

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

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.

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.

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.

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.

**Registration Data Application Data:**

Registration Data		Youth Information	
Activity	12/1/2017	Activity	Grade
Activity Fee	Kristen Russell	First Friday	G3
Address	Kids Game Night	Kids Game Night	G4
City, State, Zip	GS	Kids in the Kitchen	G5
Guardian	5	Modern Manners	G6
Receipt Date	Yes		
Registration Date	Trevor Russell		
Rockport Resident	2400 S. Kozy Dr.		
Rockport Discount	Rockport, IN 47635		
Shirt Size	812-555-3375		
Telephone			

**Rockport Youth Center Application Data:**

Rockport Youth Center 727 Main Street Rockport, IN 47635	
Registration Date	10/1/2017
Youth Name	Kristen Russell
Activity	Kids Game Night
Grade	GS
Shirt Size	S
Activity Fee	80
Rockport Discount	5
Total	\$75

## 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

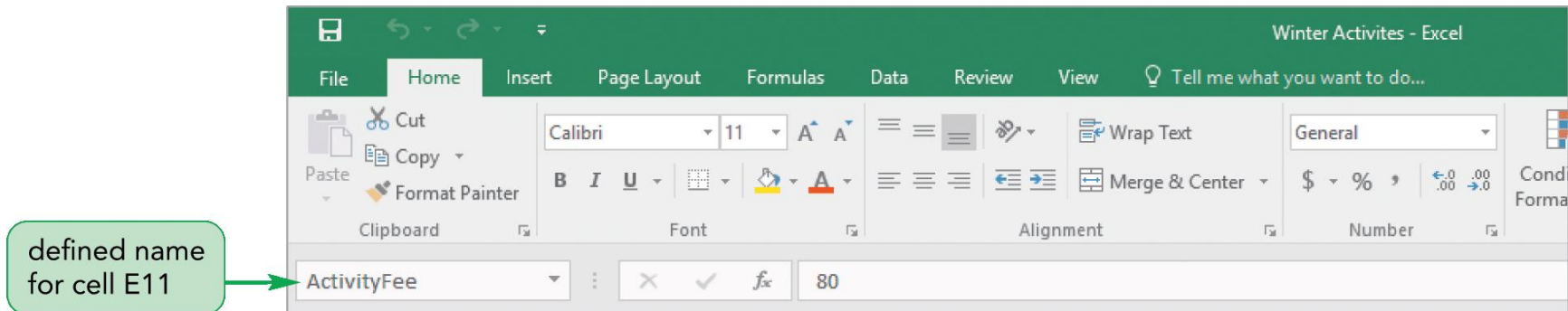
- Cell and range references do not indicate what data is stored in those cells
- You can use a **defined name** to assign a meaningful, descriptive name to a cell or range
- A **defined name** enables you to quickly navigate within a workbook to the cell or range with the defined name
- You can use defined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

# 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

# Visual Overview: Data Validation and Protection

The image displays two side-by-side screenshots of a Microsoft Excel spreadsheet titled "Winter Activities with Macros - Excel". The spreadsheet is used for managing registration data for winter activities.

**Left Screenshot:**

- Worksheet Protection:** A callout box explains that worksheet protection limits users' ability to modify the worksheet's contents, structure, or formatting.
- Data Validation:** A callout box explains that cells for data entry must be unlocked before the worksheet is protected so that users can enter and edit data in these cells. Another callout explains that 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 table.
- Input Message:** A callout box explains that 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.
- Comment:** A callout box explains that a red triangle indicates that the cell contains a comment (point to the cell to display the comment box).
- Registration Data Table:**

Registration Date	Youth Name	Activity	Grade	Shirt Size	Rockport Resident	Guardian Address	City, State Zip	Telephone
12/4/2017	Dakota Thompson	Kids Game Night	G6	M	Yes	1231 Main St	Rockport, IN 47635	812 555 8848
- Youth Information Table:**

Youth Name	Grade	Shirt Size
First Friday	G3	XS
Kids Game Night	G4	S
Kids in the Kitchen	G5	M
Modern Manners	G6	L
		XL
- Registration Fee/Discount Table:**

Registration Fee/Discount	Season Fee	Resident Discount
	80	5

**Right Screenshot:**

- Worksheet Protection:** A callout box explains that worksheet protection limits users' ability to make changes to the workbook's structure and windows.
- Comment:** A callout box explains that a comment is a text box that is attached to a specific cell in a worksheet, in which you can enter notes.
- Data Validation:** A callout box explains that 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 overwrite existing data by entering new data in those cells.
- Error Alert:** A callout box explains that 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 Data Table:**

Registration Date	Youth Name	Activity	Grade	Shirt Size	Rockport Resident	Guardian Address	City, State Zip	Telephone
12/4/2017	Dakota Thompson	Kids Game Night	G6	M	Yes	1231 Main St	Rockport, IN 47635	812 555 8848
- Youth Information Table:**

Youth Name	Grade	Shirt Size
First Friday	G3	XS
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Kids in the Kitchen	G5	M
Modern Manners	G6	L
		XL
- Registration Fee/Discount Table:**

Registration Fee/Discount	Season Fee	Resident Discount
	80	5

# 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.

Registration Data

Registration Date	Youth Name	Activity	Grade	Shirt Size
1/12/17	Kristen Russell	First Friday	G3	XS
	Kids Game Night	Kids Game Night	G4	S
	Grade	Kids in the Kitchen	G5	M
	Shirt Size	Modern Manners	G6	L
	Rockport Resident			XL
	Guardian			
	Address			
	City, State Zip			
	Telephone			

Registration Fee/Discount

Activity Fee	Rockport Discount
80	5

Activity Registration Receipt

Rockport Youth Center  
727 Main Street  
Rockport, IN 47635

Registration Date: 1/12/17

Guardian: Trevor Russell  
Address: 2400 S. Kozy Dr.  
City, State Zip: Rockport, IN 47635  
Telephone: 812-555-3375

Youth Name: Kristen Russell  
Activity: Kids Game Night  
Grade: G5  
Shirt Size: S

Data Validation dialog box:

Settings Input Message Error Alert

Validation criteria

Allow: Date

Data: greater than or equal to

Start date: =1/1/2017

Ignore blank

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			
Address	2400 S. Kozy Dr.			
City, State Zip	Rockport, IN 47635			
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

# Protecting a Worksheet and a Workbook

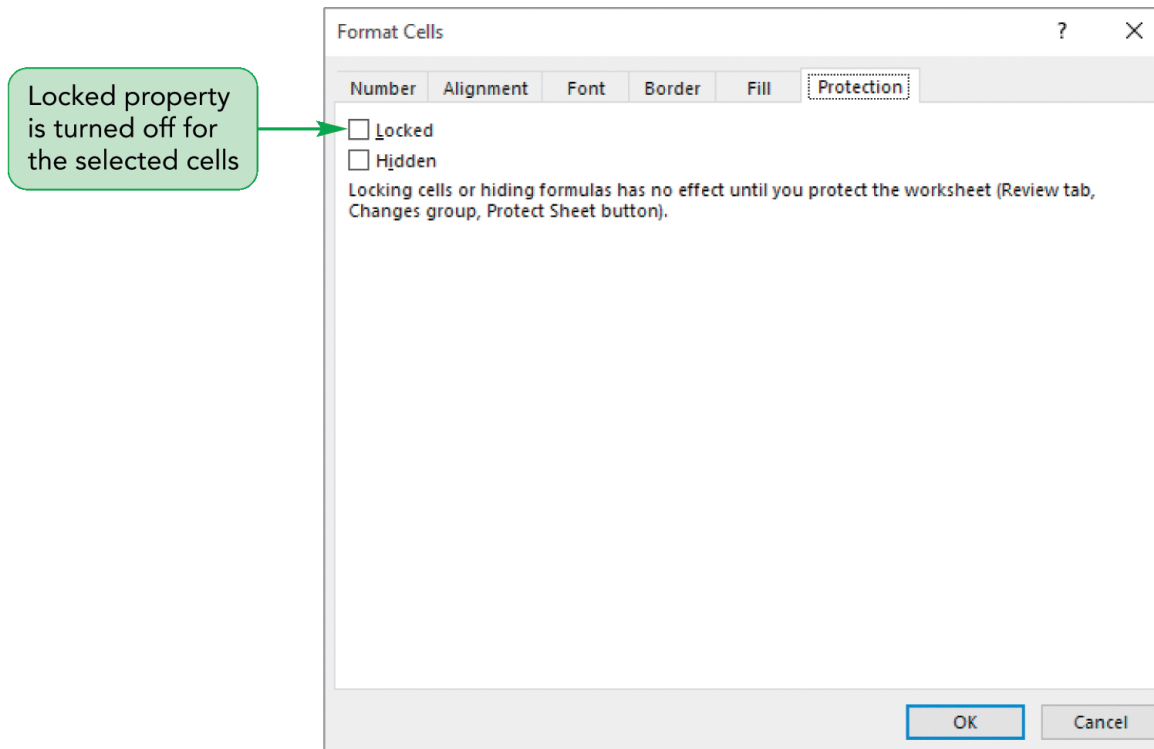
- Another way to minimize data-entry errors is to limit access to certain parts of the workbook
- **Worksheet protection** prevents users from changing cell contents, such as editing formulas in a worksheet
- **Workbook protection** also prevents users from changing the workbook's organization, such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

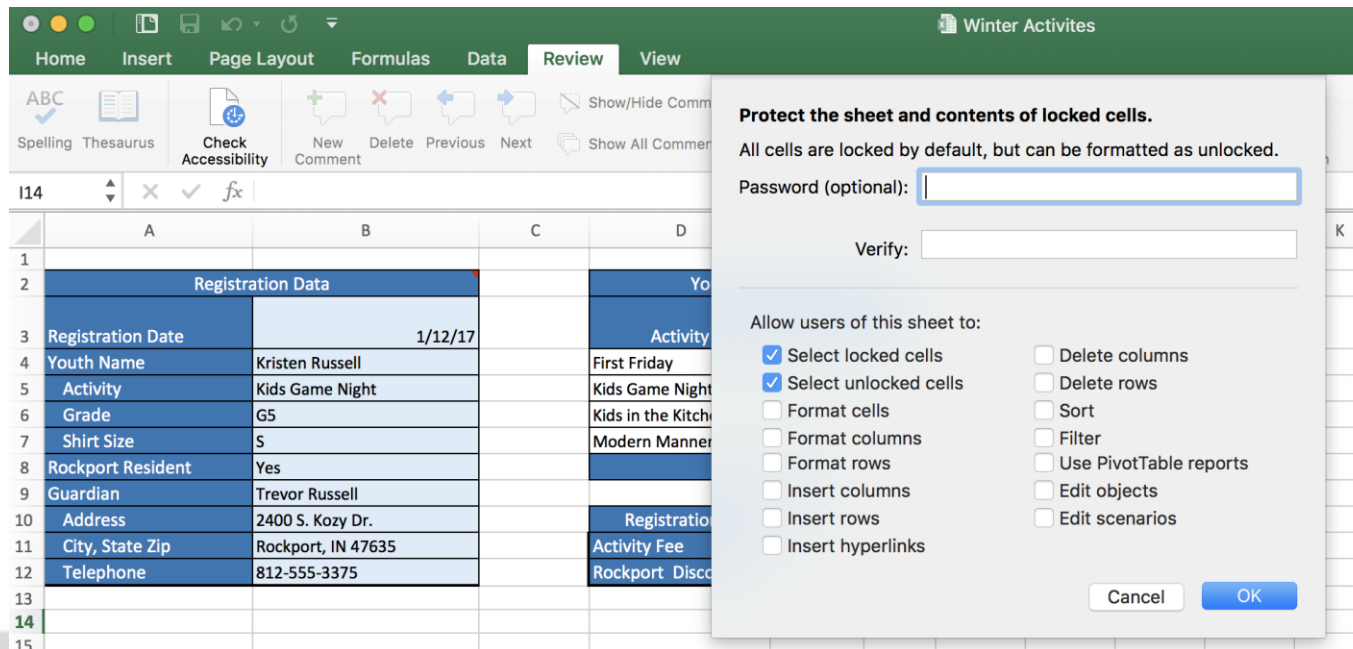




# Protecting a Worksheet and a Workbook

## ■ Protecting a **Worksheet**

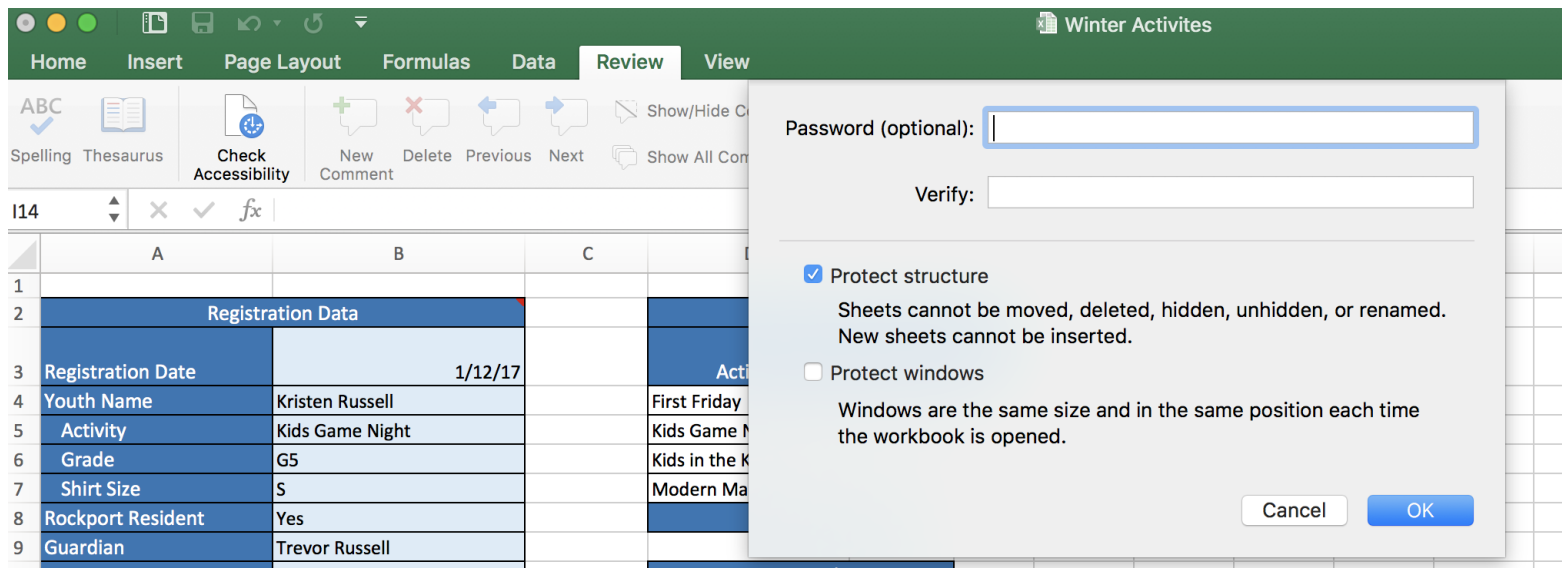
- When you set up worksheet protection, you specify which actions are still available to users in the protected worksheet
- You can limit the user to selecting only unlocked cells, or allow the user to select any cell in the worksheet; these choices remain active as long as the worksheet is protected
- 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 Excel 'Review' tab with the 'Show/Hide Comment' group active. A comment box is visible for cell B2, indicating a comment by Stephen Maynard. The spreadsheet data is as follows:

Registration Data		Child Information	
Registration Date	1/12/17	Grade	Shirt Size
Youth Name	Kristen Russell	First Friday	G3 XS
Activity	Kids Game Night	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		
Address	2400 S. Kozy Dr.	Registration Fee/Discount	
City, State Zip	Rockport, IN 47635	Activity Fee	80
Telephone	812-555-3375	Rockport Discount	5

# 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
- 
- Next week
  - Fundamentals of Programming – Excel VBA