

FIT1013 Digital Futures: IT for Business
Week 4: Developing an Excel Application
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On completion of your study this week, you should aim to:

- Create an Excel application
- Use defined names in formulas
- Create validation rules for data entry
- Learn about macro viruses and Excel security features
- Create and run a macro
- Edit a macro using the Visual Basic Editor
- Assign a macro to a keyboard shortcut and a button
- Save and open a workbook in macro-enabled format

Reference: Excel 2016, Module 7



Visual Overview: Excel Application and Defined Names

Left Screenshot: Registration Data Table

- The Name box** displays the cell reference or the defined name of the selected cell.
- You can make the Name box longer so you can see the complete defined names by dragging its sizing handles.
- An **Excel application** is a spreadsheet written or tailored to meet specific needs. It typically includes reports and charts, a data entry area, and a custom interface, as well as instructions and documentation.
- When you click the Name box arrow, a list of all of the defined names in the workbook opens.
- An application includes an input area to enter and edit data. You can set what types of values can be entered and where the user can enter data.

Right Screenshot: Receipt Form

- A **defined name** (often called a **range name**) is a word or string of characters assigned to a cell or range.
- The Defined Names group on the Formulas tab contains buttons to create, edit, delete, and manage defined names.
- If the formula is too long to display in the formula bar, you can expand the formula bar so that the entire formula is visible.
- You can click the Expand/Collapse Formula Bar button to expand or collapse the formula bar.
- Defined names make entering formulas faster and make the formulas easier to understand.
- An application often includes an area with formulas, labels, and so forth to generate output, such as a report or chart, that is based on the input data. Users cannot enter data into the output area.

Reference : Module 7, NP Perspectives Excel 2016

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Planning an Excel Application

- An Excel application is a spreadsheet written or tailored to meet specific needs
- Planning includes designing how the worksheet(s) will be organized; you can:
 - Enter and edit data (setting where and what types of data can be entered)
 - Store data after it has been entered
 - Use formulas to manipulate and perform calculations on data
 - Display outputs, such as reports and charts

Naming Cells and Ranges

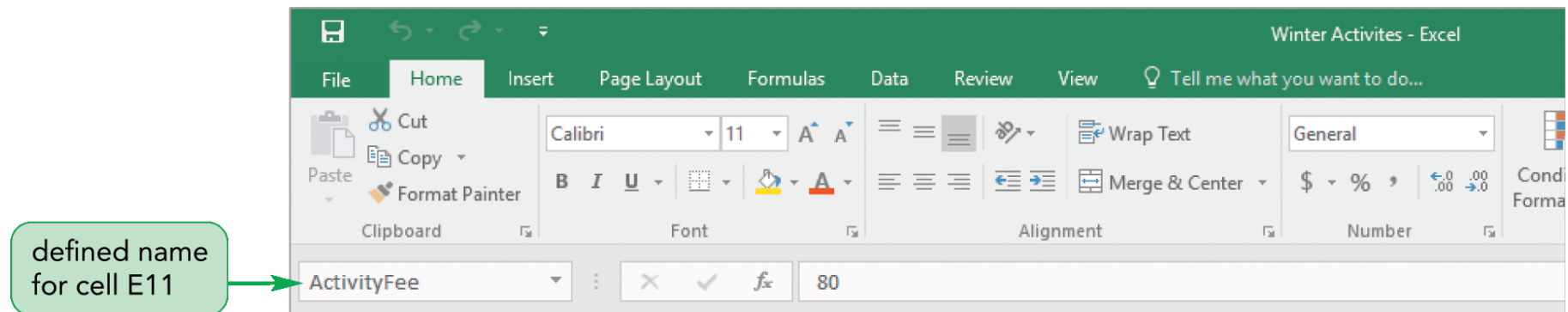
- Cell and range references do not indicate what data is stored in those cells
- You can use a **defined name** to assign a meaningful, descriptive name to a cell or range
- A **defined name** enables you to quickly navigate within a workbook to the cell or range with the defined name
- You can use defined names to create more descriptive formulas

Naming Cells and Ranges

- Rules for naming cells or ranges
 - Must begin with a letter or _
 - Can include letters and numbers as well as periods and underscores, but not other symbols or spaces
 - Use an underscore between the words or capitalize the first letter of each word
 - Cannot be a valid cell address, function name, or reserved word
 - Can include as many as 255 characters
 - The name is not case sensitive

Naming Cells and Ranges

- Using the **Name Box** to Create Defined Names
 - The Name box is a quick way to create a defined name for a selected cell or range



Naming Cells and Ranges

- Selecting Cells and Ranges by Their Defined Names
 - The **Name box** displays all of the defined names in a workbook
 - Click a name in the Name box list to quickly select the cell or range referenced by that name

Naming Cells and Ranges

- Creating Defined Names by Selection
 - Quickly define names without typing them if the data is organized as a **structured range of data** with labels in the first or last column, or in the top or bottom row
 - Defined names are based on the row or column labels

Naming Cells and Ranges

- Editing and Deleting Defined Names
 - The [Name Manager dialog box](#) lists all of the names currently defined in the workbook, including Excel table names
 - In addition to the name, it identifies the current value for that name as well as the worksheet and cell or range it references
 - Use the Name Manager dialog box to create a new name, edit or delete existing names, and filter the list of names

Using Defined Names in Formulas

- Defined names make formulas simpler to enter and understand
- To use a defined name in a formula:
 - Enter the formula as usual
 - As you type a defined name in a formula, the Formula AutoComplete box appears, listing functions and defined names that begin with the letters you typed
 - You can double-click the name you want in the Formula AutoComplete box or press the Tab key
 - **See Ex 403**

Using Defined Names in Formulas

- Adding Defined Names to Existing Formulas
 - You might name cells after creating formulas in the worksheet or you might not use the names
 - Because defined names are not automatically substituted for the cell addresses in a formula, you can replace cell addresses in existing formulas in the worksheet with their defined names to make the formulas more understandable
 - **See Ex 404**
 - **MARS VZ4I0C**

Visual Overview: Data Validation and Protection

Worksheet protection
Limits users' ability to modify the worksheet's contents, structure, or formatting.

Workbook protection
Limits users' ability to make changes to the workbook's structure and windows.

A red triangle indicates that the cell contains a comment. Point to the cell to display the comment box.

Cells for data entry must be unlocked before the worksheet is protected so that users can enter and edit data in these cells.

You can use data validation to create a set of rules that determine what users can enter in a specific cell or range. For example, Shirt Size entries must match the sizes listed in the Youth Information.

An input message appears when the cell becomes active and can be used to specify the type of data the user should enter in that cell. This input message reminds users to select one of the shirt sizes in the list.

When the arrow button is clicked, a list of the possible entries, as specified in the validation rule, appears. This list shows the shirt sizes that users can select.

A comment is a text box that is attached to a specific cell in a worksheet in which you can enter notes.

Cells with data or formulas that you do not want to change are usually locked before the worksheet is protected so that users cannot accidentally over-write existing data by entering new data in these cells.

An error alert appears if a user tries to enter a value in a cell that does not meet the validation rule, as in the case when a user enters an invalid shirt size.

Registration Date	Youth Name	Grade	Shirt Size
12/4/2017	Dakota Thompson	G6	M
	Kids Game Night		
	Kids in the Kitchen		
	Modern Manners		

Grade	Shirt Size
G3	XS
G4	S
G5	M
G6	L
	XL

Invalid Shirt Size

An invalid Shirt Size has been entered. Click Cancel, and then use the arrow to select the Shirt Size.

Only Cancel OK

Validating Data Entry

- To ensure that correct data is entered and stored in a worksheet, you can use data validation
- Each **validation rule** defines criteria for the data that can be entered and stored in a cell or range
- You can add input and error alert messages for the user to that cell or range
- You specify the validation criteria, the input message, and the error alert for the active cell in the Data Validation dialog box

Validating Data Entry

- Specifying Validation Criteria

- When creating a validation rule, you specify the type of data that is allowed as a list or range of acceptable values (called **validation criteria**)

Type	Acceptable Values
Any value	Any number, text, or date; removes any existing data validation
Whole Number	Integers only; you can specify the range of acceptable integers
Decimal	Any type of number; you can specify the range of acceptable numbers
List	Any value in a range or entered in the Data validation dialog box separated by commas
Date	Dates only; you can specify the range of acceptable dates
Time	Times only; you can specify the range of acceptable times
Text Length	Text limited to a specified number of characters
Custom	Values based on the results of a logical formula

Validating Data Entry

- Creating an **Error Alert Style** and **Message**
 - An error alert determines what happens after a user tries to make an invalid entry in a cell that has a validation rule defined
 - The three error alert styles are:
 - **Stop:** Prevents the entry from being stored in the cell
 - **Warning:** Prevents the entry from being stored in the cell unless the user overrides the rejection and decides to continue using the data
 - **Information:** Accepts the data value entered, but allows the user to choose to cancel the data entry

Validating Data Entry

- Creating an **Input Message**

- One way to reduce the chance of a data-entry error is to display an input message when a user makes the cell active
- An input message provides additional information about the type of data allowed for that cell
- Input messages appear as ScreenTips next to the cell when the cell is selected
- Can add an input message to a cell even if you don't set up a rule to validate the data in that cell




Validating Data Entry

- Creating a **List Validation Rule**
 - Use the data validation feature to restrict a cell to accept only entries that are on a list you create
 - Create the list of valid entries in the Data Validation dialog box or use a list of valid entries in a single column or row
 - Once you create a list validation rule for a cell, a list box with the possible values appears when the user selects the cell

Validating Data Entry

- Testing Data Validation Rules
 - Test validation rules by entering incorrect values that violate the validation rules
 - The only way an error occurs in cells that have a list validation is if an incorrect entry is typed or pasted in the cell
 - Entering invalid data will ensure that validation rules work as expected

Types of data entry messages available

Icon	Type of Alert	Label on Button	Action If Button Clicked
	Warning	Continue Yes	value entered in cell; processing continues
		Continue No	value entered in cell; Excel stops, waiting for you to enter another value
		Cancel	value not entered in cell
	Information	OK	value entered in cell
		Cancel	value not entered in cell
	Stop	Retry	
		Cancel	

Data Validation

OPTIONS IN THE ALLOW LIST BOX	
ALLOW	DESCRIPTION
Any Value	Any value can be entered into the cell.
Whole Number	The cell will accept only integers. A validation rule can further specify the range of acceptable integers.
Decimal	The cell will accept any type of numeric value. A validation rule can further specify the range of acceptable values.
List	The cell will accept only values from a list. The list can be taken from a range of cells in the worksheet, or the list of values can be entered directly into the dialog box, with the values separated by commas.
Date	The cell will accept only dates. A validation rule can further specify the range of acceptable dates.
Time	The cell will accept only times. A validation rule can further specify the range of acceptable times.
Text Length	The cell will accept only text of a specified number of characters.
Custom	The validation rule will be based on an Excel logical formula.

Excel interface showing a worksheet with data and a Data Validation dialog box.

Worksheet Data:

Registration Data		Youth Information		
Registration Date		Activity	Grade	Shirt Size
1/12/17		First Friday	G3	XS
	Kristen Russell	Kids Game Night	G4	S
	Kids in the Kitchen	G5	M	
	Modern Manners	G6	L	
			XL	

Registration Fee/Discount	
Activity Fee	80
Rockport Discount	5

Activity Registration Receipt

Rockport Youth Center
727 Main Street
Rockport, IN 47635

Registration Date: 1/12/17

Guardian	Trevor Russell	Youth Name	Kristen Russell
Address	2400 S. Kozy Dr.	Activity	Kids Game Night
City, State Zip	Rockport, IN 47635	Grade	G5
Telephone	812-555-3375	Shirt Size	S

Data Validation Dialog Box:

Settings | Input Message | Error Alert

Validation criteria

Allow: Date ☐ Ignore blank

Data: greater than or equal to

Start date: =1/1/2017

☐ Apply these changes to all other cells with the same settings

Clear All | Cancel | OK

Data Validation

Data Validation

Settings Input Message Error Alert

Validation criteria

Allow: List ☒ Ignore blank

Data: between ☒ In-cell dropdown

Source: =\$D\$4:\$D\$7

☐ Apply these changes to all other cells with the same settings

Clear All Cancel OK

Data Validation

Settings Input Message Error Alert

☒ Show input message when cell is selected

When cell is selected, show this input message:

Title: Activity

Input message: Click the arrow to select the Activity.

Clear All Cancel OK

Data Validation

Settings Input Message Error Alert

☒ Show error alert after invalid data is entered

When user enters invalid data, show this error alert:

Style: Stop Title: Invalid Activity

Error message: An invalid Activity has been entered. Click Cancel, and then use the arrow to select a valid Activity.

Clear All Cancel OK

Registration Data	
Registration Date	1/12/17
Youth Name	Kristen Russell
Activity	Kids Game Night
Grade	G5
Shirt Size	S
Rockport Resident	Yes
Guardian	Trevor Russell
Address	2400 S. Kozy Dr.
City, State Zip	Rockport, IN 47635
Telephone	812-555-3375

Registration Data		Youth Information		
Registration Date	1/12/17	Activity	Grade	Shirt Size
Youth Name	Kristen Russell	First Friday	G3	XS
Activity	sdsd	Kids Game Night	G4	S
Grade	G5	Kids in the Kitchen	G5	M
Shirt Size	S	Modern Manners	G6	L
Rockport Resident	Yes			XL
Guardian	Trevor Russell	Registration Fee/Discount		
Address	2400 S. Kozy Dr.	Activity Fee	80	
City, State Zip	Rockport, IN 47635	Rockport Discount	5	
Telephone	812-555-3375			

Invalid Activity

An invalid Activity has been entered. Click Cancel, and then use the arrow to select a valid Activity.

Cancel Retry

MARS

Protecting a Worksheet and a Workbook

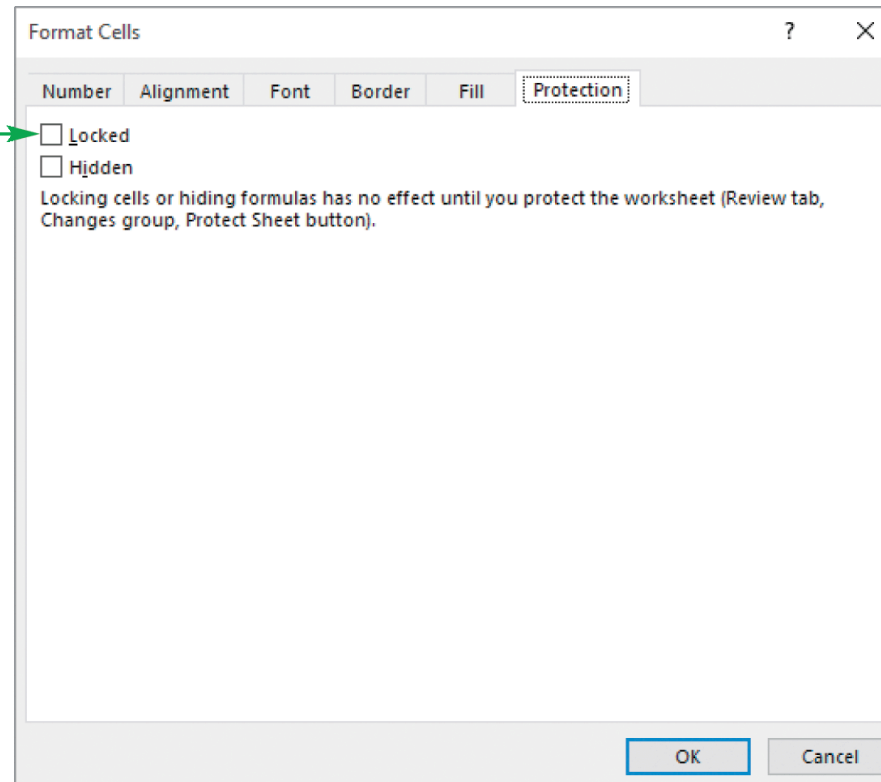
- Another way to minimize data-entry errors is to limit access to certain parts of the workbook
- **Worksheet protection** prevents users from changing cell contents, such as editing formulas in a worksheet
- **Workbook protection** also prevents users from changing the workbook's organization, such as inserting or deleting worksheets in the workbook
- You can keep users from viewing the formulas used in the workbook

Protecting a Worksheet and a Workbook

- Locking and Unlocking Cells
 - Every cell in a workbook has a **locked property** that determines whether changes can be made to that cell
 - The locked property has no impact as long as the worksheet is unprotected
 - After you protect a worksheet, the locked property controls whether the cell can be edited
 - Unlock a cell by turning off the locked property
 - By **default**, the locked property is turned **on** for each cell, and worksheet protection is turned **off**

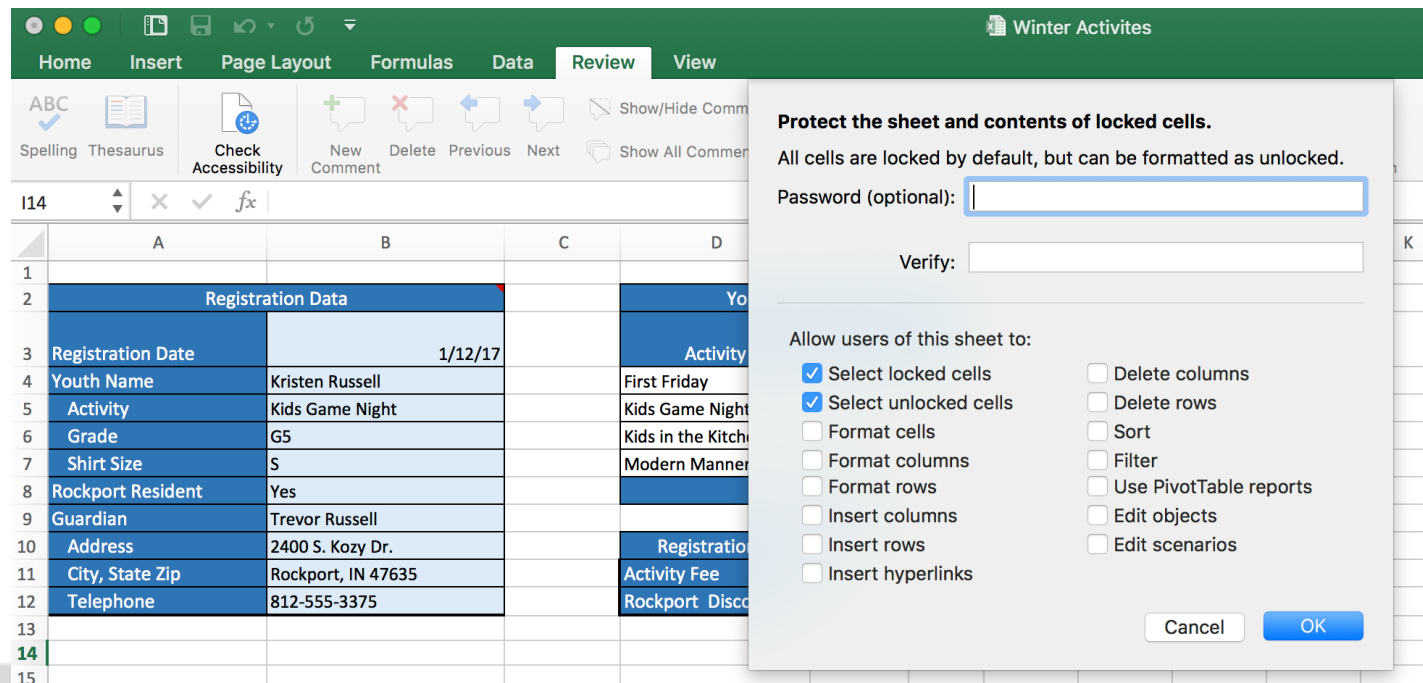
Protecting a Worksheet and a Workbook

Locked property
is turned off for
the selected cells



Protecting a Worksheet and a Workbook

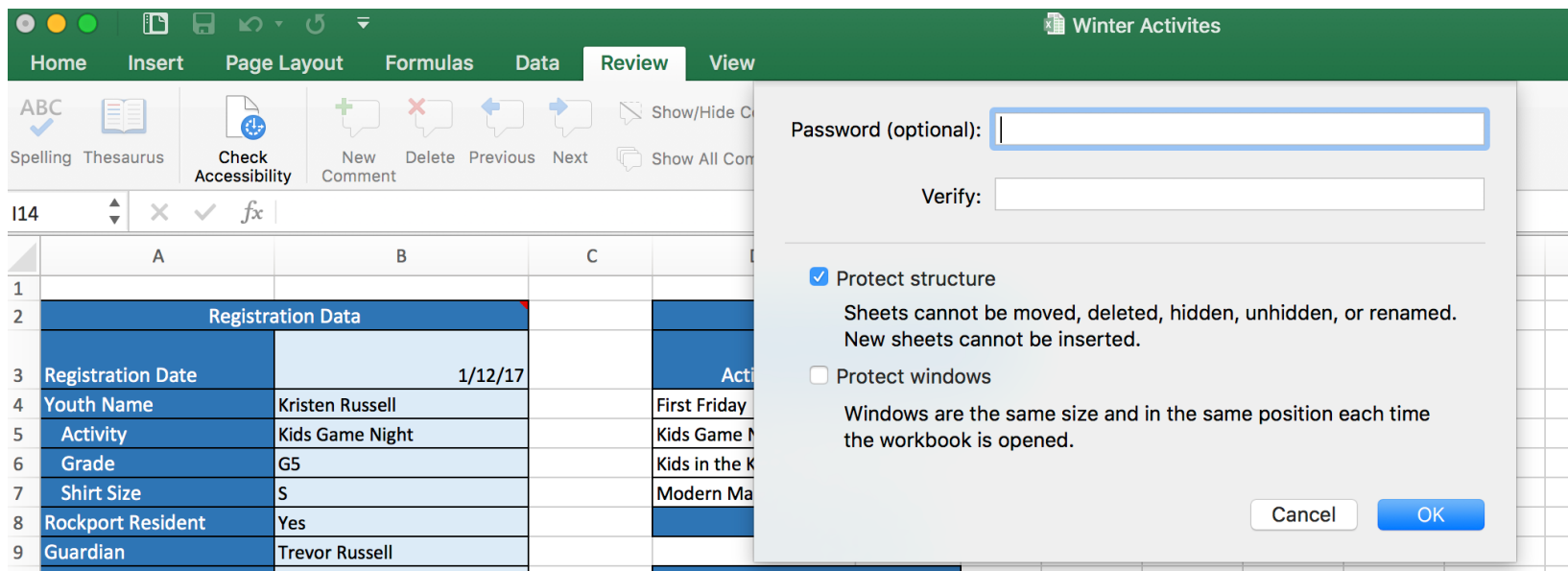
- Protecting a **Worksheet**
 - When you set up worksheet protection, you specify which actions are still available to users in the protected worksheet
 - You can limit the user to selecting only unlocked cells, or allow the user to select any cell in the worksheet; these choices remain active as long as the worksheet is protected
 - A protected worksheet can always be unprotected
 - You can add a password that must be entered to turn off the protection



Protecting a Worksheet and a Workbook

■ Protecting a **Workbook**

- Worksheet protection applies only to the contents of a worksheet, not to the worksheet itself
- To keep a worksheet from being modified, you need to protect the workbook
- You can protect both the structure and the windows of a workbook
- Protecting the structure prevents users from renaming, deleting, hiding, or inserting worksheets



Protecting a Worksheet and a Workbook

- **Unprotecting** a Worksheet and a Workbook
 - You can turn off worksheet protection at any time
 - You must unprotect a worksheet to edit its contents
 - You can unprotect the workbook
 - If you need to insert a new worksheet or rename an existing worksheet, you can unprotect the protected workbook, make the changes to the structure, and then reapply workbook protection

Inserting Comments

- Comments are often used in workbooks to:
 - Explain the contents of a particular cell, such as a complex formula
 - Provide instructions to users
 - Share ideas and notes from several users collaborating on a project
- If you collaborate on a workbook, the top of the comment boxes would show the name of each user who created that comment
- A small red triangle appears in the upper-right corner of a cell with a comment
- The comment box appears when you point to a cell with a comment

The screenshot shows the Microsoft Excel interface with the 'Review' tab selected. A comment box is visible for cell B2, displaying the name 'Stephen Maynard' and the text 'Enter all data from the Registration form into cells B3 through B12.' The spreadsheet contains a 'Registration Data' table with columns for Registration Date, Youth Name, Activity, Grade, and Shirt Size. The 'Registration Date' is 1/12/17. The 'Youth Name' is Kristen Russell. The 'Activity' is Kids Game Night. The 'Grade' is G5. The 'Shirt Size' is S. The 'Registration Fee/Discount' table shows an Activity Fee of 80 and a Rockport Discount of 5.

Registration Date	Youth Name	Activity	Grade	Shirt Size
1/12/17	Kristen Russell	Kids Game Night	G5	S

Registration Fee/Discount	
Activity Fee	80
Rockport Discount	5

MARS

Tutorial Activities

- Learn about macro viruses and Excel security features
- Create and run a macro
- Edit a macro using the Visual Basic Editor
- Assign a macro to a keyboard shortcut and a button
- Save and open a workbook in macro-enabled format

Summary

- Excel application
- Defined names in formulas
- Validation rules for data entry
- Excel security features
- Excel Macros
- Homework
 - Go through Excel Tutorial 7
 - Attempt Quiz
- Next week
- Fundamentals of Programming – Excel VBA