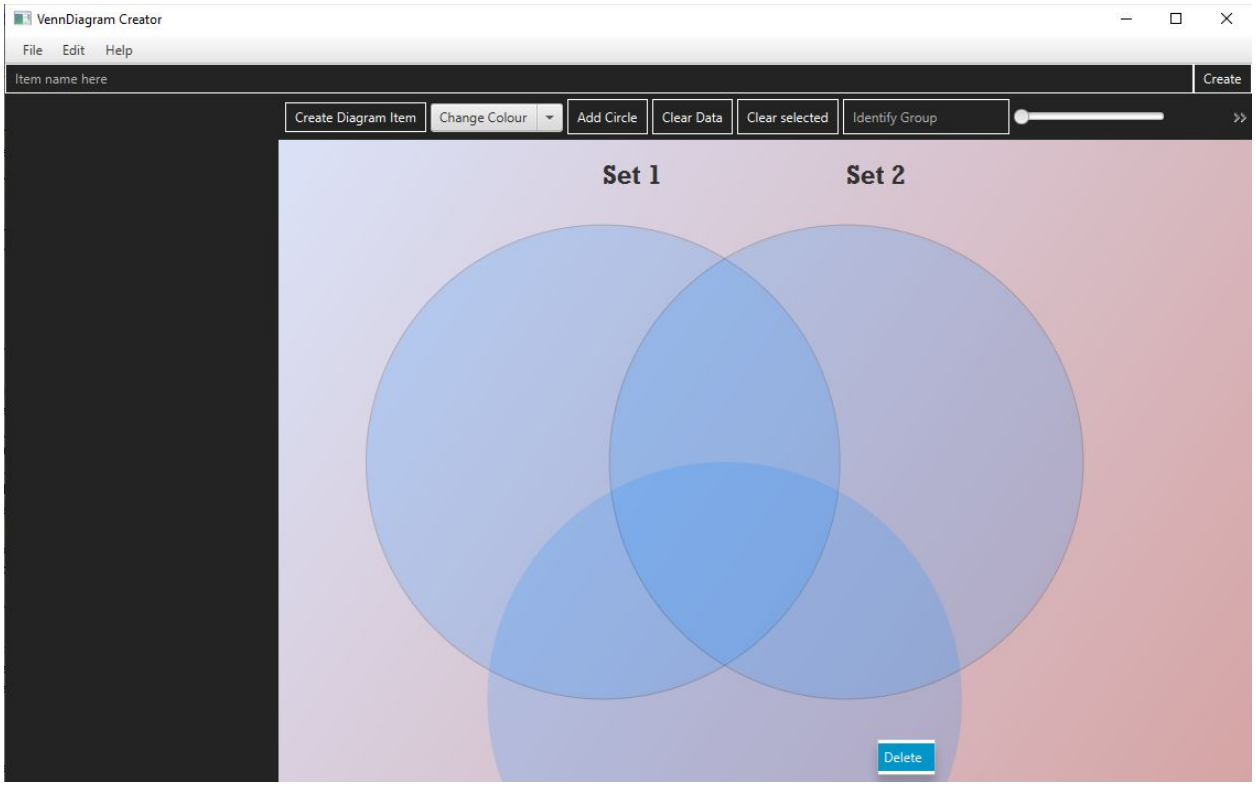


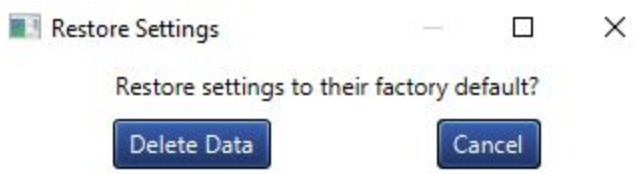
Figure 25.1 Shows the process behind deleting an extra set.

Upon deletion, the project will look identical to how it was before, and all the elements that were in that set will be removed.

Restore Default Settings:

This project offers quite a bit in the realm of customization. When this happens, naturally, a user may configure the project with settings that they no longer need, or simply just need a complete restart for their project. For that, we introduced the factory reset option. This option gathers information about the way the project was set up, and upon selection, restores the state of the project back to its original state (Factory state).

Because this is such a large change, we have a non conditional warning in place asking the user if they are certain they want to revert their project back to its factory form. **Figure 26** shows the alert that users will be prompted with.

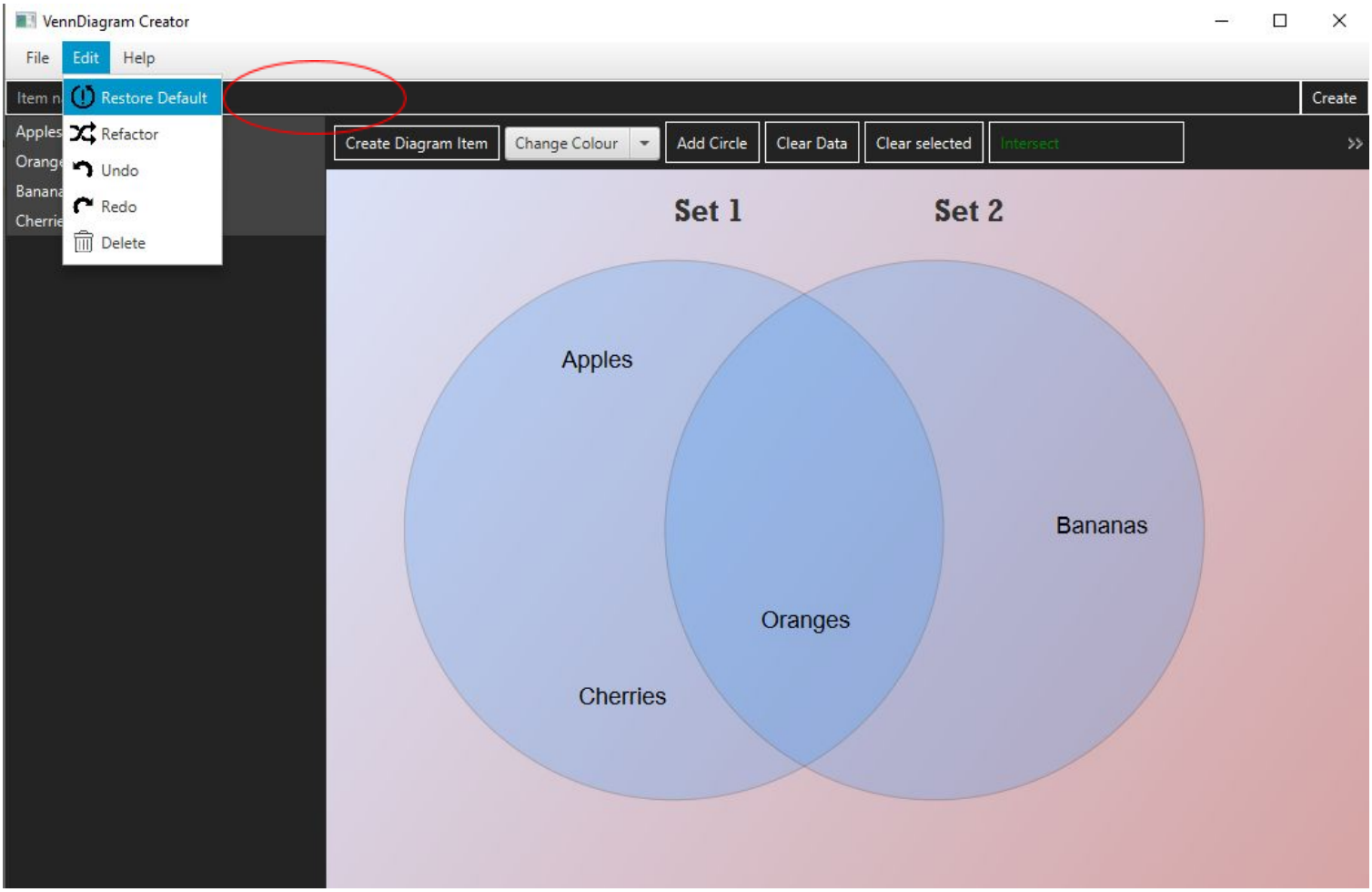


This warning works similar to other warnings that are talked about in **Section 7.0**, the controls section.

If the “Delete Data” button is pressed, then all the data is deleted off the diagram, and the settings will be reverted back to normal. If there is a third circle active, this will be removed. The set colours will be reverted to their original blue colors - and all circle sized will be restored. This will all be explored in this section.

Starting the Restoring Process:

Step 1) Locate the “Restore Default” button in the edit menu (Edit -> Restore Default). **Figure 27** shows how this is done.



Step 2) Once you have accessed the restore default option, the user should click it. They will then be prompted with a warning. This warning can be seen in **Figure 26**. Clicking "Delete All" will allow the factory reset to incur. Clicking cancel or the exit button will simply cancel the restoration process, leaving the project as it was. **Figure 28-28.1** show the process of restoration.

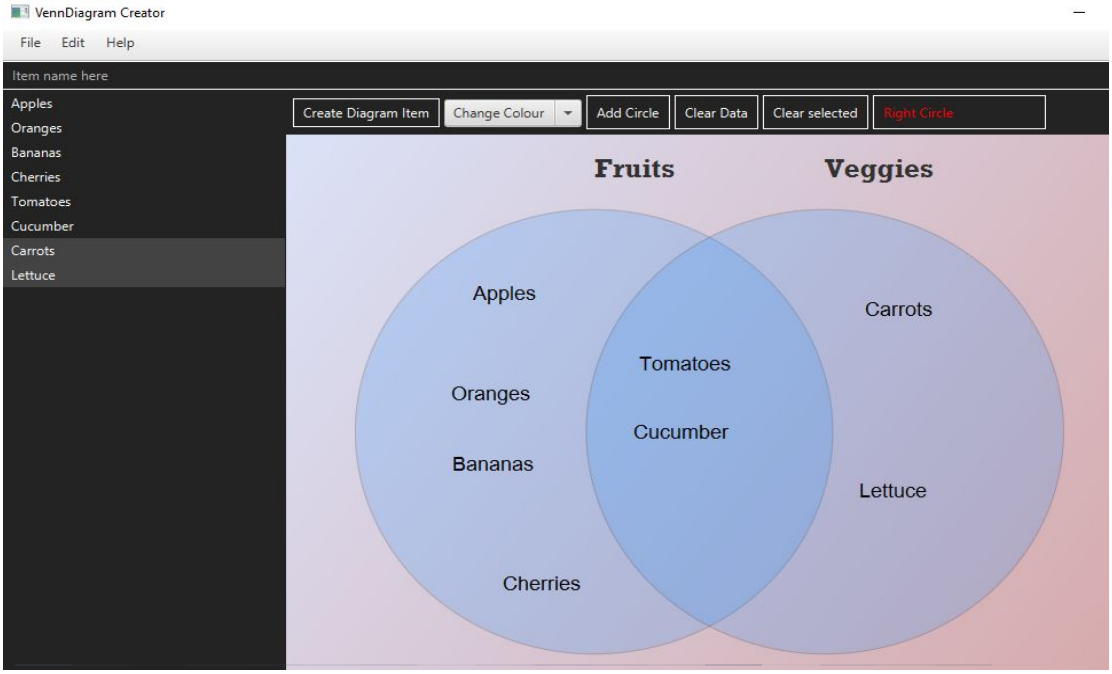
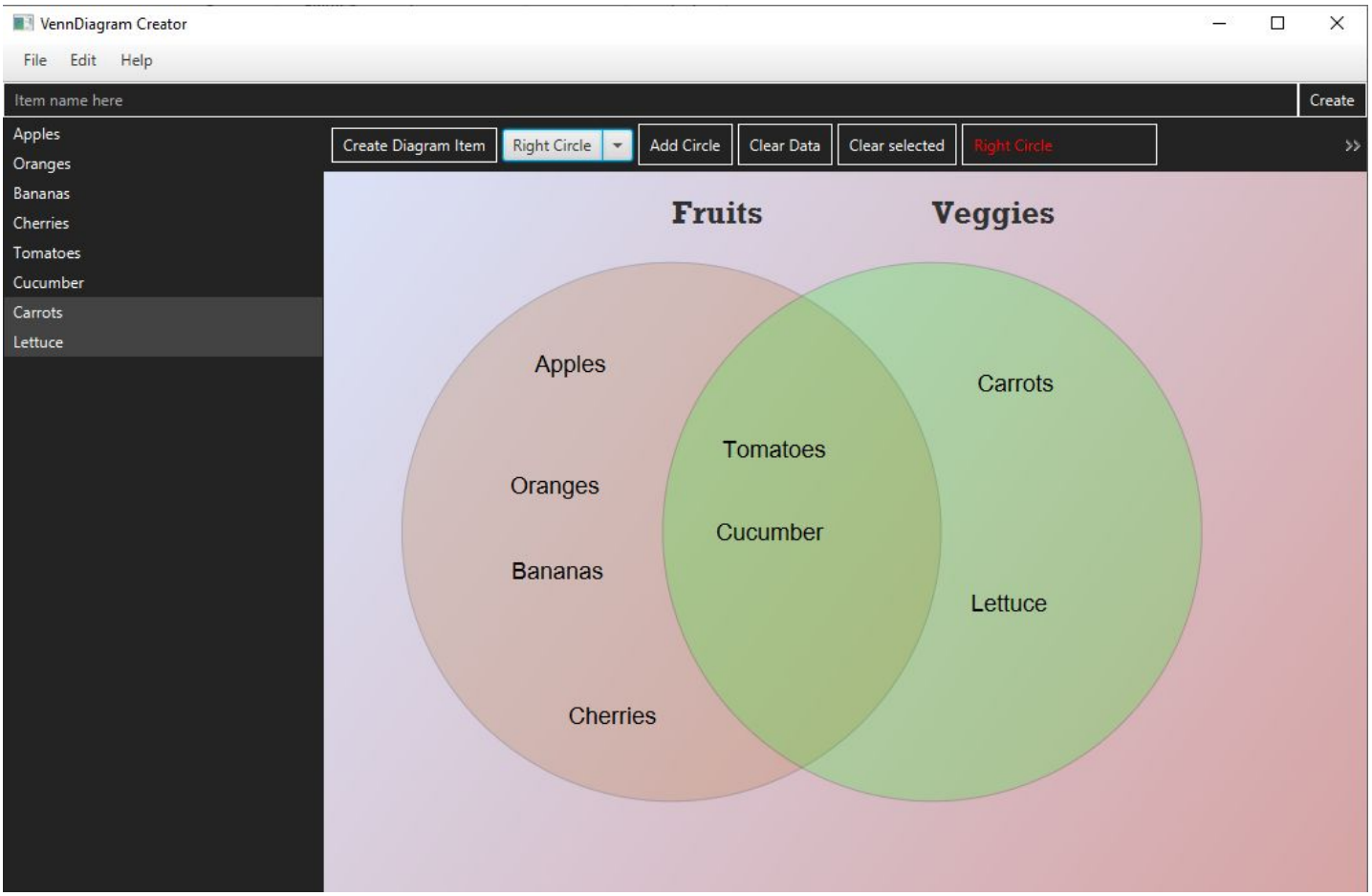


Figure 28.1 Shows the effect of restoring default.

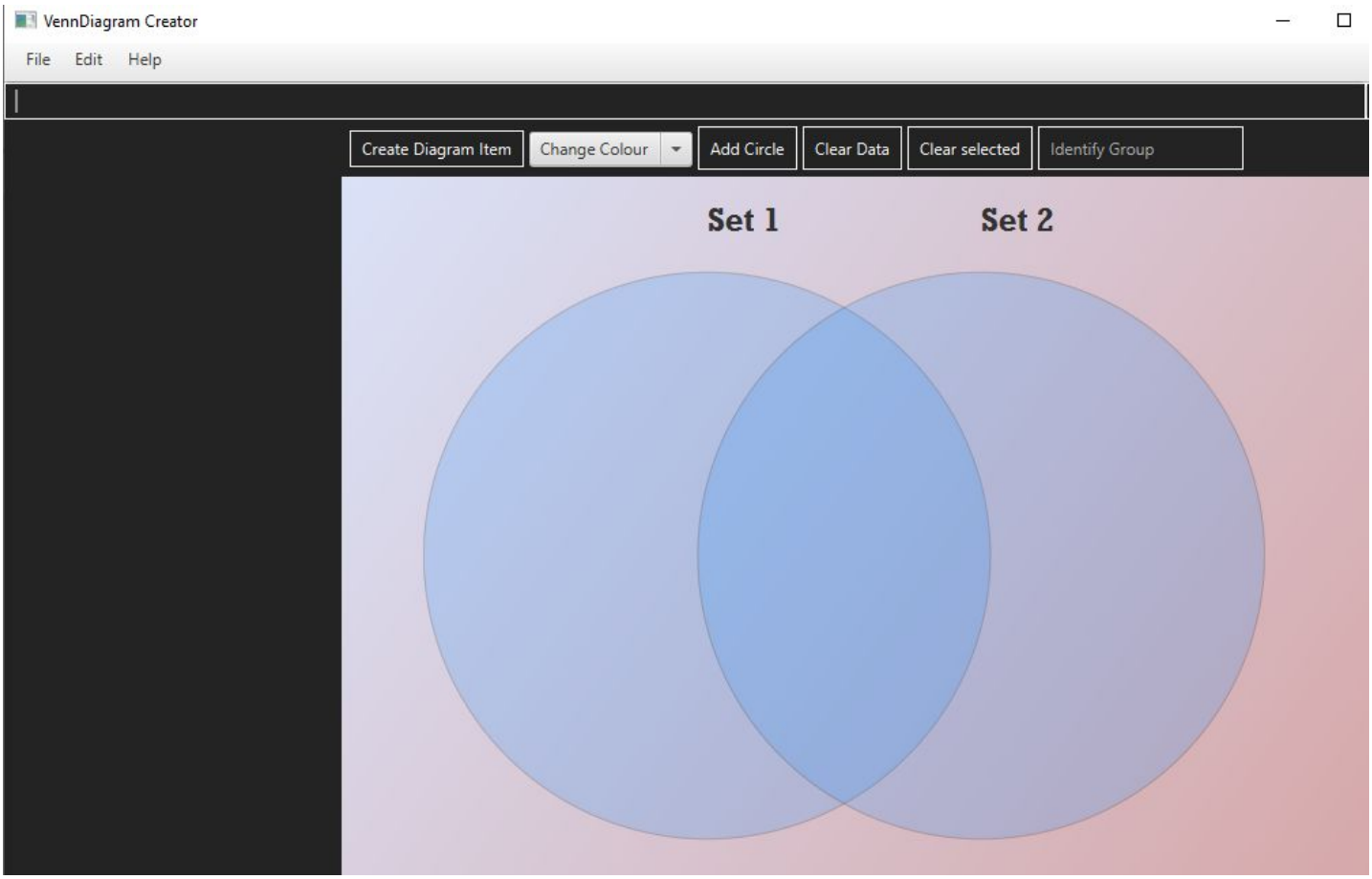
Restoring Project with Different Set Colours and Set Names:

In this section, we will see how projects with different set colours and set names can also be restored to their factory settings. If the set colours are changed, they will be reverted to their factory default colour of blue. If the set titles are changed, they will be changed back to their factory default of “Set 1” and “Set 2” respectively. For more on how to change the colour of a set or change the set title, head to **Section 6.0**, which explains some of the extra features.

Step 1) Figure 29 shows a possible configuration of a customized project. In this example, we have an orange coloured set 1 and a green coloured set 2. The titles are “Fruits” and “Veggies” respectively, However, this applies to all cases.



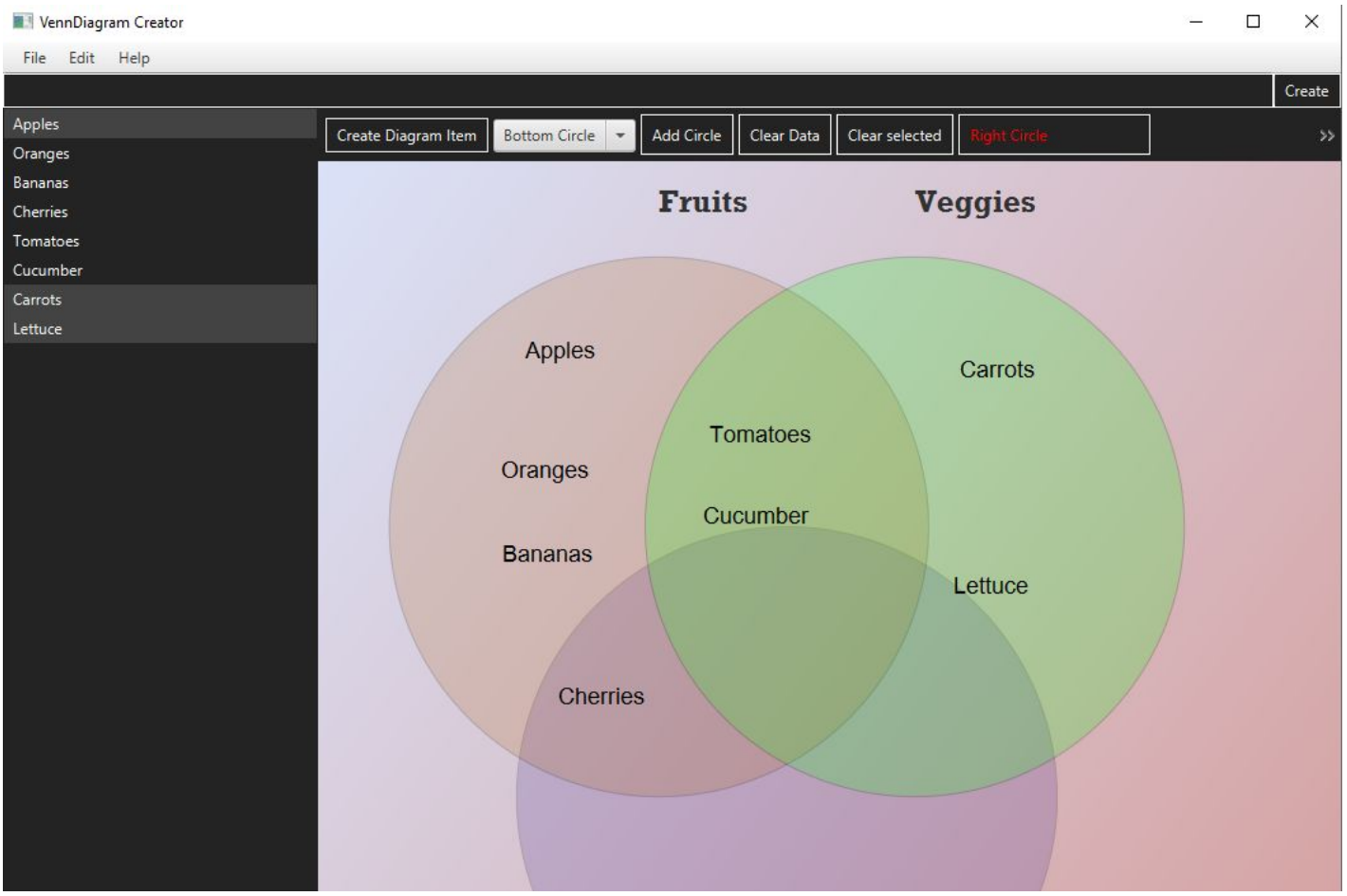
Step 2) Figure 29.1 shows the result of restoring the project to its default state. Notice that the colours are restored, and the set titles are also restored. A by-product of the factory restore is completely removing all set items as well.



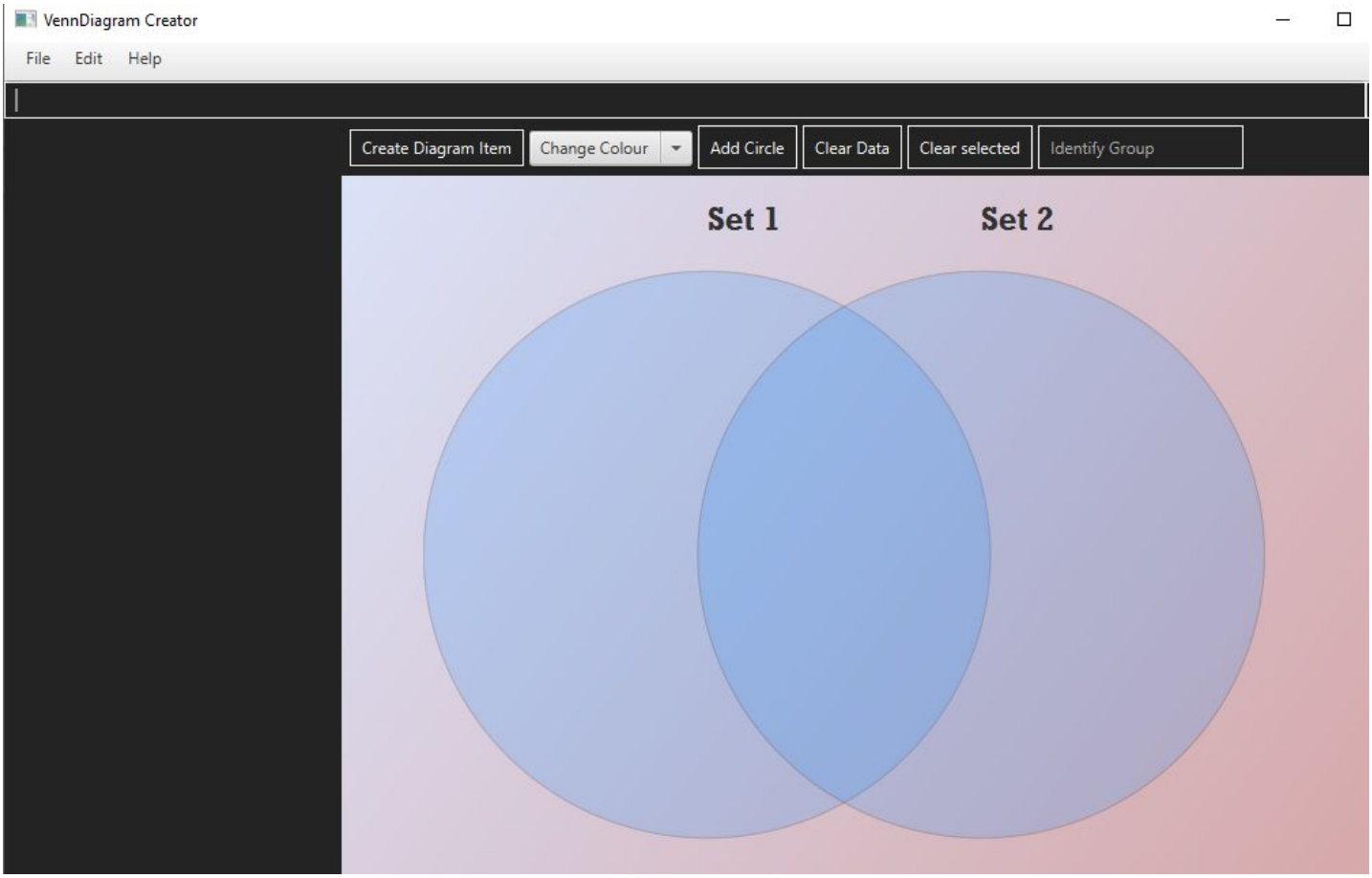
Restoring Project with Three Sets Enabled:

Since the project is equipped with the ability to have three sets, naturally, there may come a time when you need to start fresh and remove the circles and all the data. We have included this as one of the features when completing a factory reset. **Figure 30** shows an example of a project with 3 sets enabled.

Step 1) Have a project that is semi-populated. After this, configure the settings in any which way. For this example, we have the set names labeled, and the set colours changed.



Step 2) Figure 30.1 shows the result of restoring the project to its default state. Notice that the colours are restored, and the set titles are also restored. A by-product of the factory restore is completely removing all set items as well.



Saving Project to a Text File:

We understand that saving one's work is an important feature in any application. For our application, we take this very seriously. We understand that many people don't have access to CSV applications, so in knowing this, we have given the user the option to save to a text file as

well. This option does not have the same functionality that saving to a CSV file has, so naturally, we focused on the basics. Once you save to a text file, you will have a text file that has the sets, and the elements that the sets house. For example, if we have a project that resembles **Figure 29**, we will arrive at a save file that looks like **Figure 31**.

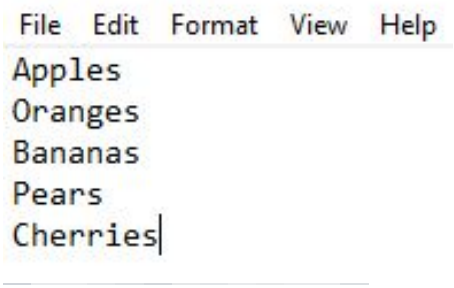
```
Left Group:Oranges, Bananas, Cherries, Apples
Match Group:Tomatoes, Cucumber
Right Group:Carrots, Lettuce
```

This is also optimized for three set functionality. If the user has data that resembles the project shown in **Figure 30,** They may receive a save file that looks like **Figure 31.1**.

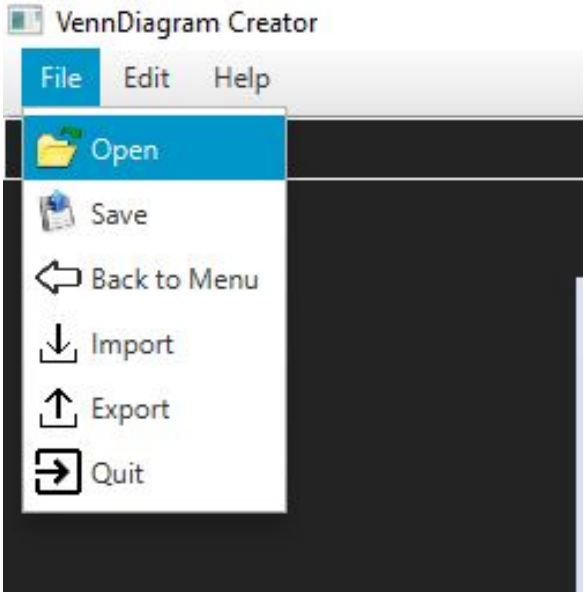
```
Left Group:Oranges, Bananas, Apples
Right Group:Carrots, Lettuce
Bottom Group:
Left Right Group:Tomatoes
Bottom Left Group:Cherries
Bottom Right Group:
Match Group:Cucumber
```

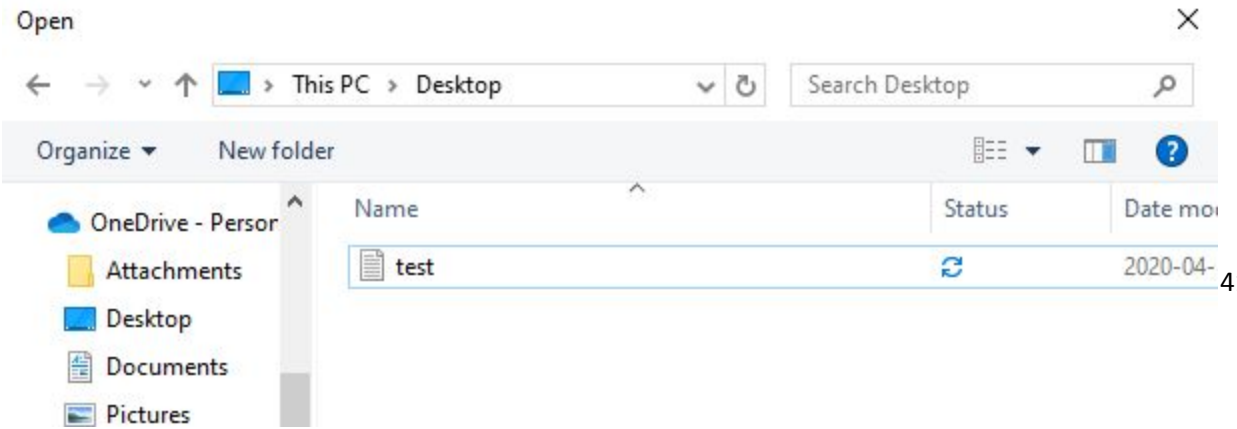
Open Project From a Text File:

Step 1) To begin this step, the user must create a text file. Once the text file is created, it may look something like the figure below.



Step 2) Locate the "Open" menu option under File->Open. This is shown in the figure below. After this is done, the user will be prompted with the file explorer like in **Figure 32.2**.





Step 3) After the file explorer opens, locate the text file that you originally created and click "Open".

Step 4) After the file has been imported the Word Bank will automatically populate with the contents of the text file. Ensure you separate items by spaces or new lines.

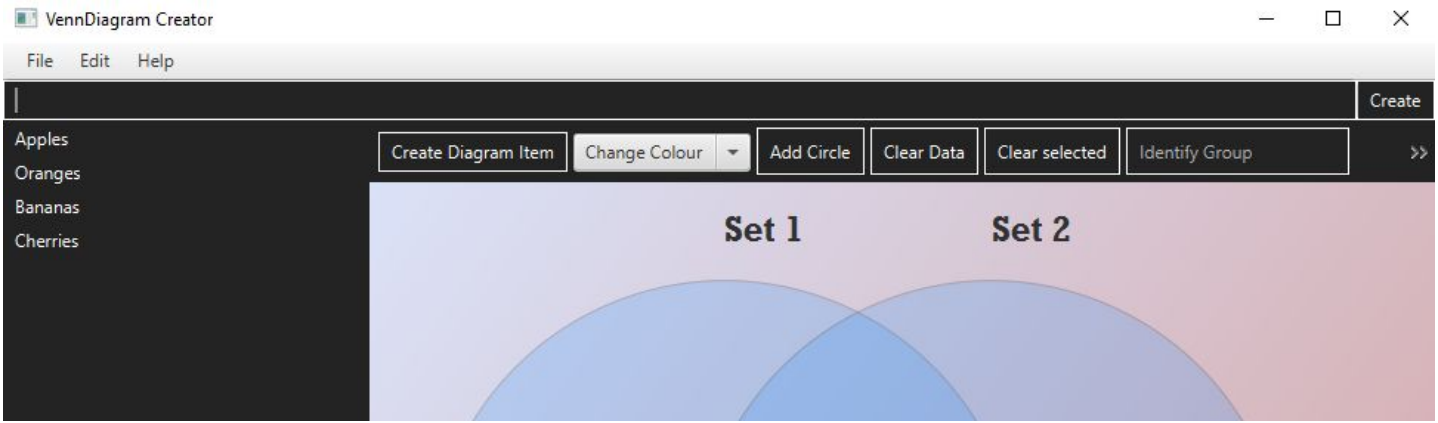
Undo and Redo:

We understand that mistakes happen. Because of this we have decided to implement a robust undo/redo system. Some of the features that our undo/redo system covers include...

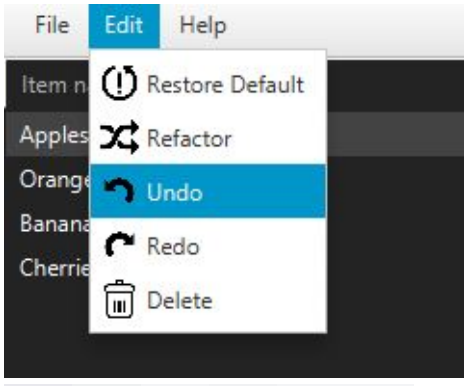
- **Changing the colour of sets**
- **Moving the Diagram Item to a new position.**
- **Insertion and deletion of set element.**
- **Changing of set name.**
- **Moving item back to last position.**

Using Word Bank: To show how this is done, we will demonstrate the undo/redo functionality on the insertion to the Word Bank.

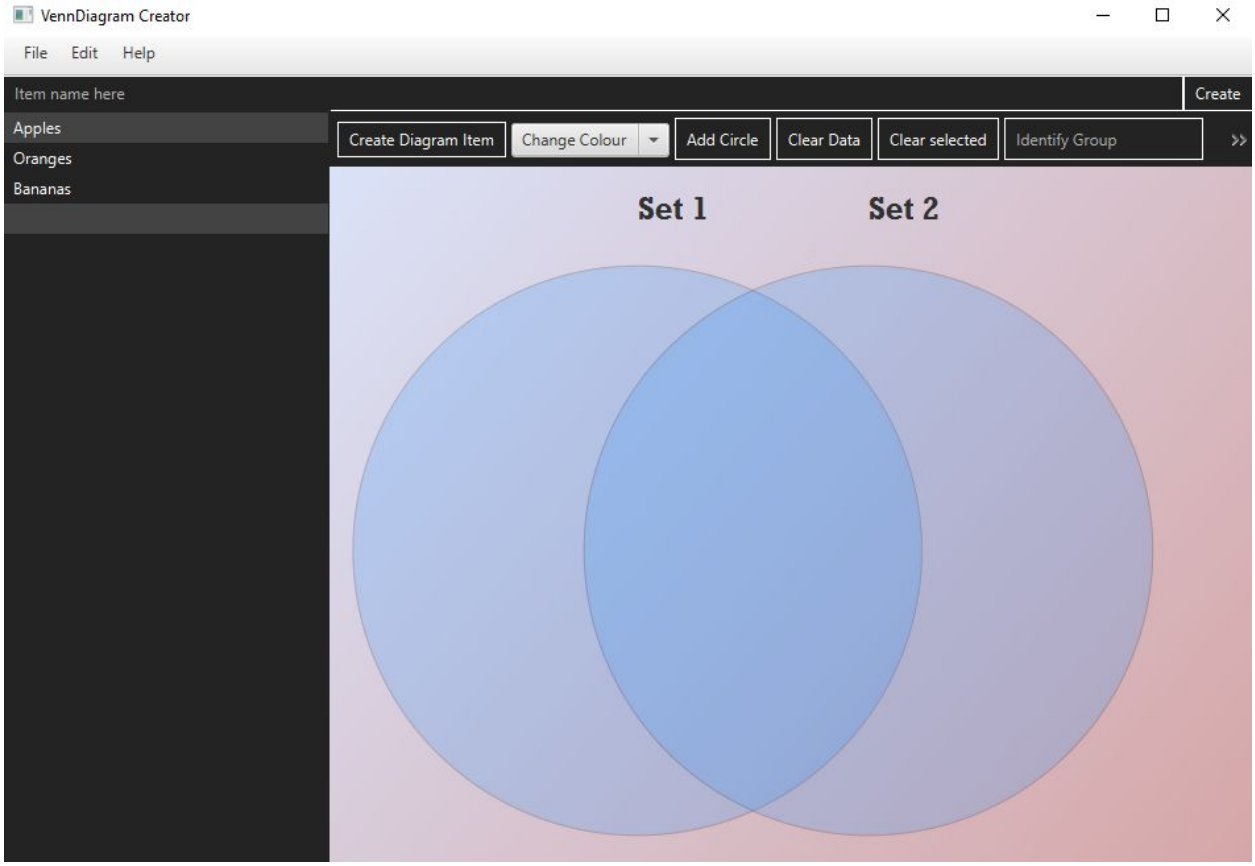
Step 1) add an element to the Word Bank. After this is done, the project's state may look like **Figure 33**.



Step 2) Go to the edit menu and locate undo. It can be found by going to the menu bar and clicking Edit-> undo.

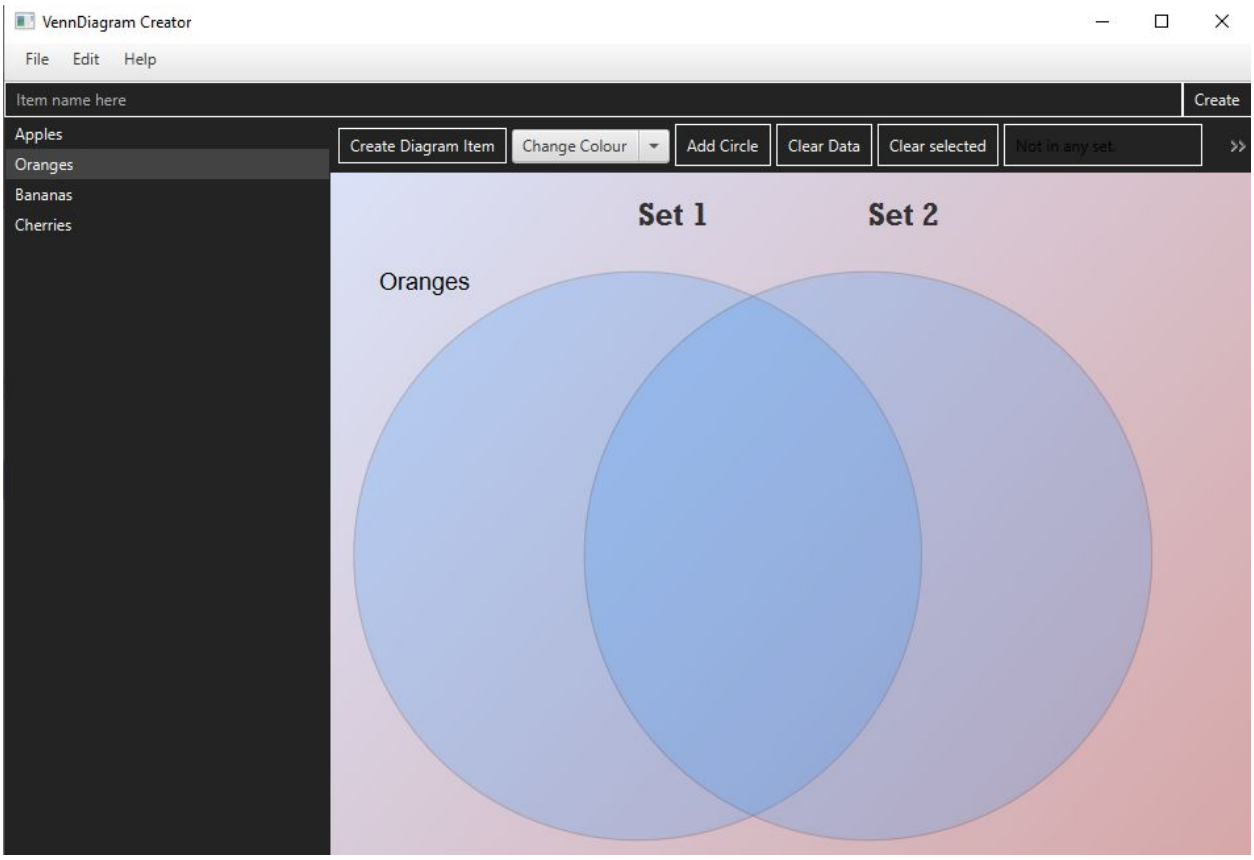


Step 3) The state of the project after we hit undo looks something like **Figure 33.2**. But yours may look different depending on the actions performed.

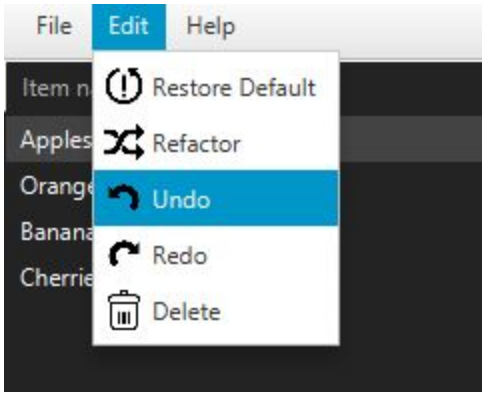


Using Diagram Item: To show how this is done, we will demonstrate the undo/redo functionality on the deletion of a Diagram Item.

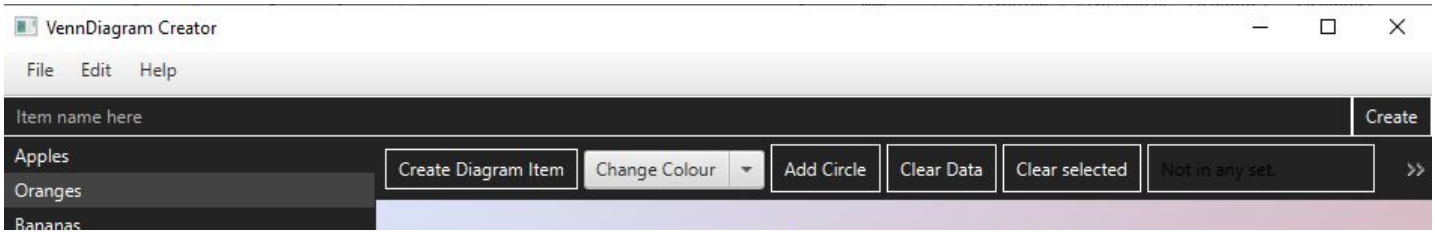
Step 1) Create the Diagram Item. After this is done, the state of the project may look something like **Figure 34**.



Step 2) Go to the edit menu and locate undo. It can be found by going to the menu bar and clicking Edit-> undo.



Step 3) The state of the project after we hit undo looks something like **Figure 34.2**. But yours may look different depending on the actions performed.



These are just two examples of our Undo/Redo functionality. As discussed, there are many more applications that the undo/redo handle, try them out for yourself!

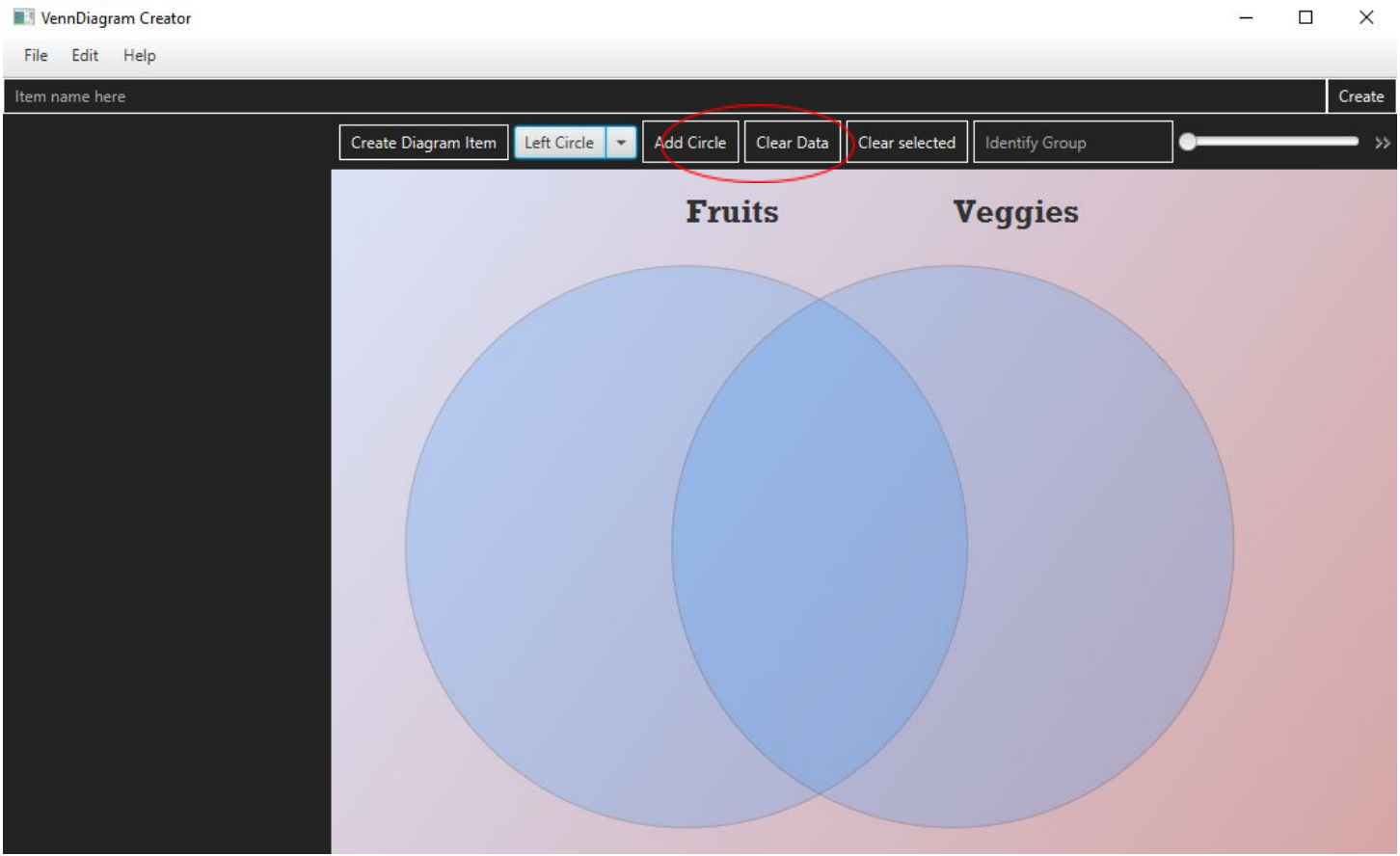
6.0) Extra Functionality:

We as designers understand the need for customizability. For this project, we have tried to include as much customizability as possible. The following features are present within the current build of our project, and will be discussed in this section: Changing the colour of any of the active sets, Changing the colour of an item's text, changing the color of a Set's name and finally, Changing the description of an item.

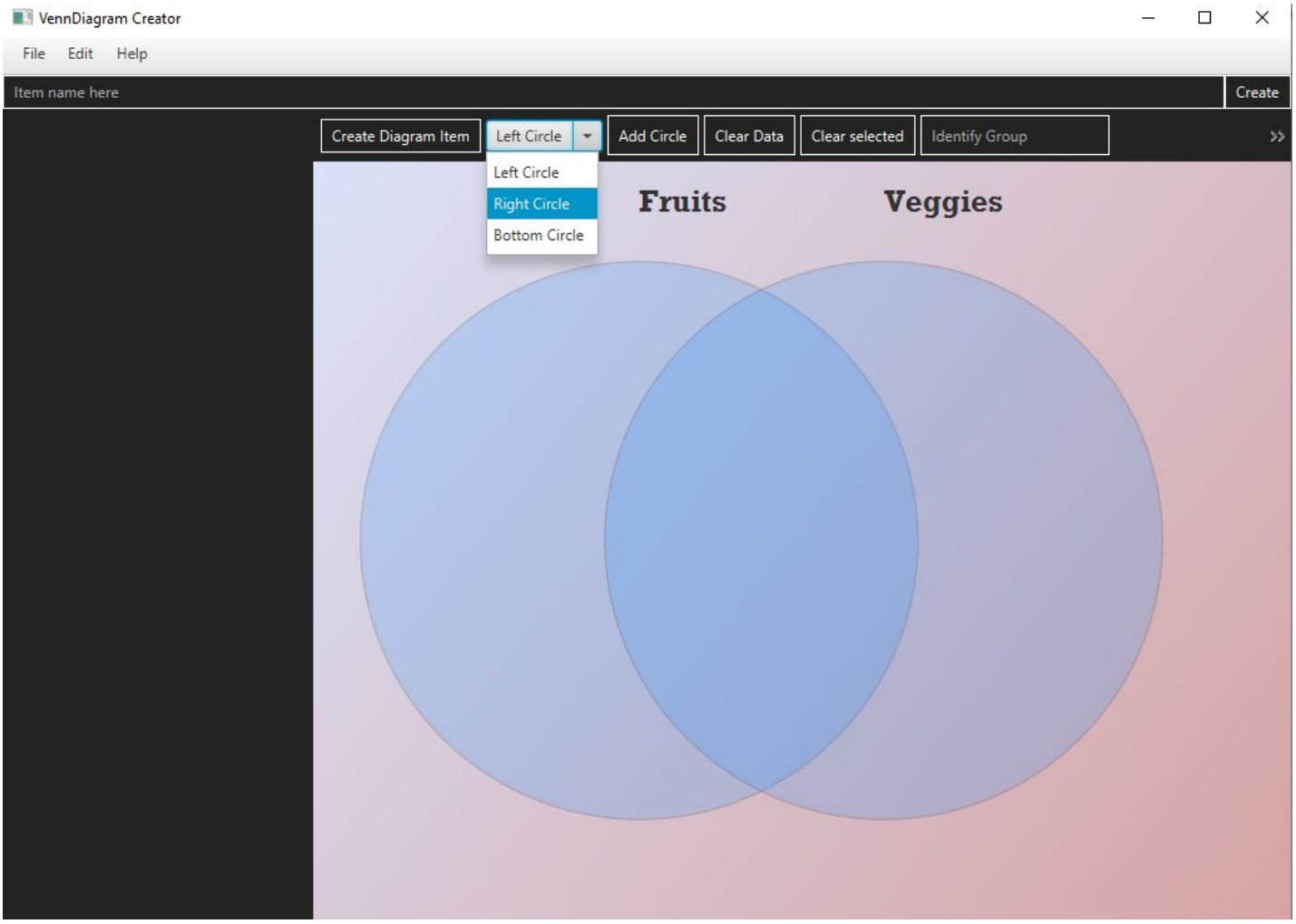
Changing the Set colours:

We have made this option available for all active sets. The first thing that the user must do is select the set they want to change. **Figures 35 -35.3** shows how to do this.

Step 1) Locate the set chooser on the toolbar. It is marked in the red circle on **Figure 35**.



Step 2) Once the user has found the Set selector for the Set Colour, they should click on it. Clicking on it will reveal three options. Now, the standard project comes with the two sets, the left circle and the right circle. If this is the state of the project, clicking the “Bottom Circle” option will result in an alert being thrown to the user. This alert will warn the user that there is not a third set in play just yet, and will not allow them to change the colour of this nonexistent set. More on this and the reasoning behind it in the **Controls Section (Section 7.0)**.



Step 3a) After choosing the desired set that the user wants to customize, the remaining steps are identical. That is, follow the remaining steps regardless of what set is chosen.

Step 3b) Figure 35.3 shows the result of choosing a set to customize. The user will be prompted with the following popup, a colour picker.

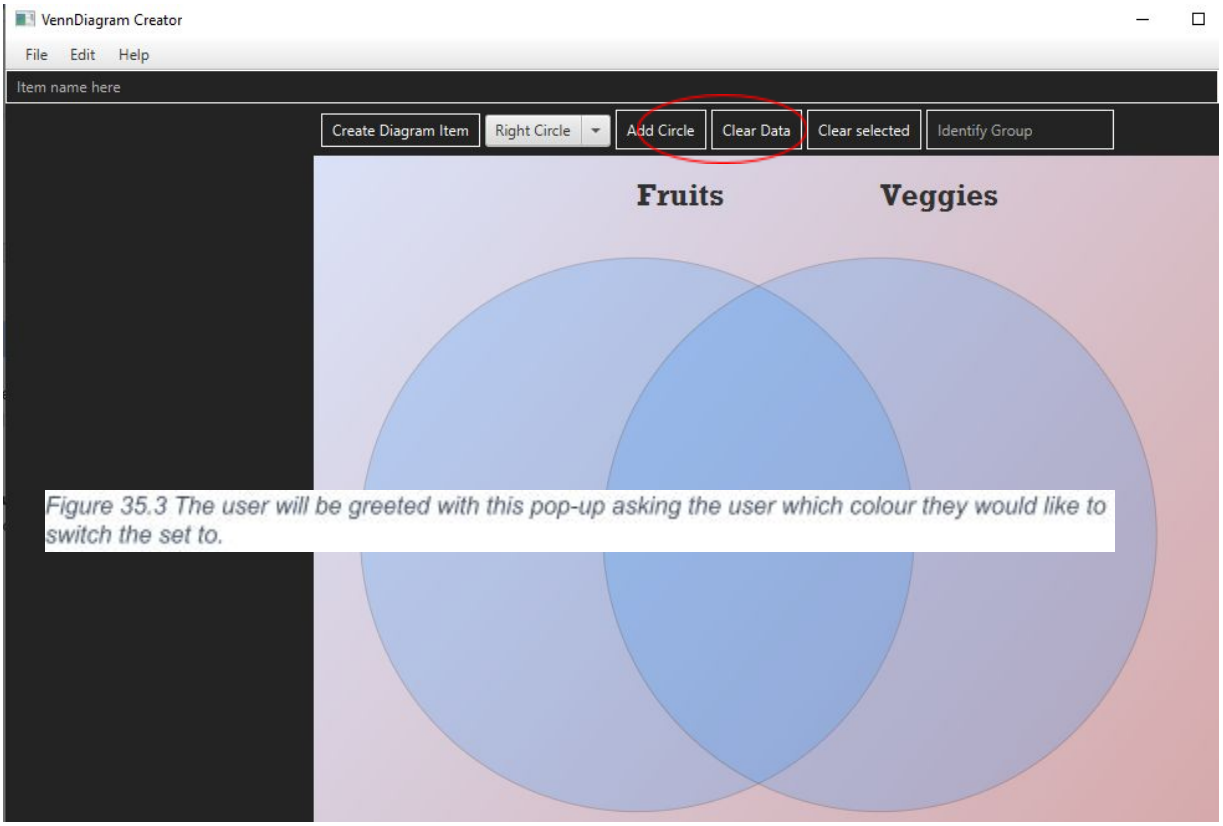
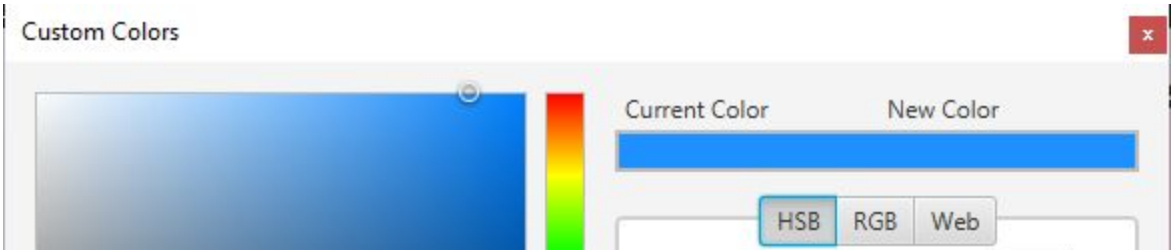


Figure 35.3 The user will be greeted with this pop-up asking the user which colour they would like to switch the set to.

Changing the Set colours (Advanced Colours):

Although the colour picker allows for the user to have a plethora of colours at their disposal, sometimes you need a very specific colour. For that, we have implemented the "Custom Colour" option. If you look closely at **Figure 35.3** you will see the "Custom Color" option in the bottom half. This option brings out a colour picker with much more customization options and allows for a nearly infinite combination of colours to be chosen. **Figure 35.4** shows an example of the Custom Color picker in action. Again, as mentioned before, this option is uniform to all sets.



The Custom Colors window allows for three methods of choosing. Using HSB (Hue, Saturation, and Brightness), RGB (Red, Green, Blue) or Web.

Using the **HSB** option, the user is able to adjust the Hue Saturation and Brightness accordingly to make their ideal color. The user can also adjust the range of the colour they're using by shifting the rainbow slider.

Using the **RGB** option, the user is able to adjust the red, green, and blue values to make any number of colour combinations.

Using the **Web** option, the user is able to directly input the HEX colour value. This allows for a precise and easy way to get the desired colour.

Changing Text Colour of the Diagram Items:

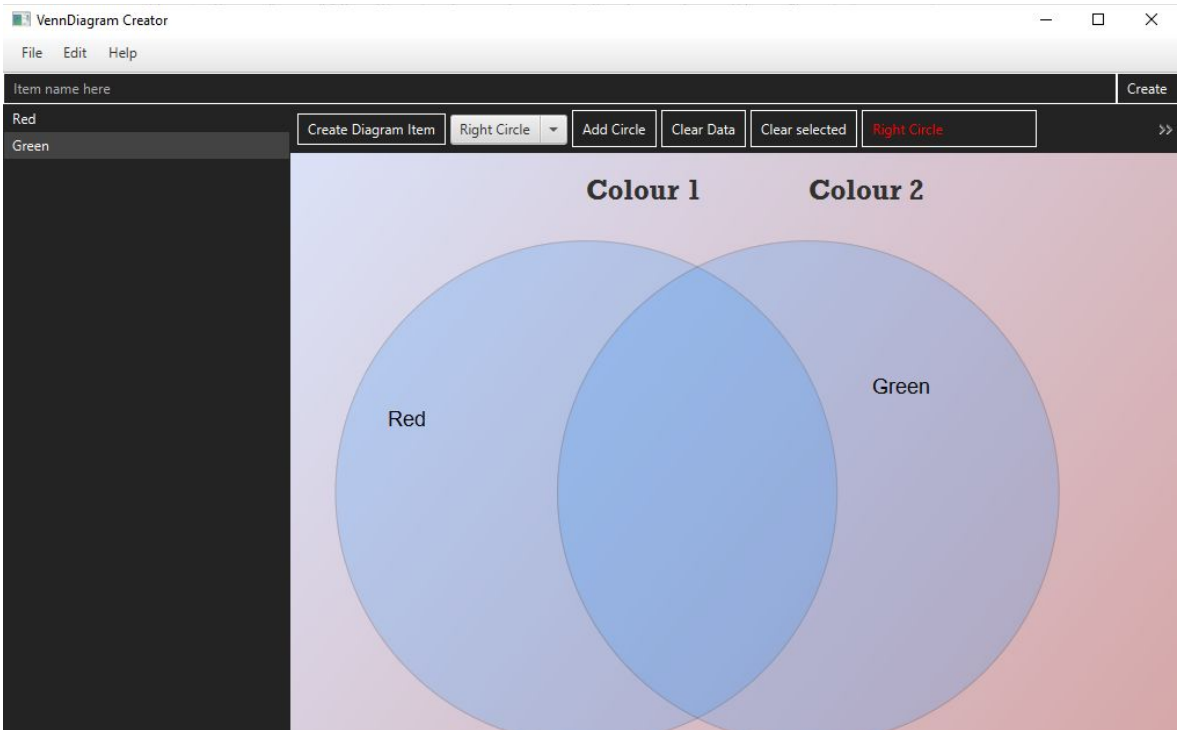
In an effort to maintain our flexibility and exercise the number of customization options we can implement; we have also chosen to add the ability to change the colour of the Diagram Item. This can be done by accessing the refactor page as seen in **Section 5.7**. Please see that section and follow the steps to access the *Refactor Page*.

Step 1) Provided the user is in the *Refactor Page* they may have a screen that looks like **Figure 36**. But rather than change the text like we did in **Section 5.7.1**, we are going to simply change the Item's text colour. This can be done by clicking the highlighted Colour picker in **Figure 36.1**. Once this is done, the user will see a Colour Picker menu appear, like in **Figure 35.4**.

Step 2) Once the user has selected the highlighted button in **Figure 36**, they will be greeted with the following. **Figure 36.1** shows the Colour Picker that the user is given to customize the Diagram item text. This will only effect the colour of the item that you selected. All other items will retain their existing colours.

Step 2b) Similarly to **Section 6.1** the user can have the option of selecting more advanced colours to optimize their experience. This option is identical to **Advanced Colours** section in **Section 6.1**. Follow that to apply advanced colours to the Item text.

Step 3) The following figures, **Figures 37 – 37.1** show the before and after of changing the colour of a Diagram Item.



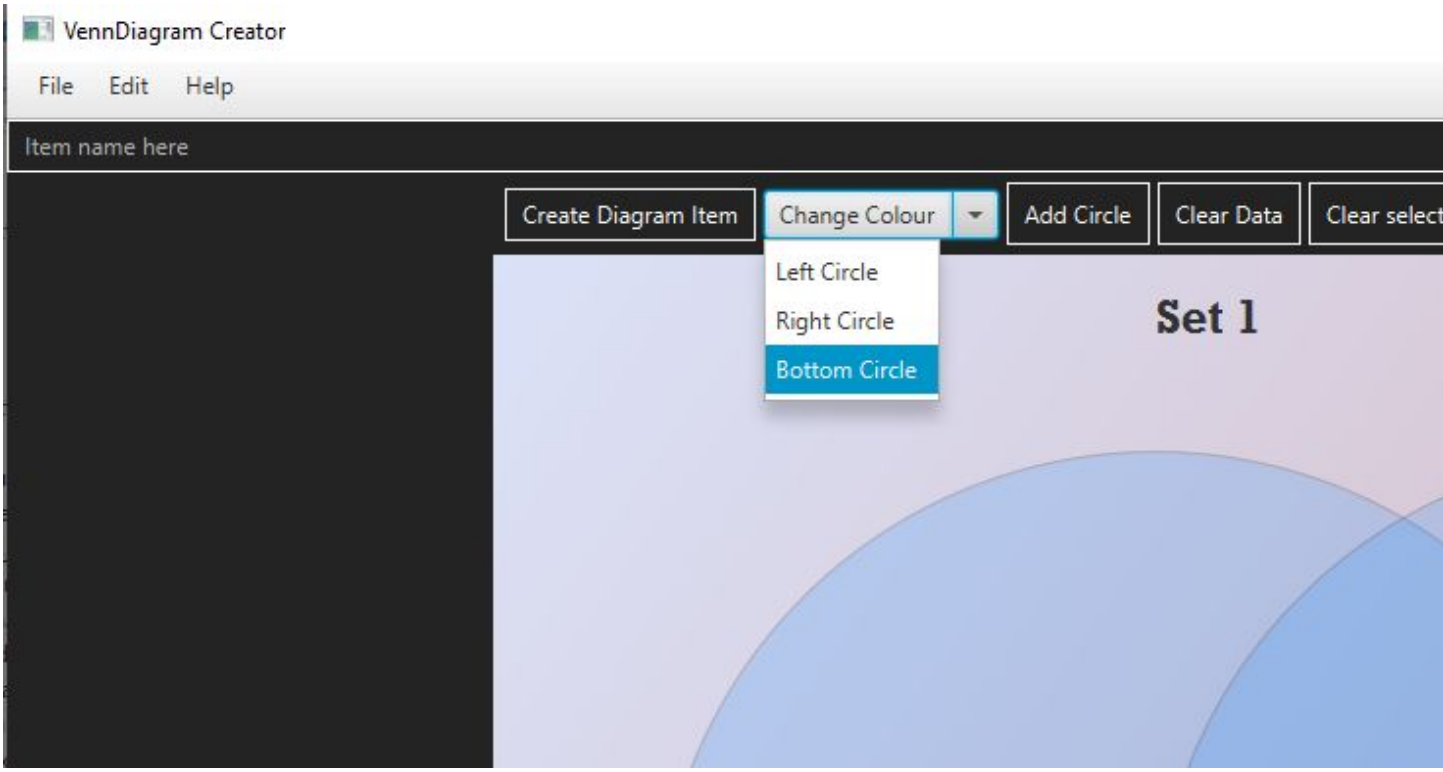
7.0) Controls:

In an effort to make the user experience as seamless as possible, there have been a number of controls put in place. Some of these controls allow for adjustment, which lets the user decide how flexible their project is, however, the majority of controls put in place are static, and they are done this way so that the integrity of the application.

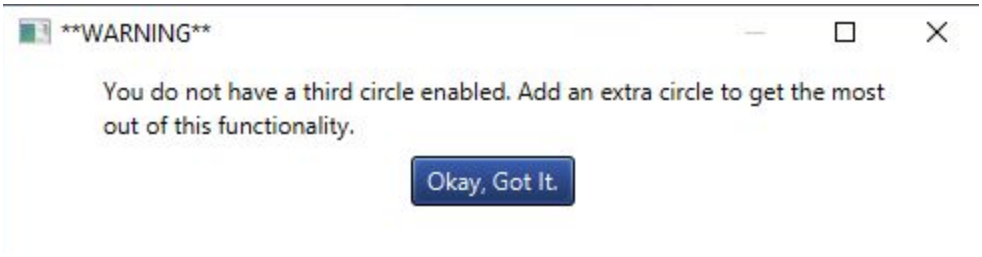
Additional Sets (Colour Change):

This project supports up to three sets being used at a given time. The default state of the project is two sets. Naturally, there are things that can be done with three circles but not with two. The first example of this is changing the colour of the third set. If the user was to try and change the colour of the third set when there is no third set present, they will receive an alert telling them why the event could not be completed. **Figures 39 – 39.1** show this event.

Step 1) Locate the change colour menu on the toolbar. Once this is located, select the "Bottom Circle" option, as shown in **Figure 38**. **Reminder** *This can only be done with 2 circles, having a third circle and attempting this will simply perform the action*.



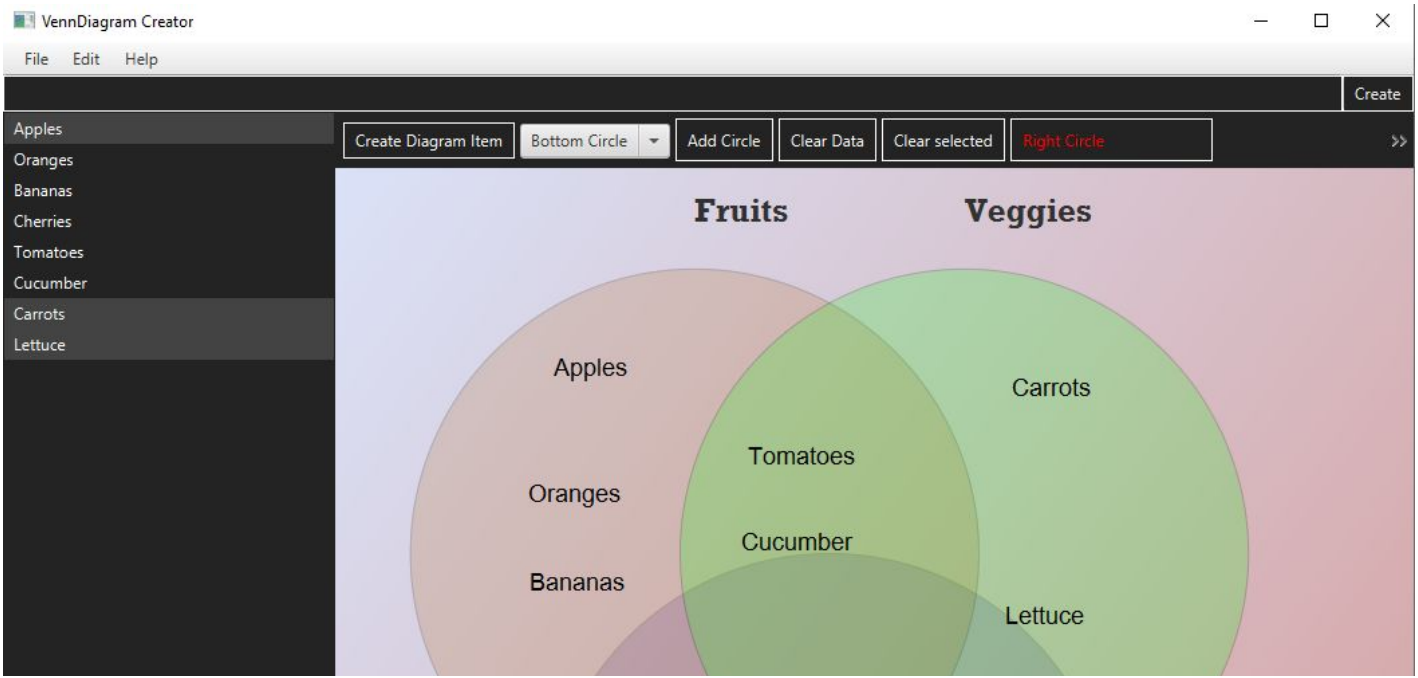
Step 2) Upon clicking the "Bottom Circle" option. The User will be alerted that the action could not be completed. This is done to inform the user that they are trying to complete a task without having the functionality enabled. The alert is designed to show the user that the task they are trying to complete is useless without the addition of the third set. **Figure 38.1** shows the alert that the user sees.



Additional Sets (More than Three Circles):

An additional control that we have added is stopping the addition of sets past 3. This is done because the addition of a fourth set or even a fifth set would eliminate more functionality than it would add. The third set allows users to complete complex computations, however, adding a fourth and fifth set seem to make the project look too clustered and confusing. For this reason, we have decided to omit the addition of more than three sets.

Step 1) if the user has been given this alert, they likely completed the following sets. Locate the "Add Circle" button. The process behind the addition of the extra set can be viewed in **Section 5.6**. Once the user has three sets enabled, they may see a project that looks like the following.



Step 2) Upon clicking the "Add Circle" button, the project will see that there are already three circles being used and pass the following alert back to the user.

Duplicate Item (Word Bank):

Duplicate word bank items mean that within the word bank, the application can house multiple items baring the same name and having different IDs. For our project, we decided this would not be a good idea as it would cause much confusion. To mediate this static control, we allowed for the user to create multiple Diagram Items. More on that in **Section 7.2.1**. For the word bank, the text is checked against every other item in the word bank, if an item matches, it will not be added into the word bank.

There are several controls in place to ensure that this functions correctly. For example, when an item is added into the word bank, an item with the same name may not be added. However, when said item is removed from the list, it can then be added back by entering it into the word bank once more. (This item will have a different ID and different default options bound to it).

Step 1) Start by building a word bank with items similar to **Figure 40.**

Step 2) Try to add a duplicating item into the word bank.

Step 3) The user will receive the following alert telling them that the tag already exists within this word bank. This becomes especially useful when the user has a long list of items and they may repeat themselves. This control helps the user to keep track of what has and has not been logged.

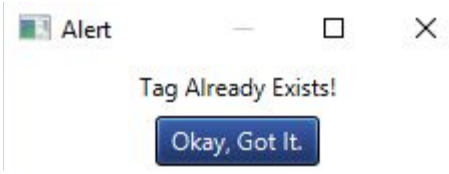
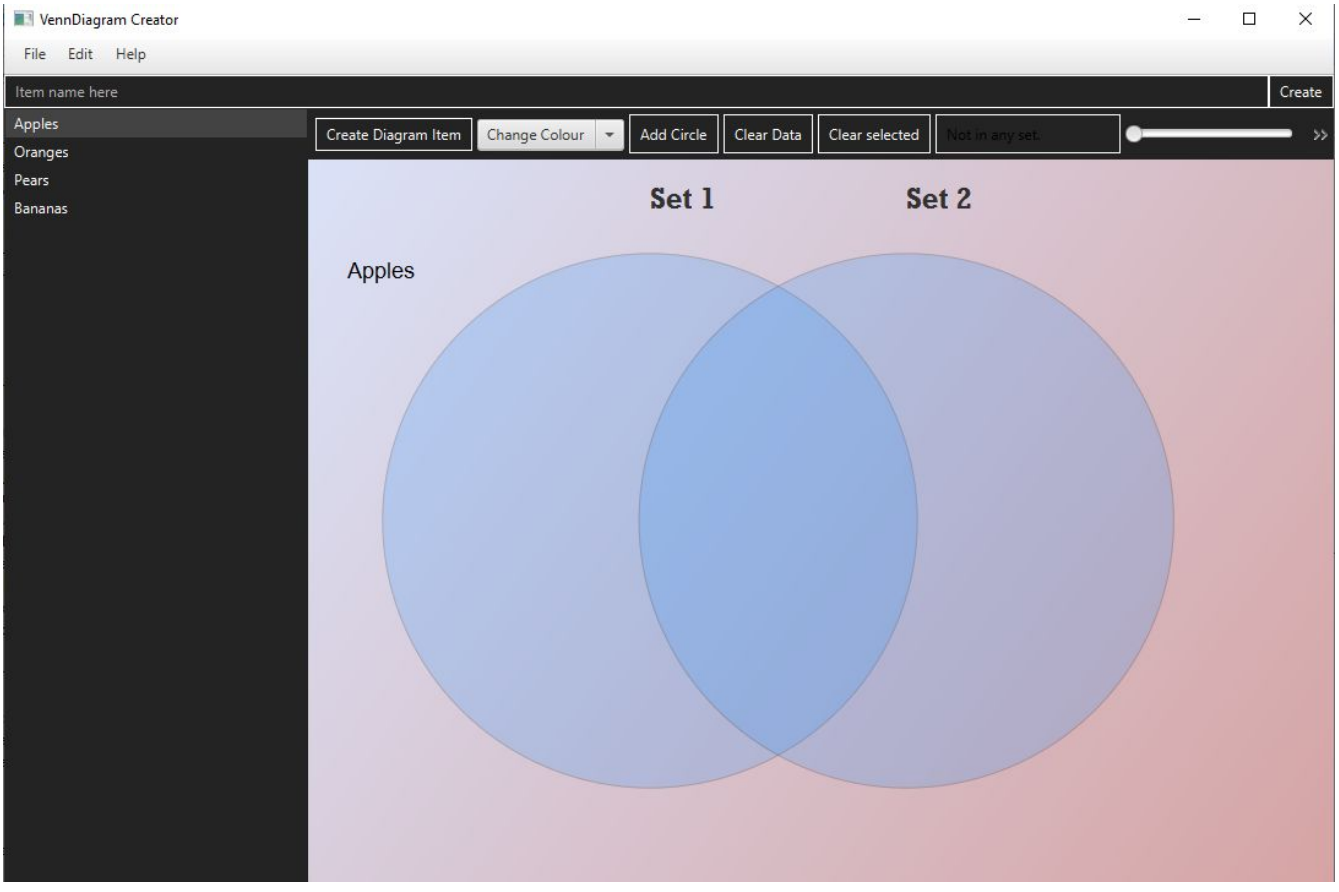


Figure 40.2 Shows the alert that the user receives when trying to add a duplicate item.

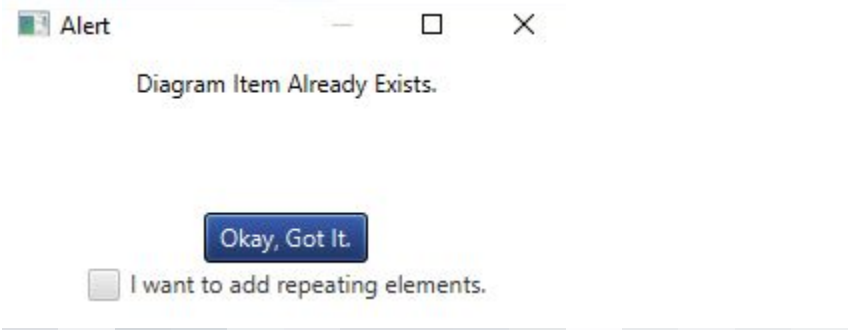
Duplicate Item (Diagram Item):

As mentioned in the previous section, since we did not allow for duplicates in the word bank, we allowed for the option of duplicate items as Diagram Items. At first the user will be unable to do this. They will receive an alert telling them that the item they are creating already exists. However, the user can override this. Follow the next few steps to complete this action.

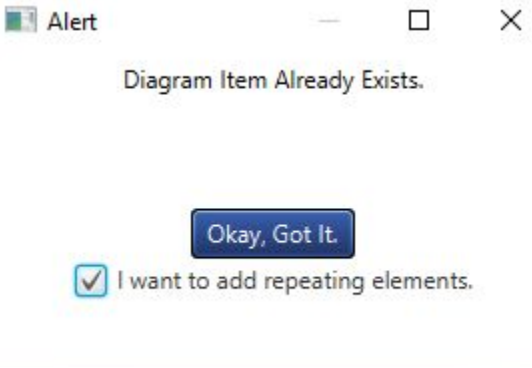
Step 1) Create a project with a populated word bank and create a Diagram Item. **Figure 41** is an example of a project with a Diagram Item on it.



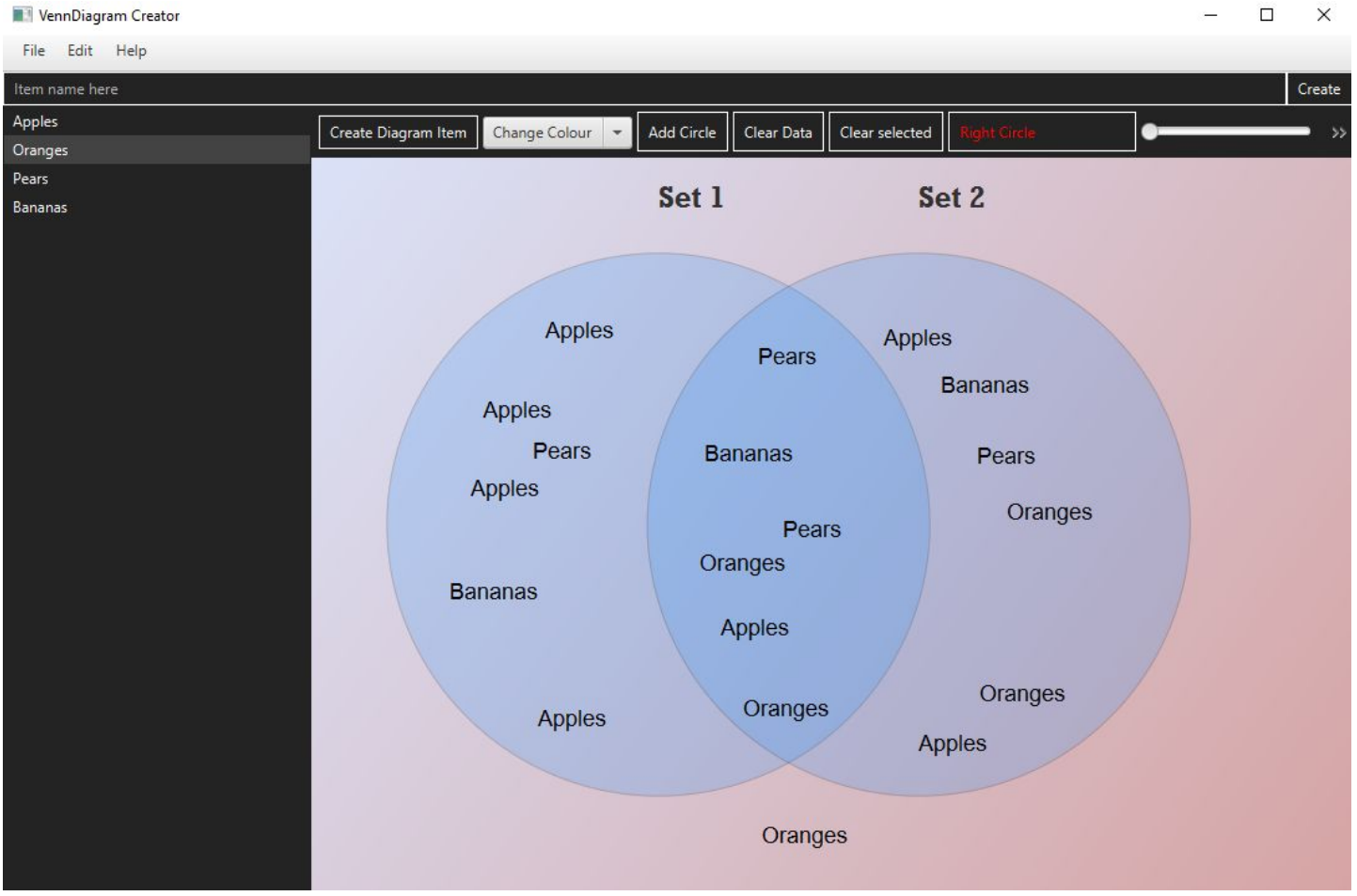
Step 2) When the user attempts to create another Diagram Item using the same Word Bank item, they will be given an error that looks like **Figure 41.1**.



Step 3) This is a dynamic control. It can be changed such that duplicate items are allows. **Figure 41.2** shows the alert that the user is given when attempting to create a duplicate item. If the user checks off the check box labelled “I want to add repeating elements”, this lets the project know that the user understands the implications that come along with duplicate diagram items. After this is checked off, users are allowed to use Word Bank items to create as many Diagram Items as they desire. However, be aware that when once Diagram Item is removed, the Word Bank item will also be removed. This leaves the remaining children of the parent word unbound.



Step 4) The final step is to create as many Diagram Items as you desire, after the previous steps are followed, the restrictions on repeating items is lifted. **Figure 41.3** shows the state of the project with multiple duplicates.

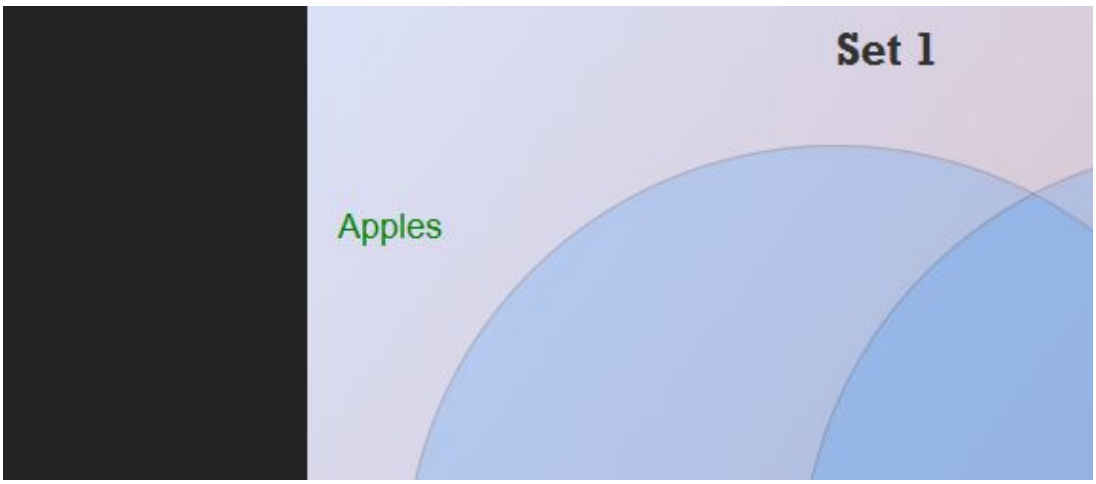


Disclaimer This setting can be reverted using the “Restore Default” option. This is discussed in depth in **Section 5.8**.

Miscellaneous Controls (Bounds checker):

The drag and drop functionality allows the user to have great control over their item, and precision in its placement. One issue with this is the fact that the item may be dragged off screen or into a spot where the bounds for that item are not defined. Because of this, there has been a control put in place where the item will revert itself to its last correct placement. The following figures show this in action.

After the drop is detected, a series of calculations are done to determine if the item has been placed out of bounds. If it is determined that the object is out of bounds (Like the above case) then the item will be placed in its last known correct coordinates. If the item has not been placed out of bounds, the placement will occur normally.



8.0) Referenced Images and Work:

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