

## **Lab 3: Average Units Shipped By Employee**

Lab Assignment for NETD2202 – Net Development I

Prior to attempting this assignment you should...

1. Read Chapters 1, 2, 3, 4, 5, 6, and 8.
2. Attend Class
3. Watch [2D and Jagged Array Videos](#)
4. Watch [GIT Videos](#)
5. Sample Code...
  - [VB - 2D Array Demo](#)
  - [VB - Jagged Array Demo](#)

This lab is to be completed individually.

Analyze the problem, code and test a solution. Submit (.zip) your solution, desk-check, and the GitHub URLs for the Lab 1 and 2. **IMPORTANT** do not create a repository for Lab 3, the repository for Lab 3 should be create during Lab 4 and the URL for Lab 3 will also be submitted with the Lab 4 submission.

### **Demonstrates**

- Visual Studio (Ch. 1)
- Constants and Variables (Ch. 4)
- Use of controls (Ch. 2)
  - Setting Properties Statically
  - Setting Properties Dynamically
- Adherence to the Style Guide
- Events (Ch. 6)
- If/Elseif (Ch. 5)
- Methods (Functions and Subroutines) (Ch. 6)
- Two Dimensional Array(s) (Ch. 8)
  - Array of Integers
- Loops (Ch. 5)

## Client Requirements

Your company had been contracted to create a windows application in Visual Basic to calculate the average number of units shipped per week. The client liked it so much that they decided to expand the scope of the project to include an employee component.

Your solution will take an input for each day in the week numbered from 1 to 7, but the functionality will be extended to record the information for 3 employees. The user input data will need to be validated and, if it passes validation, the data will need to be displayed to the user. Once the number of units has been entered for the 7<sup>th</sup> day for the 3<sup>rd</sup> employee the solution will calculate and display the average per employee, as well as, the company average.

As well, the solution will not allow the user to strike the enter key or input any more data until the form is Reset/Cleared.

The solution should also allow the user to exit the program regardless of the state of the form, in other words. The user can exit at any time.

You can either use you original application as your starting point, but you must maintain a copy of the original code for backwards compatibility. So, before starting please ensure you have an account created with GitHub. And, ensure the original Average Units Shipped code is Committed and Pushed to your GitHub repository.

As part of the company audit process you will be expected to submit your code, a desk-check for the quality assurance department, and a link to your GitHub account specifically to the original set of code.

## Instructions from the UX (User Experience) Department

The application window is titled "Average Units Shipped By Employee". It features a "Units:" input field at the top, followed by three columns for "Employee 1", "Employee 2", and "Employee 3". Each column contains a list of numbers (1-7) and a text area for input. At the bottom, there are "Enter", "Reset", and "Exit" buttons.

**Screenshot 1 (Top Left):** Day 2. Units: 1001. A message box is displayed: "Please ensure the units shipped are between 0 and 1000!".

**Screenshot 2 (Top Right):** Day 2. Units: 1001. The message box is closed. The "Enter" button is highlighted.

**Screenshot 3 (Middle Left):** Day 1. Units: (empty). Employee 1 data: 1000, 146.57. Employee 2 and 3 are empty.

**Screenshot 4 (Middle Right):** Day 7. Units: (empty). Employee 1 data: 1000, 146.57. Employee 2 data: 10, 20, 30, 40, 50, 60.

**Screenshot 5 (Bottom Left):** Done. Units: (empty). Employee 1 data: 1000, 146.57. Employee 2 data: 10, 20, 30, 40, 50, 60, 70, 40.00. Employee 3 data: 100, 200, 300, 400, 500, 600, 700, 400.00. Overall average: 195.67.

**Screenshot 6 (Bottom Right):** Day 1. Units: (empty). All employee data areas are empty.

1. The form should...
  - Not allow maximizing or minimizing of the screen.
  - Have its title bar set to something meaningful.
  - Ensure its Accept and Cancel buttons are set.
  - Open in the centre of the screen.
  - Be named as per our development style guide.
2. All buttons should...
  - Have their tab indexes set.
  - Have its text set appropriately using access keys (&) to ensure efficiency.
  - Have a tool tip to ensure the user understands the purpose of the key.
  - Be named as per our development style guide.
3. Result/Output Label should...
  - Have its tab index set.
  - Not be allowed to auto size
  - Have its text set to an empty string.
  - Have its text in the text box should be aligned MiddleCenter.
  - Have a tool tip to ensure the user understand the purpose of the control.
  - Have a 3D border style.
  - Be named as per our development style guide.
4. Labels that are used strictly for the purpose describing the use of another control like Label to TextBox, and appear to the left of the control they are describing should...
  - Have their tab indexes set.
  - Not be allowed to auto size.
  - The text should be aligned MiddleRight.
  - Have its text set appropriately using access keys (&) to ensure efficiency.
  - Be named as per our development style guide.
5. Labels that are used strictly for the purpose describing the use of another control like Label to TextBox, and appear to the above of the control they are describing should...
  - Have their tab indexes set.
  - Not be allowed to auto size.
  - The text should be aligned MiddleCenter.
  - Be named as per our development style guide.
6. Input text box should...
  - Have their tab indexes set.
  - Text should be empty.
  - Have a tool tip to ensure the user understands the purpose of the control.
  - Be named as per our development style guide.

7. Entry Display text box should...
  - Have its tab indexes set.
  - Text should be empty.
  - Have a tool tip to ensure the user understand the purpose of the control.
  - Be named as per our development style guide.
8. ToolTip control should be named as per our development style guide

### **User Input Flow**

1. The user should be allowed to exit the solution by either...
  - Clicking the Exit Button with the mouse on the screen.
  - Clicking the Control Box with the mouse on the screen.
  - Tabbing to the Exit Button and Tapping Enter on the keyboard.
2. The user should be allowed to reset the screen by...
  - Clicking the Reset Button with the mouse on the screen.
  - Tapping the Esc Key on the keyboard,
  - Tabbing to the Reset Button and Tapping Enter on the keyboard.
3. The user will enter a number representing units shipped into a text box and then will...
  - Tap the Enter Key on the keyboard.
  - Click the Enter button with the mouse on the screen.
  - Tab to the Enter Button and Tapping Enter on the keyboard.
4. Once the units shipped has been entered the...
  - Input text box should be cleared.
  - Entry Display text box should show any existing entries, as well as, the new entry.
5. Input...
  - 1<sup>st</sup> set of seven entries should be displayed in the Employee 1 Entry Display text box and should also be entered in a 2 dimensional array, by employee (0) and day (0-6).
    - Once the 7 entries for the 1<sup>st</sup> employee are complete, calculate average for the 1<sup>st</sup> employee and display the average in appropriate Output Label for the 1<sup>st</sup> employee.
  - 2<sup>nd</sup> set of seven entries should be displayed in the Employee 2 Entry Display text box and should also be entered in the, above mentioned, 2 dimensional array, by employee (1) and day (0-6).
    - Once the 7 entries for the 2<sup>nd</sup> employee are complete, calculate average for the 2<sup>nd</sup> employee and display the average in appropriate Output Label for the 2<sup>nd</sup> employee.
  - 3<sup>rd</sup> set of seven entries should be displayed in the Employee 3 Entry Display text box and should also be entered in the, above mentioned, 2 dimensional array, by employee (2) and day (0-6).

- Once the 7 entries for the 3<sup>rd</sup> employee are complete, calculate average for the 3<sup>rd</sup> employee and display the average in appropriate Output Label for the 3<sup>rd</sup> employee
  - Also, calculate the company and display the company average in appropriate Output Label for the company
- 6. Once input for 7 days and 3 employees is complete has been entered the user should...
  - Be prevented from entering any more data, until the reset button is clicked, by ...
  - Making the user input text box read only.
  - Disabling the Enter Button.
- 7. If the user wishes to enter a new week's set of data they will need to...
  - Click the Reset button with the mouse on the screen.
  - Tap the Esc key on the keyboard.
  - Tab to the Reset Button and Tapping Enter on the keyboard.

## Instructions from the Business Analyst

1. The client requires that the user must input the units shipped for each of the 7 days in a week, numbered 1 to 7 for each of 3 employees.
2. For the units shipped to be valid it must be...
  - A whole number only...
    - Displaying an Validation error message if a whole number was not entered
    - And, for maximum efficiency, the invalid entry should be selected in the entry text box so the user is not required to clear out the text box to make a valid entry.
  - Between 0 and 1000 inclusive
    - Displaying a Validation error message that the number entered was not in the appropriate range and display the range in the message.
    - And, for maximum efficiency, the invalid entry should be selected in the entry text box so the user is not required to clear out the text box to make a valid entry.

## Instructions from the Tech Lead

1. All classes and the form must be set to `Option Strict On`.
2. Reset...
  - Should have its own Method (subroutine).
  - Should clear/reset the form level variables, as well as, input and output controls.
3. If the units shipped is valid...
  - It will need to be stored in a 2 dimensional array for the processing section of the solution
    - Units shipped will be stored in array by employee (0-2) and by day (0-6) day. (So, the first employee's first day will have an index of (0,0).)
  - Units will need to be displayed on the screen in a multiline text box (Display Entry), one per employee, with each entry appearing on a different line (vbCrLf), so the user can easily see what has already been entered.
4. Once the user has entered valid units shipped for all 7 days for a single employee, the solution needs to
  - Loop the array to sum the shipped units in the array elements for that specific employee
  - Use the sum of the units shipped to calculate the average units sold.
  - Display the average for the specific employee in the appropriate Output Label for that specific employee.
  - Suggestion: Create a function that will take the array and employee index as parameters and loop the array and calculating for that specific index.
5. Once the user has entered valid units shipped for all 7 days for all the employees, the solution needs to...
  - Loop the array to sum the shipped units in the array elements
  - Use the sum of the units shipped to calculate the company average units shipped.
  - Suggestion: Create a function that will take the array as a parameter and for each employee call the function above storing the value calculated for each employee and then dividing that by the number of employees.
  - Display the company average in the appropriate Output Label.
  - Prevent the user from entering any more data, until the reset button is clicked, by...
    - Making the user input text box read only and Disabling the Button that controls (Enabled = False)
6. The average units shipped will then be displayed to the user formatted to 2 decimal places.
7. Questions: Tech Lead is Alfred at [alfred.massardo@durhamcollege.ca](mailto:alfred.massardo@durhamcollege.ca).

Video URL: [https://www.youtube.com/watch?v=v-uoETLurkQ&list=PLES7udHg\\_THCwp8EWohOjUyOiNUCjzSly](https://www.youtube.com/watch?v=v-uoETLurkQ&list=PLES7udHg_THCwp8EWohOjUyOiNUCjzSly)

2D Array Demo URL : <https://github.com/pmassardo/DemoJaggedArray>

Jagged Array Demo URL: <https://github.com/pmassardo/DemoIfLoopArrayVB>