

District Data Coordinator Toolbox: Automating Data Acquisition Using Database Connections in Excel

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Mid-Atlantic: Delaware, Maryland,
New Jersey, Pennsylvania, Washington, D.C.

Prerequisite

For this presentation, we assume you have an established database connection.

If not, please review the tool below, which is available on the REL Mid-Atlantic website:

***District Data Coordinator Toolbox:
Implementing Database Connections
in Excel***

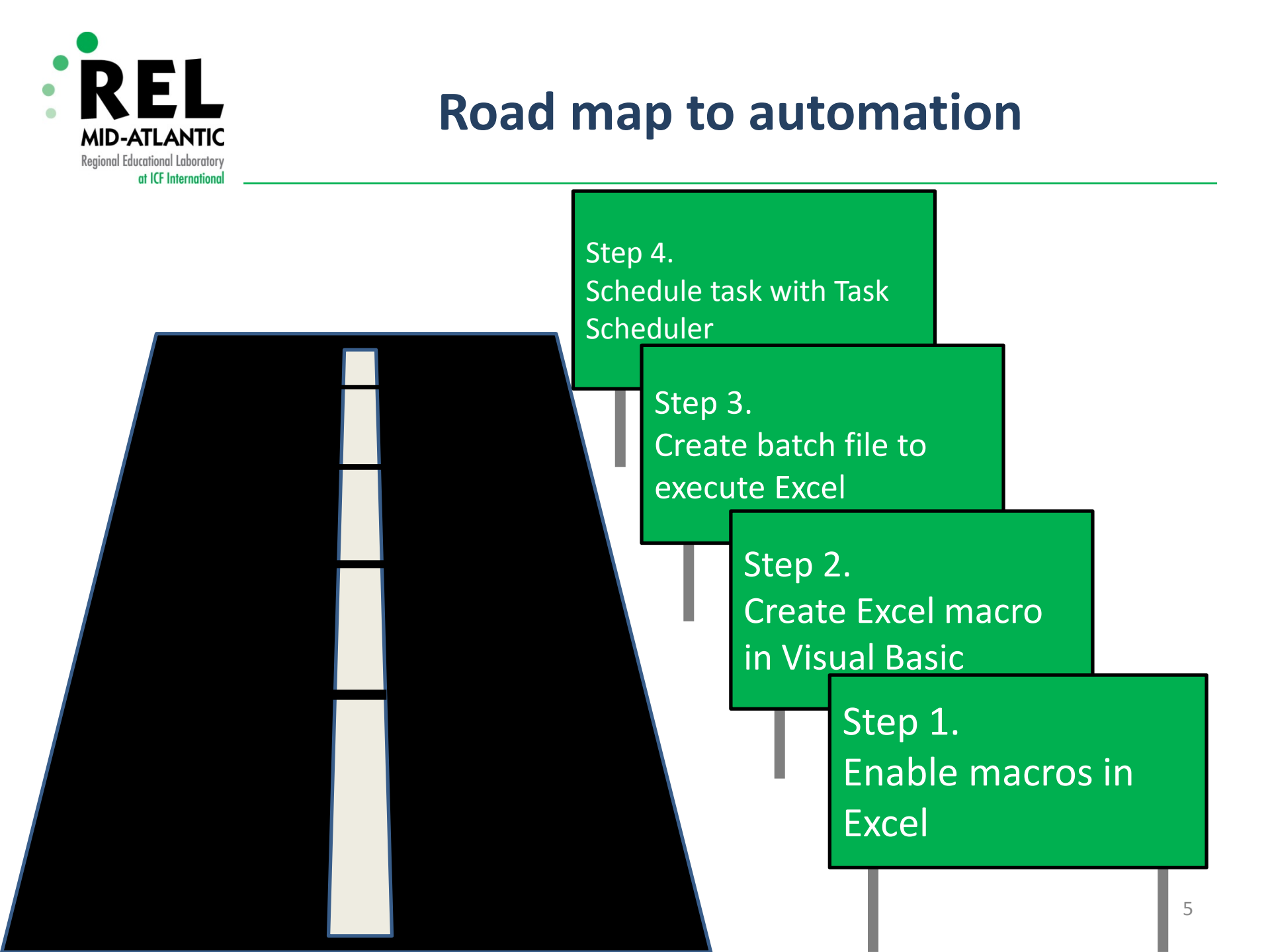
Taking the next step...

- You're making use of a database connection(s) in Excel, and your increased efficiency resulted in more data requests from stakeholders
- Let us suppose some of those data needs are repetitive, or cyclical in nature
 - Maybe someone wants a report updated on a monthly or weekly basis
 - Maybe data in the database is refreshed each evening, and you want the latest available to you each morning
- Let's automate that data acquisition process!

Road map to automation

1. Enable our spreadsheet to accommodate macros
2. Create an Excel macro using Visual Basic code
3. Create a batch file containing instructions to tell our computer to execute our Excel macro
4. Schedule a task (running the batch file) using the Task Scheduler

Road map to automation



Step 4.
Schedule task with Task
Scheduler

Step 3.
Create batch file to
execute Excel

Step 2.
Create Excel macro
in Visual Basic

Step 1.
Enable macros in
Excel

Data automation example

- To follow the steps in our road map to connectivity, let's assume the following example:
 - District leadership is focused on monitoring student mobility
 - As a result, several principals with highly-mobile populations have requested a weekly summary report of enrollment at their middle schools
 - They want to examine enrollment, disaggregated by grade level and student race/ethnicity
 - The data we need to obtain are stored in an Access database

Report to be automated

- Below is the PivotTable we want to automatically refresh each week.

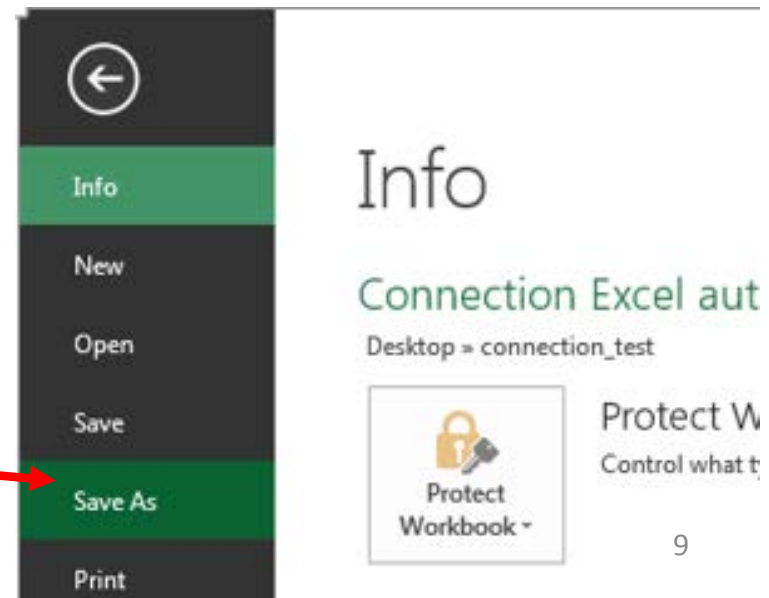
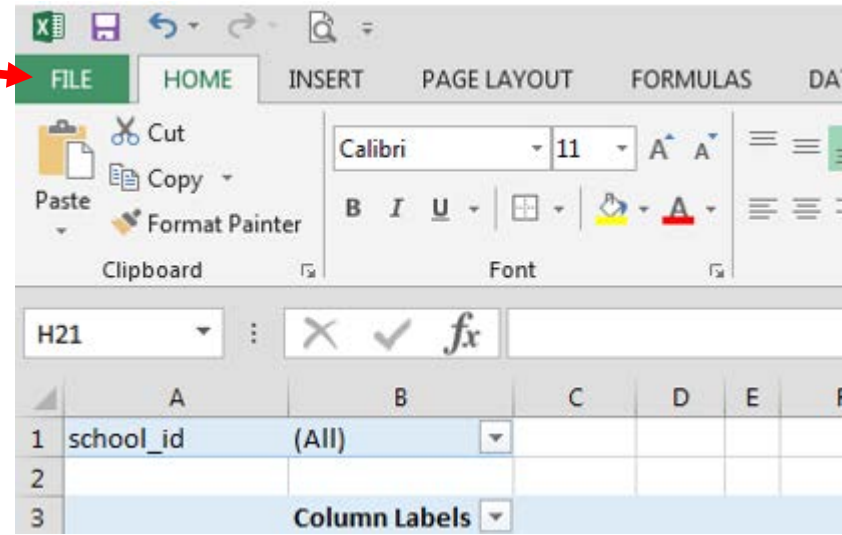
school_id		(All)											
	Column 1												
		06		07		08							
			% of	% of		% of	% of		% of	% of	Total	Total % of	Total % of
Row Labels		n	Race/Et	Grade	n	Race/Eth	Grade	n	Race/Eth	Grade	n	Race/Eth	Grade
African American		132	53.4%	26.6%	176	34.0%	35.5%	188	34.6%	37.9%	496	37.9%	100.0%
American Indian		1	0.4%	20.0%	2	0.4%	40.0%	2	0.4%	40.0%	5	0.4%	100.0%
Asian		7	2.8%	21.2%	13	2.5%	39.4%	13	2.4%	39.4%	33	2.5%	100.0%
Hispanic		54	21.9%	27.7%	74	14.3%	37.9%	67	12.3%	34.4%	195	14.9%	100.0%
Multi-Racial		6	2.4%	24.0%	13	2.5%	52.0%	6	1.1%	24.0%	25	1.9%	100.0%
White		47	19.0%	8.5%	240	46.3%	43.2%	268	49.3%	48.3%	555	42.4%	100.0%
Grand Total		247	100.0%	18.9%	518	100.0%	39.6%	544	100.0%	41.6%	1309	100.0%	100.0%

Enabling macros in Excel

- To automate the refresh of our PivotTable, we need to use some Visual Basic code and Excel macros

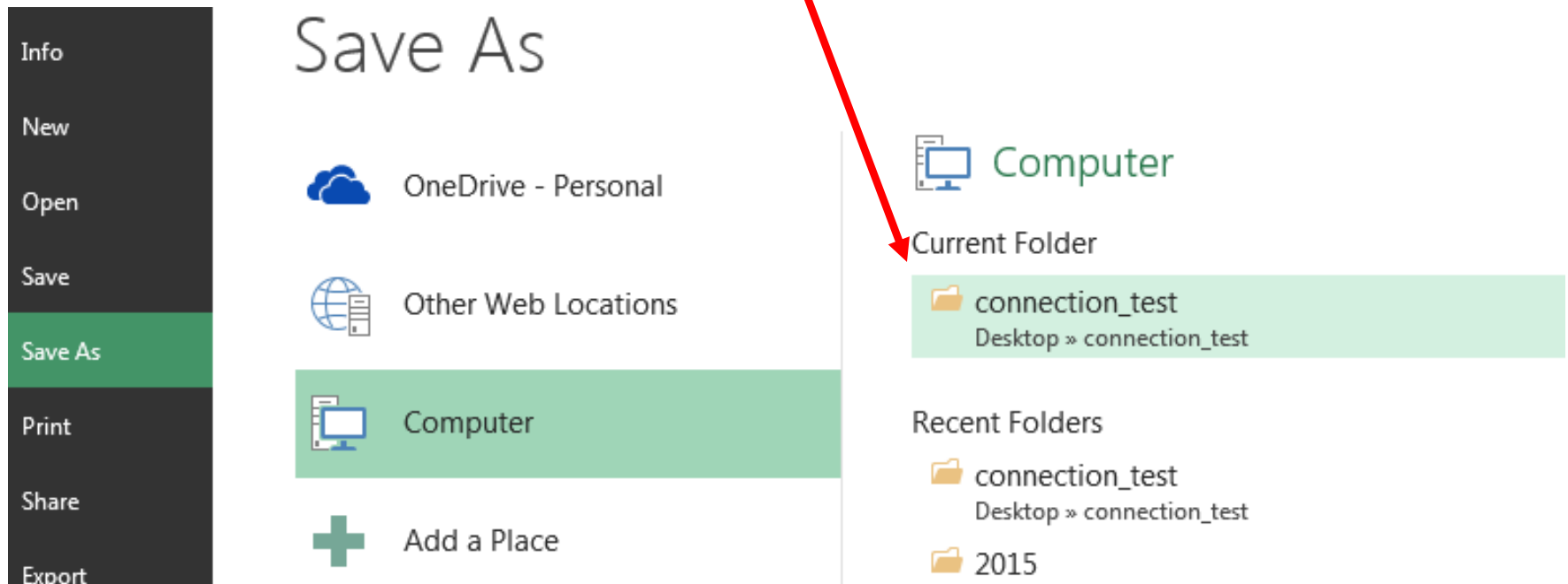
Save file as different type

1. Click 'File' at the top of the Excel sheet containing data and pivot table
2. Click 'Save As'



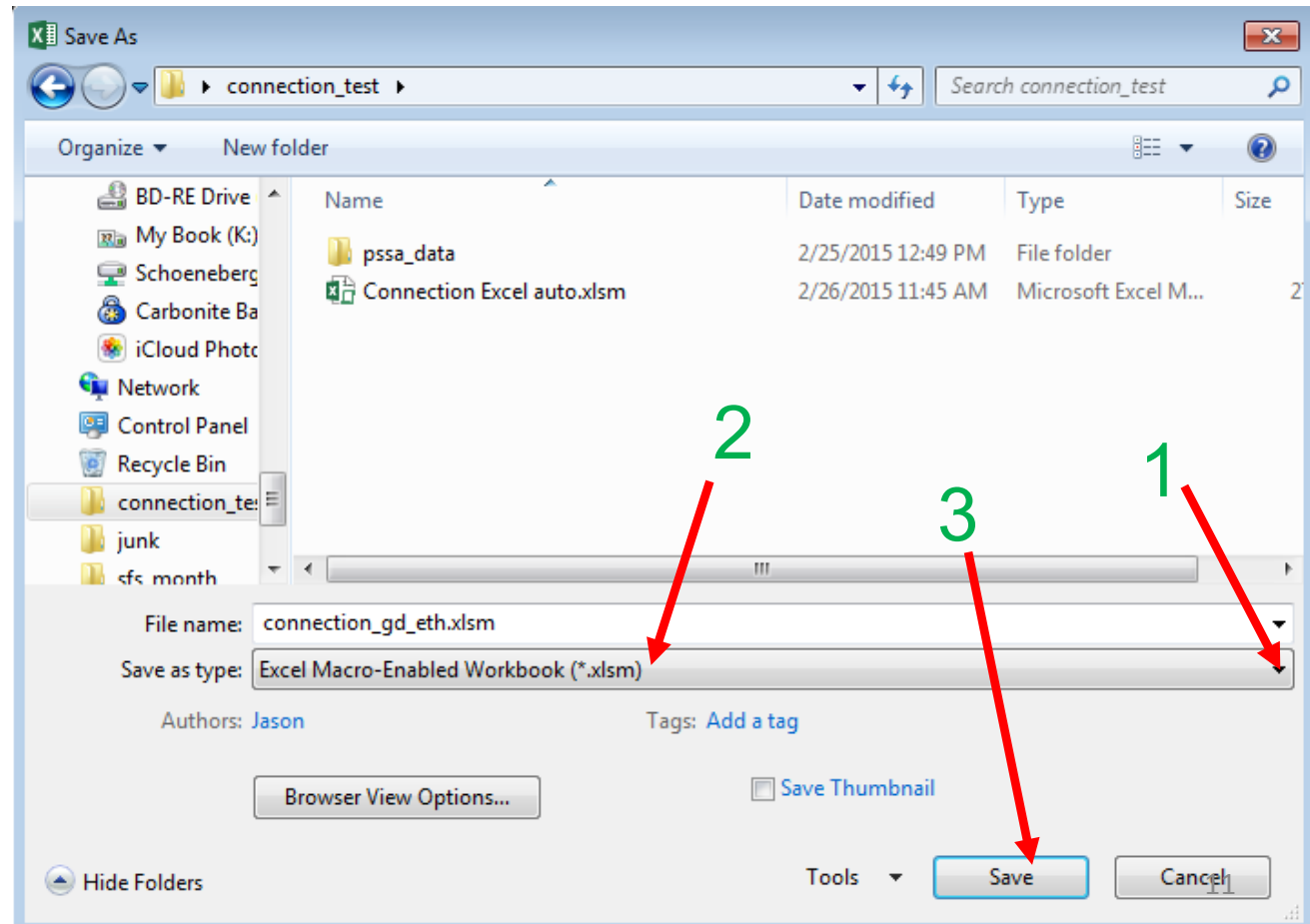
Specify save location

- Navigate to the destination where you want to save the file



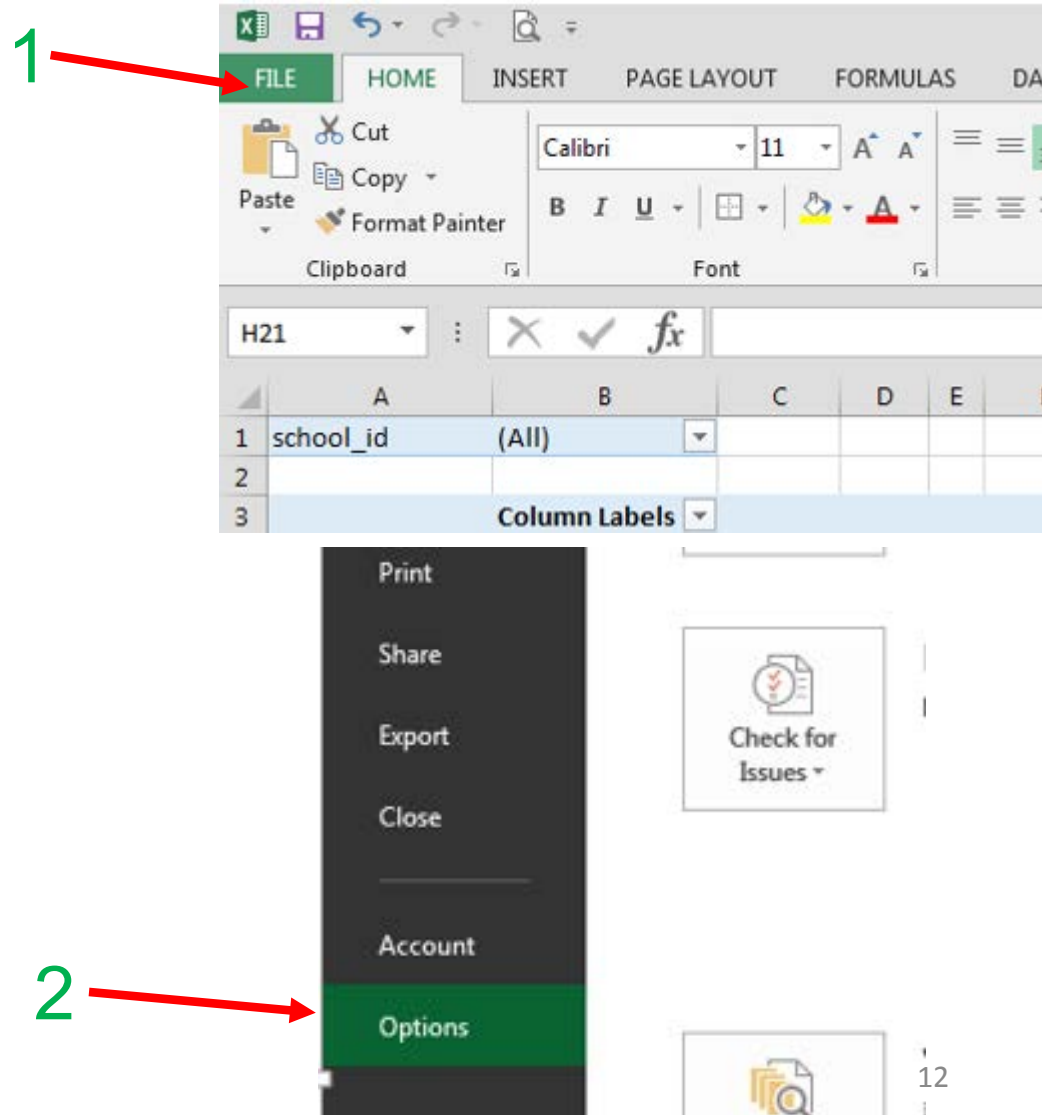
Specify Excel macro-enabled file type

1. Use drop-down to specify file type
2. Choose Excel Macro-Enabled Workbook (*.xlsm)
3. Click Save



Enable Excel developer ribbon

1. Click 'File' at the top of the Excel sheet containing data and pivot table
2. Click 'Options'

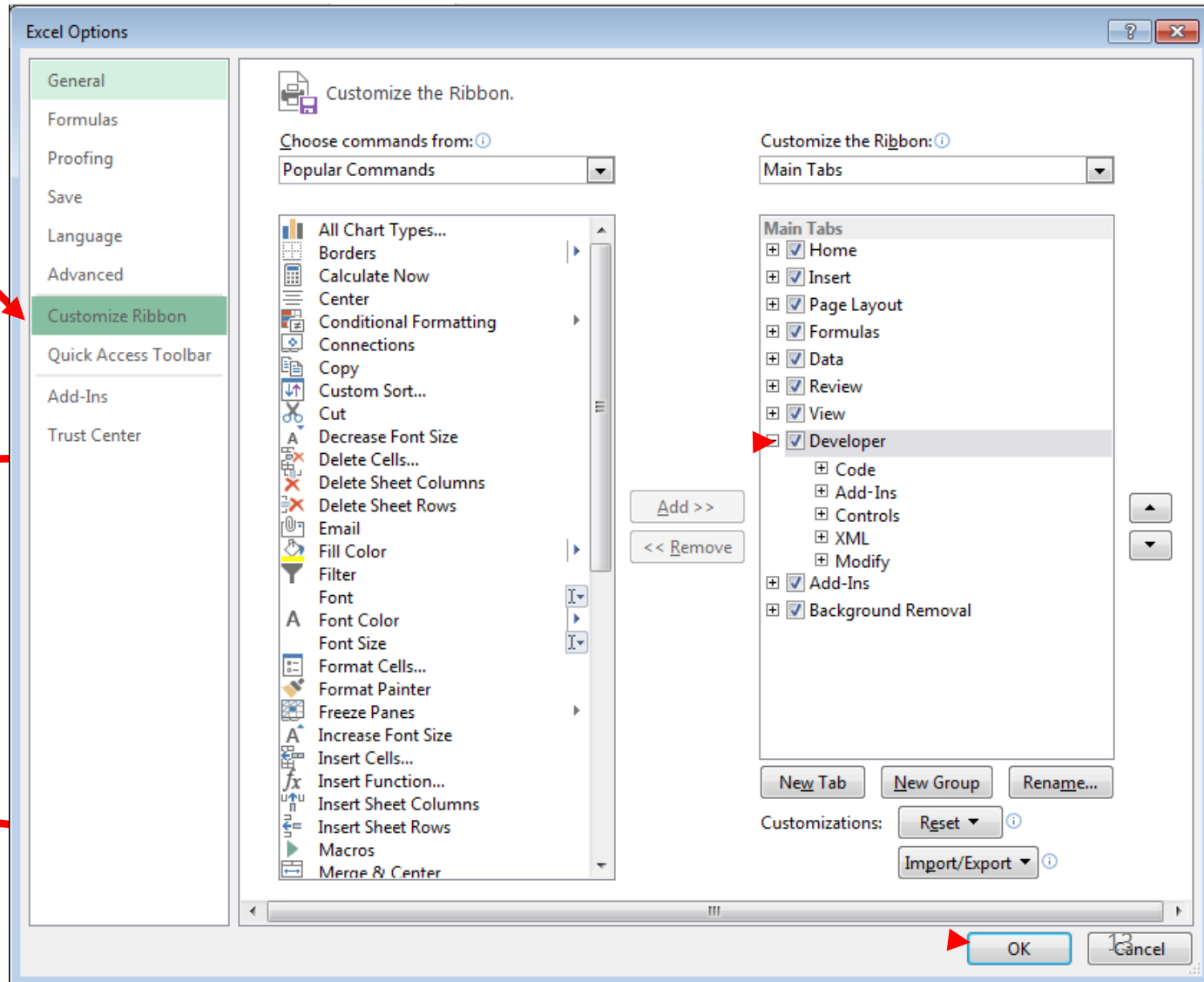


Ensure developer ribbon enabled

1 Click
Customize
Ribbon

2 Ensure
Developer
box is
checked

3 Click OK

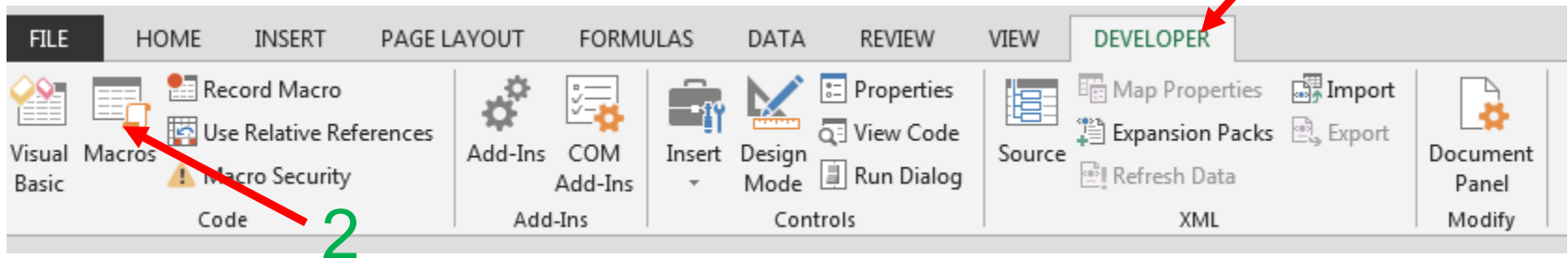


Creating an Excel macro

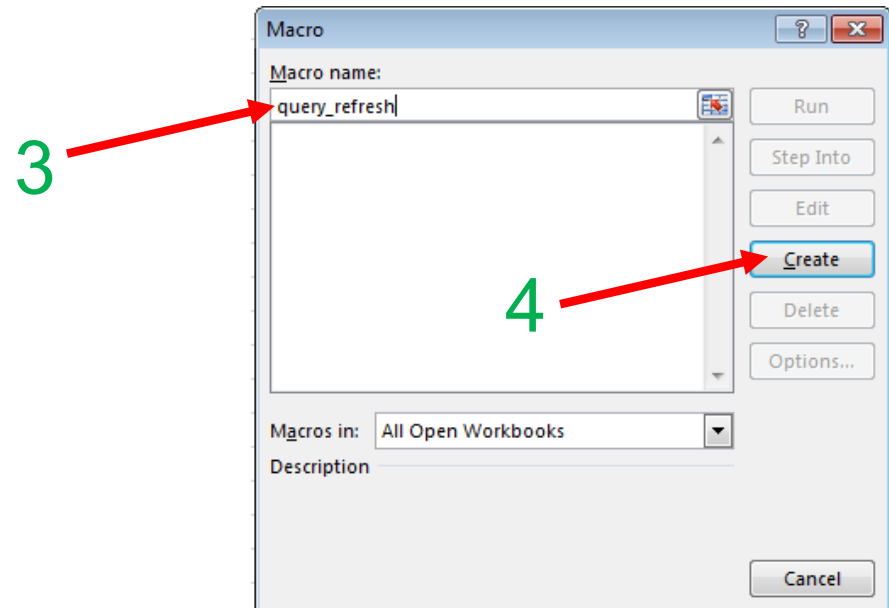
- Using the Developer tab, we will enter Visual Basic code to create an Excel macro that refreshes our PivotTable

Naming our macro

1. Click on the Developer tab at the top of Excel
2. Click on the Macros button

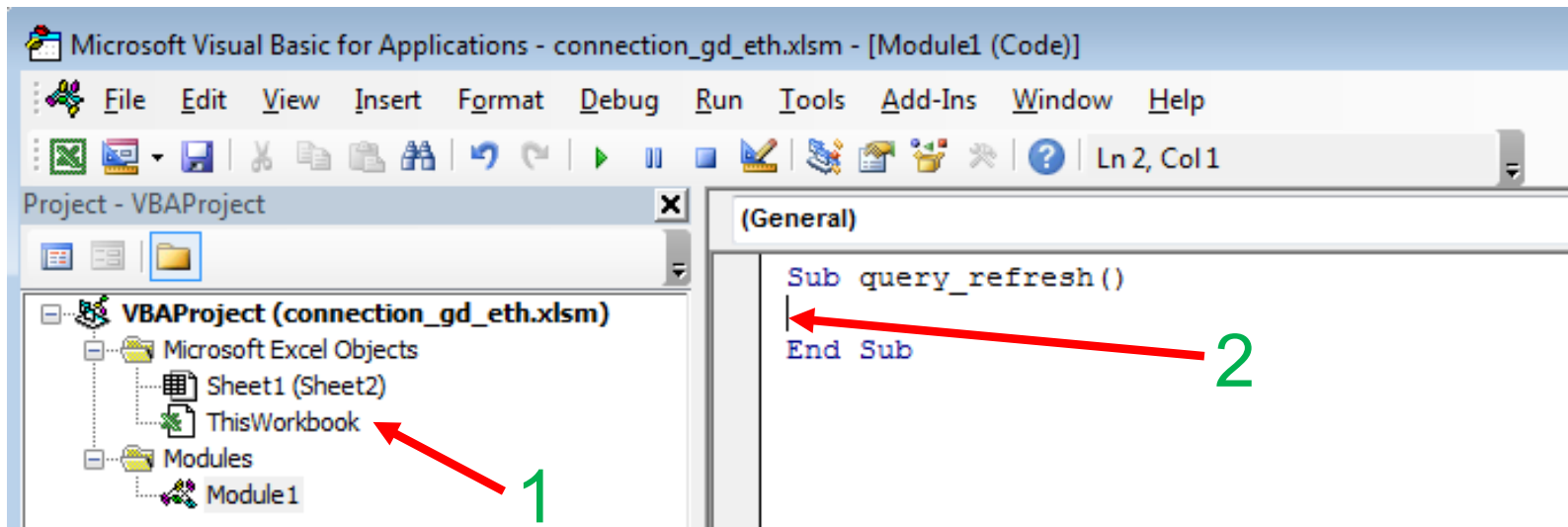


3. Enter a name (query_refresh) for the macro
4. Click Create



Entering Visual Basic code

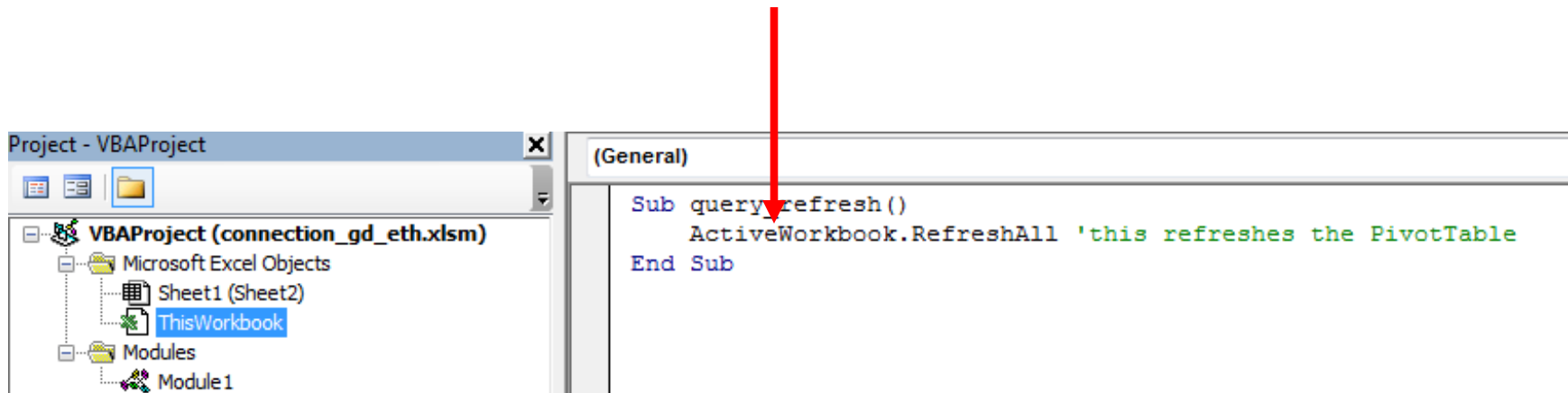
- The 'Sub' denotes the beginning of the macro code
 - The 'End' denotes the end of the macro code
1. Click on ThisWorkbook
 2. Click between Sub and End statements to place cursor



Macro code for copy-pasting

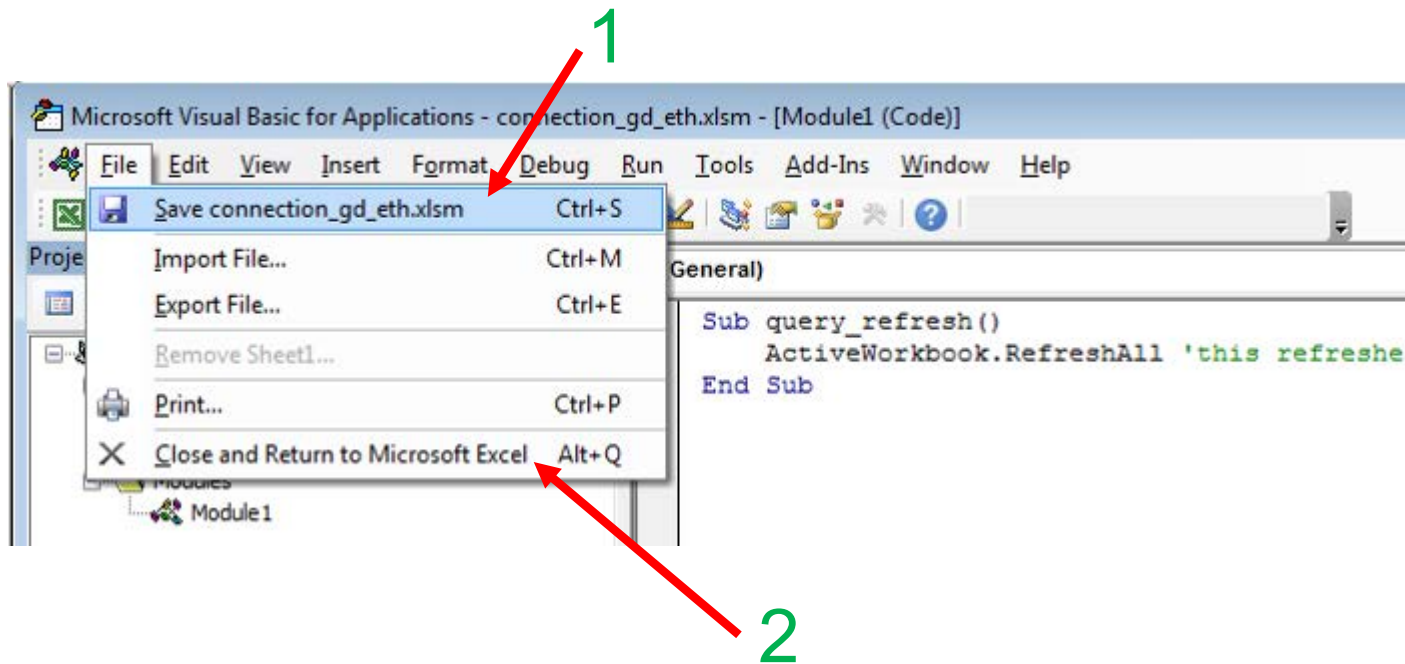
- Below is the Visual Basic code to be copy-pasted into the query_refresh window, between Sub and End statements:

ActiveWorkbook.RefreshAll 'this refreshes the PivotTable



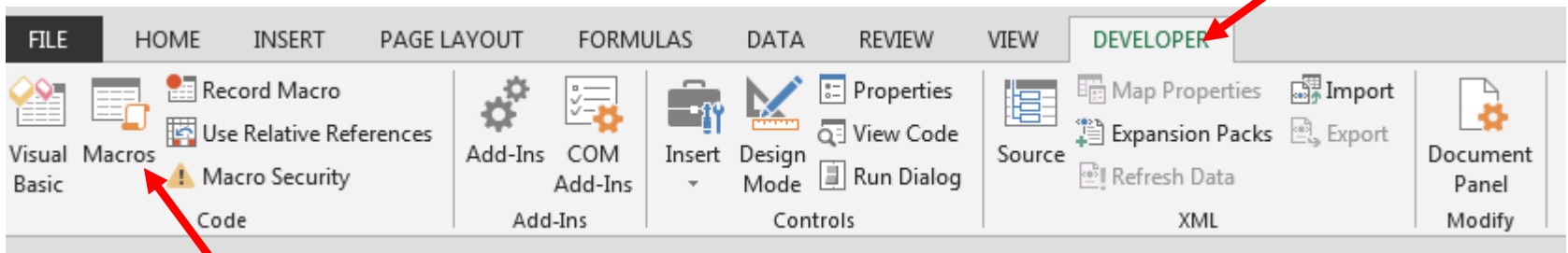
Save & close Visual Basic window

1. Click Save
2. Click File-Close and Return to Microsoft Excel

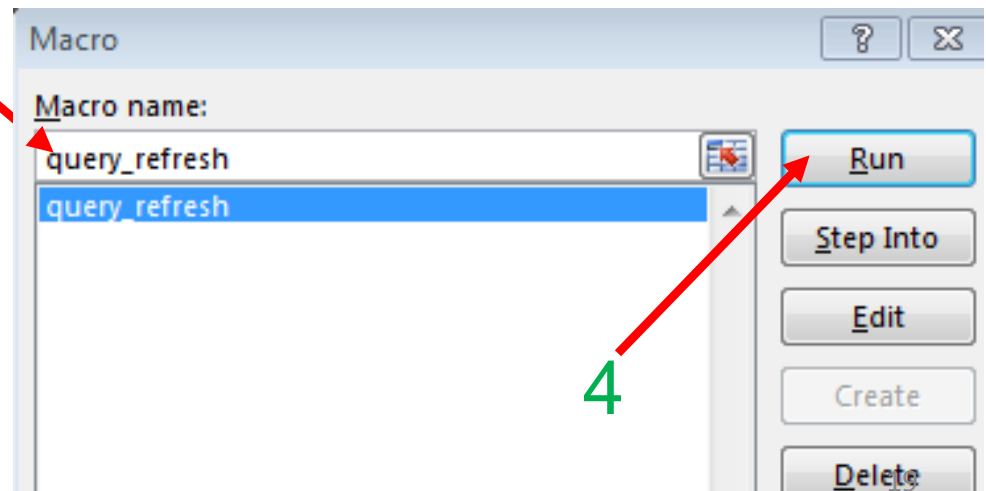


Executing the macro

- To refresh data using the macro:
1. Click on the Developer tab at the top of Excel
 2. Click on the Macros button



3. Select macro you wish to run
4. Click Run (Data Refreshes)

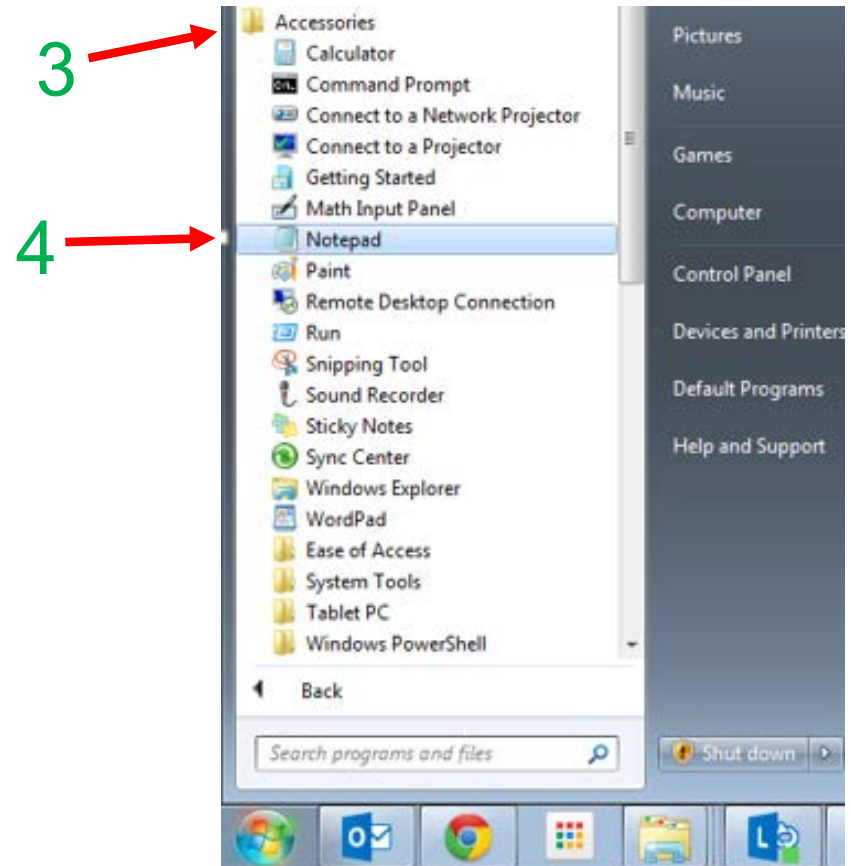
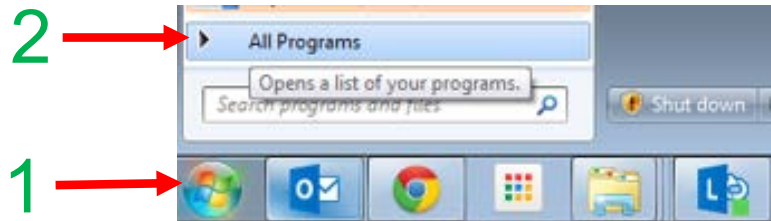


Creating a batch file

- Using Notepad or another text editor, we can create a batch (.vbs extension) file containing instructions informing our computer to execute our Excel macro

Opening Notepad

1. Click on the Windows icon
2. Click All Programs
3. Click on Accessories
4. Click on Notepad



Batch file code for copy-pasting

- Below is the code to be copy-pasted into the batch file

Option Explicit

On Error Resume Next

ExcelMacroExample

Sub ExcelMacroExample()

Dim xl

Set xl = CreateObject("Excel.Application")

xl.Application.Workbooks.Open

"C:\Users\Jason\Desktop\connection_test\connection_gd_eth.xlsm"

xl.Application.Visible = True

xl.Application.run

"C:\Users\Jason\Desktop\connection_test\connection_gd_eth.xlsm"!query_refresh"

xl.Application.displayalerts = false

xl.ActiveWorkbook.save

xl.ActiveWorkbook.close

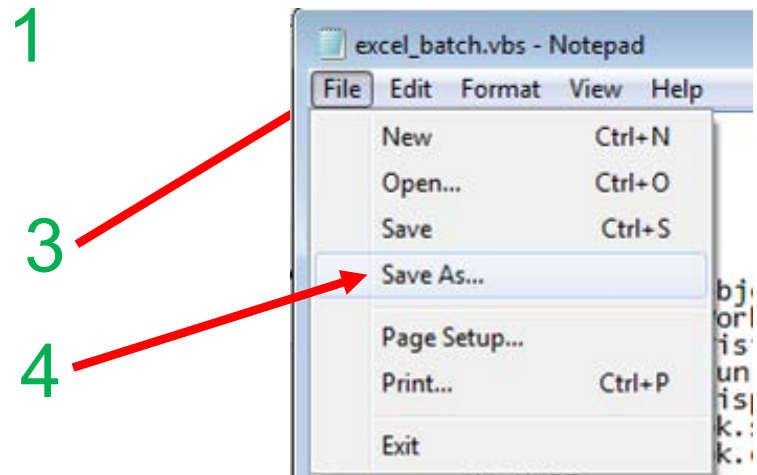
End Sub

Creating the batch file

1. Specify your specific folder path and spreadsheet name
2. Specify the name you assigned your macro

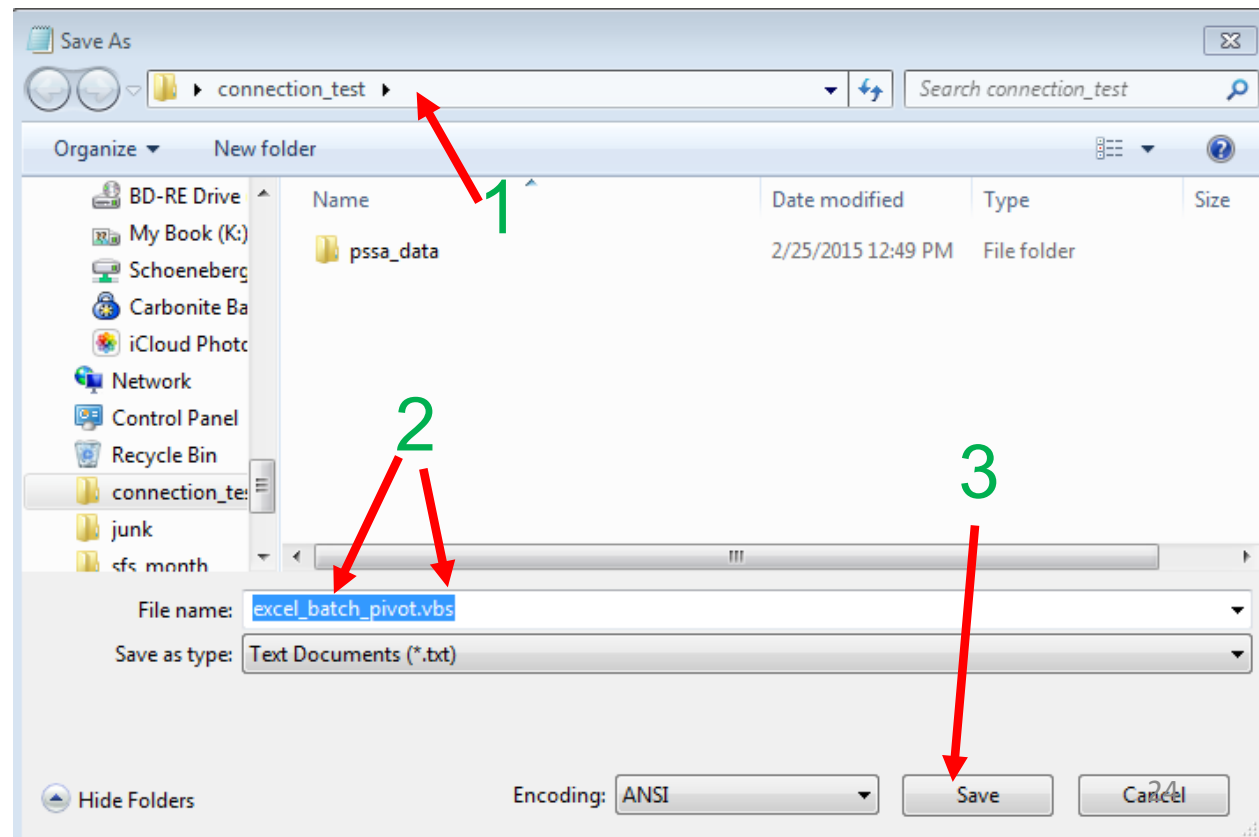
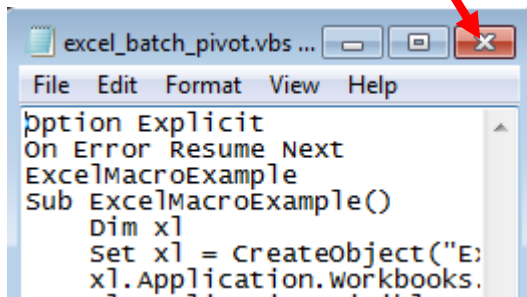
```
excel_batch_pivot.vbs - Notepad
File Edit Format View Help
Option Explicit
On Error Resume Next
ExcelMacroExample
Sub ExcelMacroExample() |
    Dim xl
    Set xl = CreateObject("Excel.Application")
    xl.Application.workbooks.Open "C:\Users\Jason\Desktop\connection_test\connection_gd_eth.xlsm"
    xl.Application.Visible = True
    xl.Application.run "'C:\Users\Jason\Desktop\connection_test\connection_gd_eth.xlsm'!query_refresh"
    xl.Application.displayalerts = false
    xl.ActiveWorkbook.save
    xl.ActiveWorkbook.close
End Sub
```

3. Click File
4. Click Save As



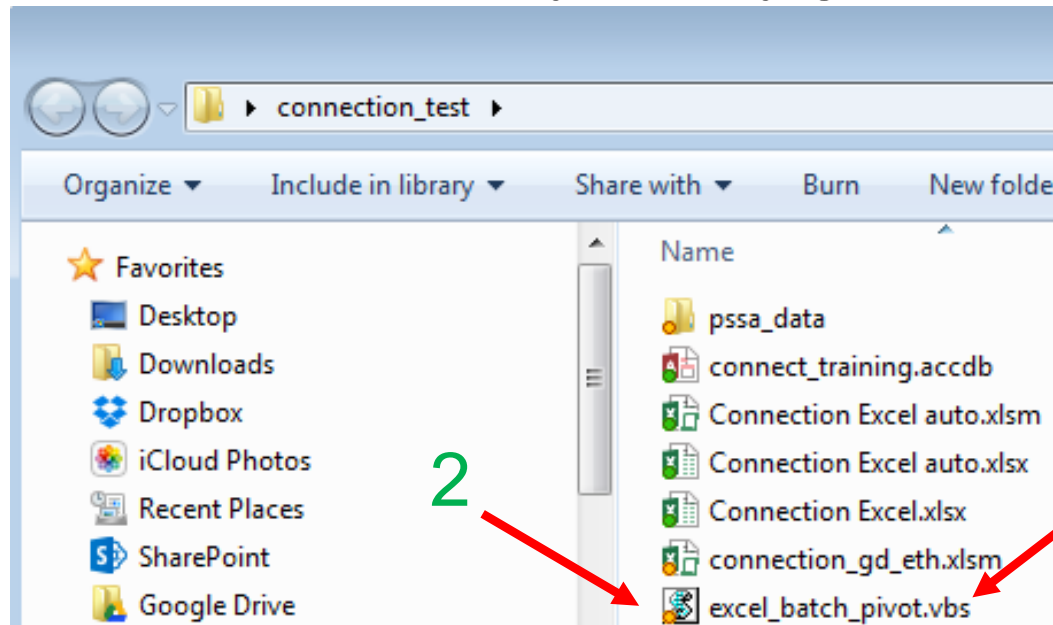
Saving the batch file

1. Navigate to your chosen folder
2. Name your batch file (excel_batch_pivot), and enter '.vbs' as the file extension
3. Click Save
4. Close Notepad



Saving the batch file

1. Verify batch file was saved
2. You can check that it works by double-clicking on the batch file itself
3. You should see Excel open briefly, then immediately close
4. If there is an error in the code, you may get an error notice

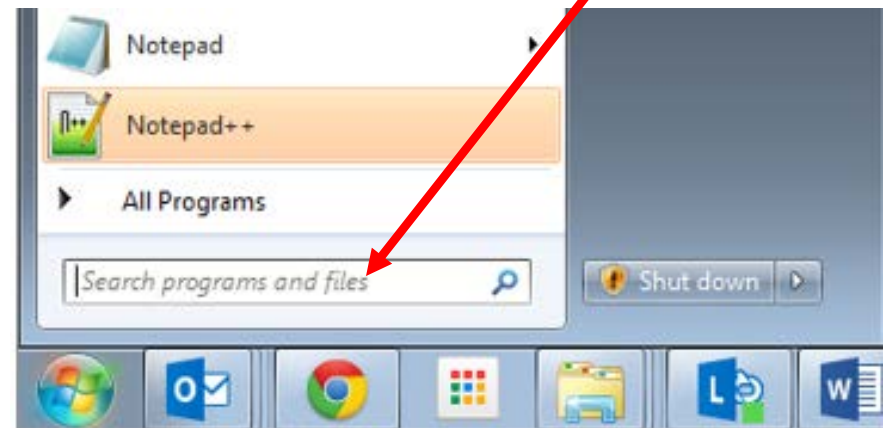
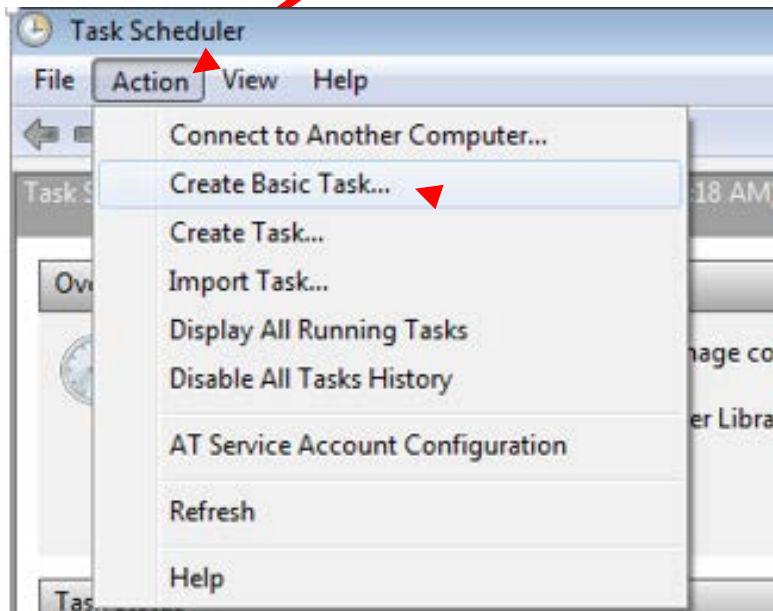


Scheduling a task

- Now we can use the Task Scheduler to run our batch file, which executes the Excel macro and refreshes our PivotTable

Opening Task Scheduler

1. Enter 'Task Scheduler' in search box
2. Click on Action in the Task Scheduler window
3. Select Create Basic Task



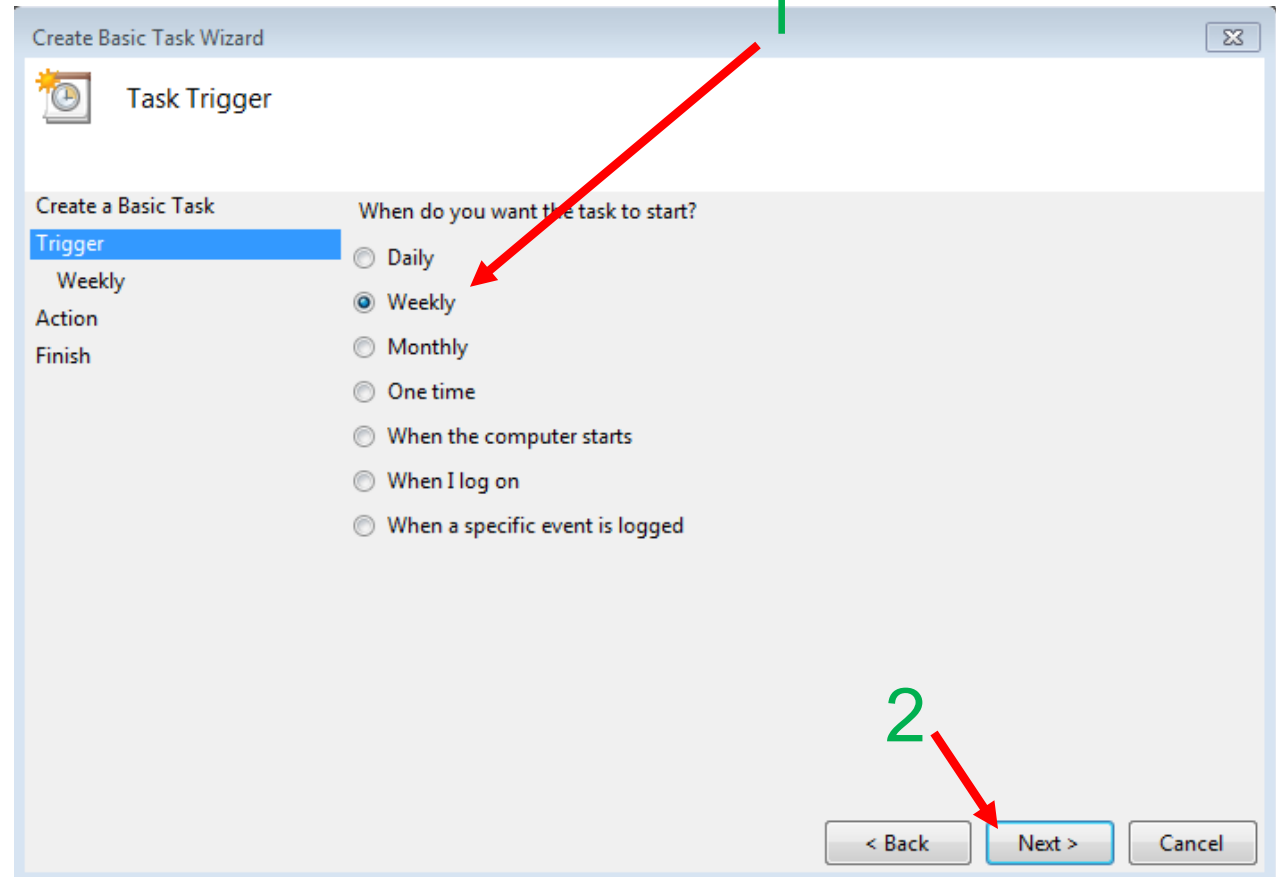
Naming the scheduled task

1. Enter a name for the scheduled task
(e.g excel_query_refresh)
2. Click Next

The screenshot shows the 'Create Basic Task Wizard' window. The title bar says 'Create Basic Task Wizard'. Inside, there's a section titled 'Create a Basic Task' with a clock icon. Below this, there's a list of steps: 'Create a Basic Task' (selected), 'Trigger', 'Action', and 'Finish'. To the right of the list, there's a description: 'Use this wizard to quickly schedule a common task. For more advanced options or settings such as multiple task actions or triggers, use the Create Task command in the Actions pane.' Below the description, there's a 'Name:' label followed by a text box containing 'excel_query_refresh'. Below that is a 'Description:' label followed by a large empty text box. At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'. A red arrow labeled '1' points to the 'Name' text box, and another red arrow labeled '2' points to the 'Next >' button.

Set frequency of scheduled task

1. Select how often you would like the refresh to occur (e.g. a weekly refresh for our principals in this example)
2. Click Next



Set time-of-day and recurrence of scheduled task

1. Specify the date to begin and time of day you would like to use
2. Specify the day of the week (e.g Friday) you want the refresh to occur
3. Click Next

The screenshot shows the 'Create Basic Task Wizard' dialog box. The title bar reads 'Create Basic Task Wizard'. The main area is titled 'Weekly' with a clock icon. On the left, there is a sidebar with 'Trigger' (Weekly), 'Action', and 'Finish'. The 'Trigger' section is expanded, showing 'Weekly' selected. The main content area shows 'Start: 2/27/2015' and '7:05:35 AM' with a 'Synchronize across time zones' checkbox. Below this, 'Recur every: 1 weeks on:' is followed by checkboxes for days of the week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday (checked), and Saturday. At the bottom, there are buttons for '< Back', 'Next >', and 'Cancel'. Red arrows with green numbers 1, 2, and 3 point to the date/time fields, the Friday checkbox, and the 'Next >' button respectively.

Create Basic Task Wizard

Weekly

Create a Basic Task

Trigger

Weekly

Action

Finish

Start: 2/27/2015 7:05:35 AM ☐ Synchronize across time zones

Recur every: 1 weeks on:

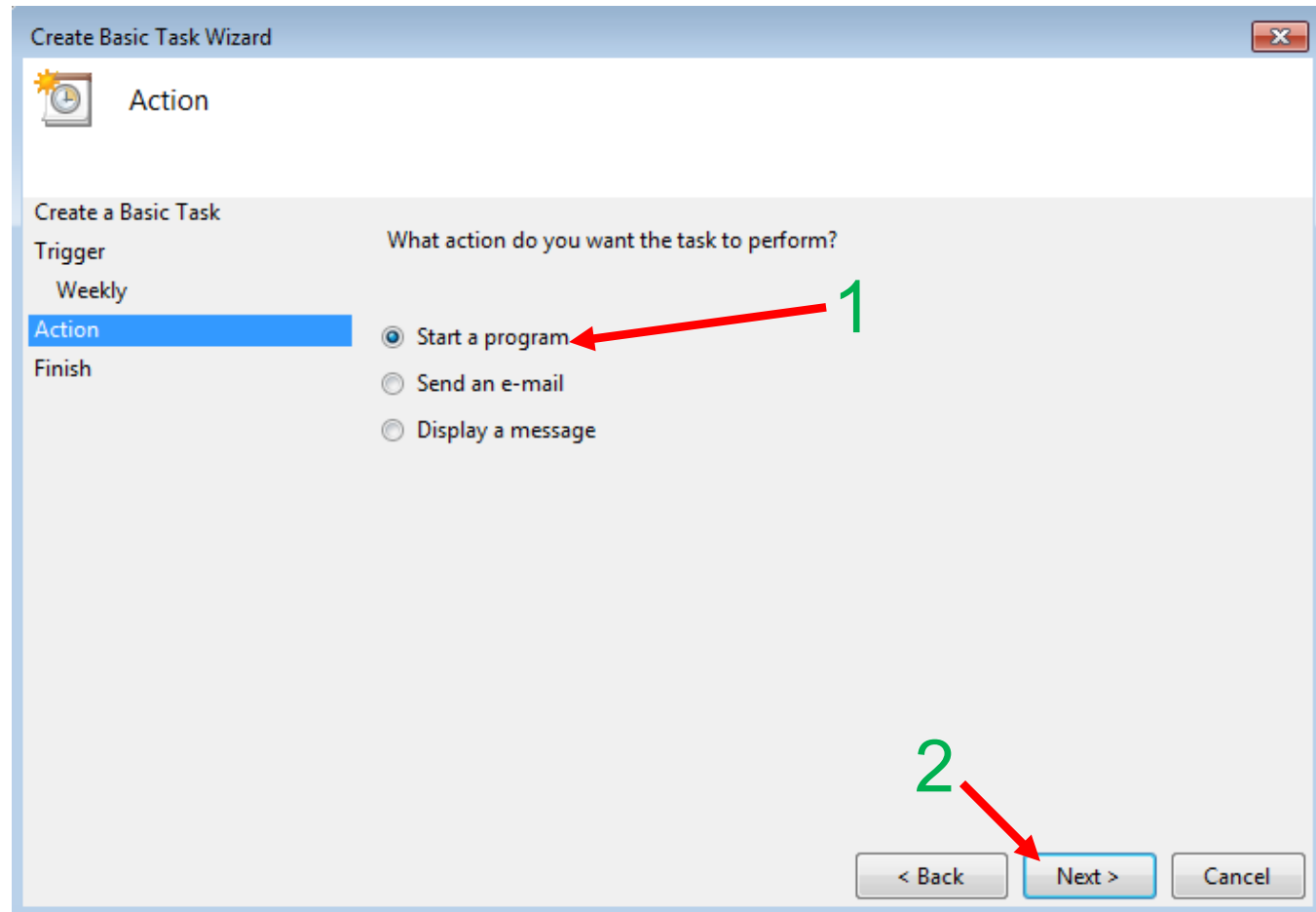
☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday

☐ Thursday ☒ Friday ☐ Saturday

< Back Next > Cancel

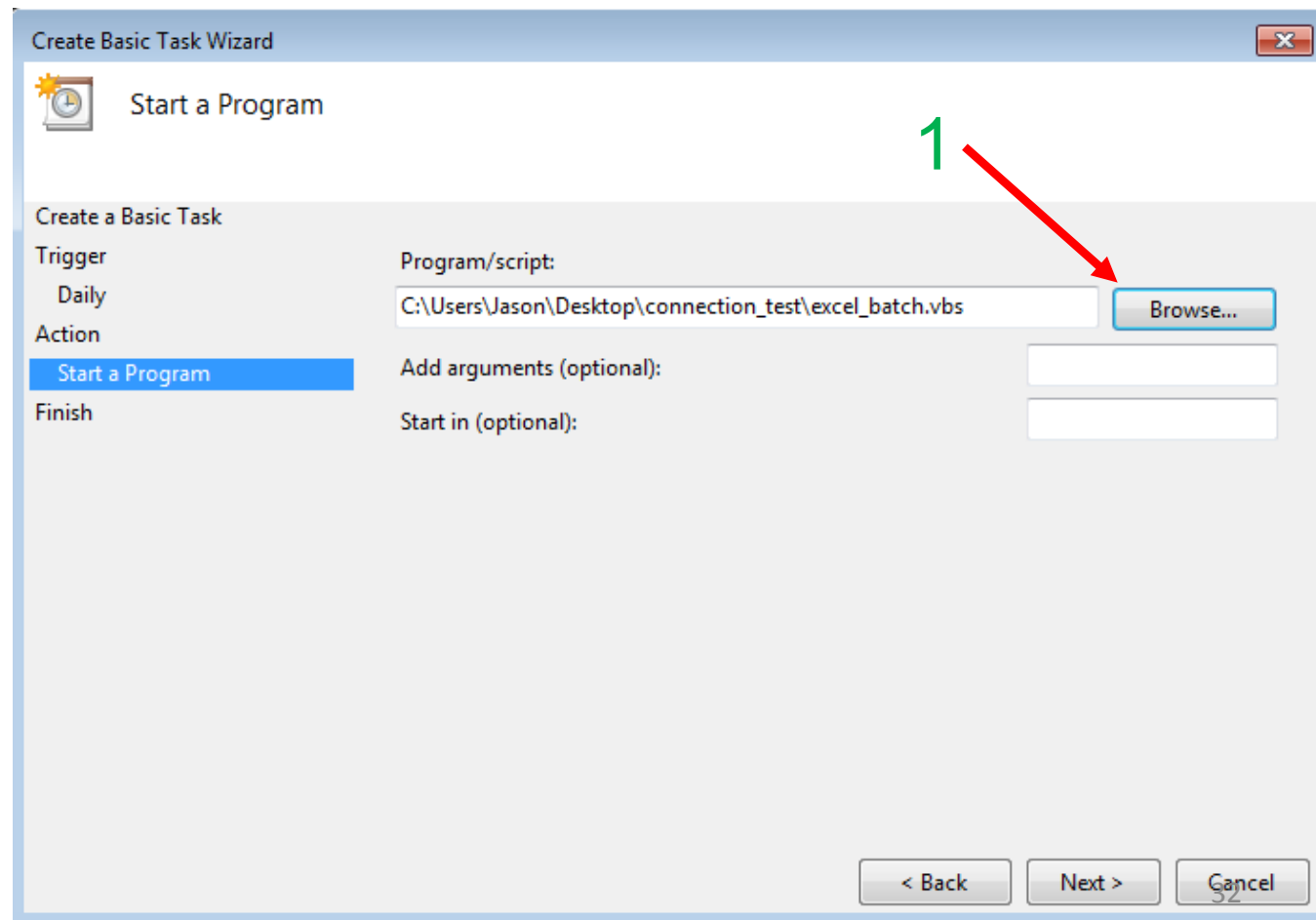
Specify the type of action to be scheduled

1. Select 'Start a program'
2. Click Next



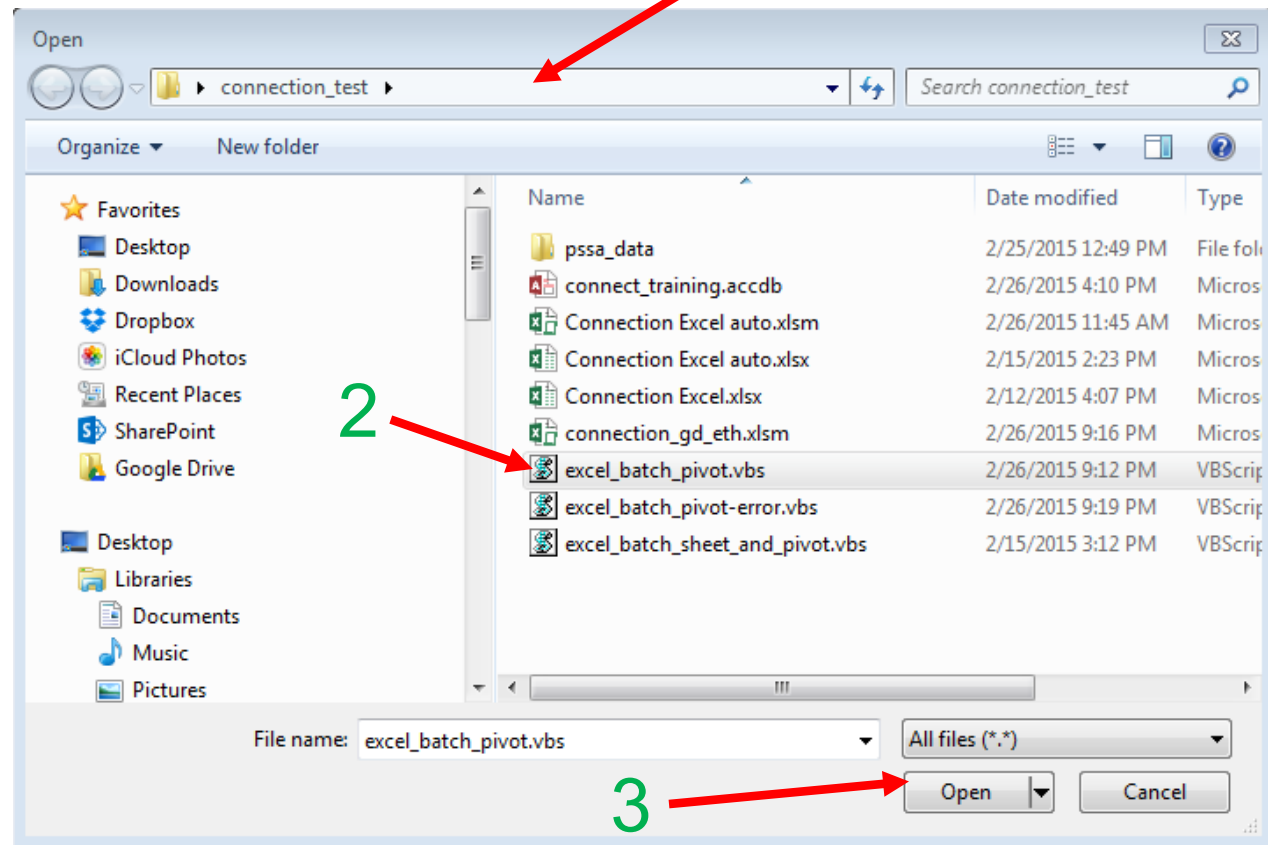
Specify file scheduled task should execute

1. Click 'Browse' to navigate to folder location where '.vbs' file is stored



Specify batch file to execute

1. Navigate to folder location where '.vbs' file is stored
2. Select the '.vbs' file of interest
3. Click Open



Specify file scheduled task should execute

1. Click Next

Create Basic Task Wizard

Start a Program

Create a Basic Task

Trigger
Daily

Action
Start a Program

Finish

Program/script:
C:\Users\Jason\Desktop\connection_test\excel_batch.vbs Browse...

Add arguments (optional):

Start in (optional):

1

< Back **Next >** Cancel

Review & finish scheduling task

1. Review properties of scheduled task:

- a) Name of scheduled task
- b) Trigger time
- c) Action (batch file to execute)

2. Click Finish

Create Basic Task Wizard

Summary

Create a Basic Task

Trigger
Weekly
Action
Start a Program
Finish

Name: excel_query_refresh

Description:

Trigger: Weekly; At 7:05 AM every Friday of every week, starting 2/27/2015

Action: Start a program; C:\Users\Jason\Desktop\connection_test\excel_batch_pivot.

☐ Open the Properties dialog for this task when I click Finish
When you click Finish, the new task will be created and added to your Windows schedule.

< Back Finish Cancel

Monitoring/editing a scheduled task

1. Double-click on the scheduled task under the Active Tasks pane inside Task Scheduler:

Active Tasks

Active tasks are tasks that are currently enabled and have not expired.

Summary: 59 total

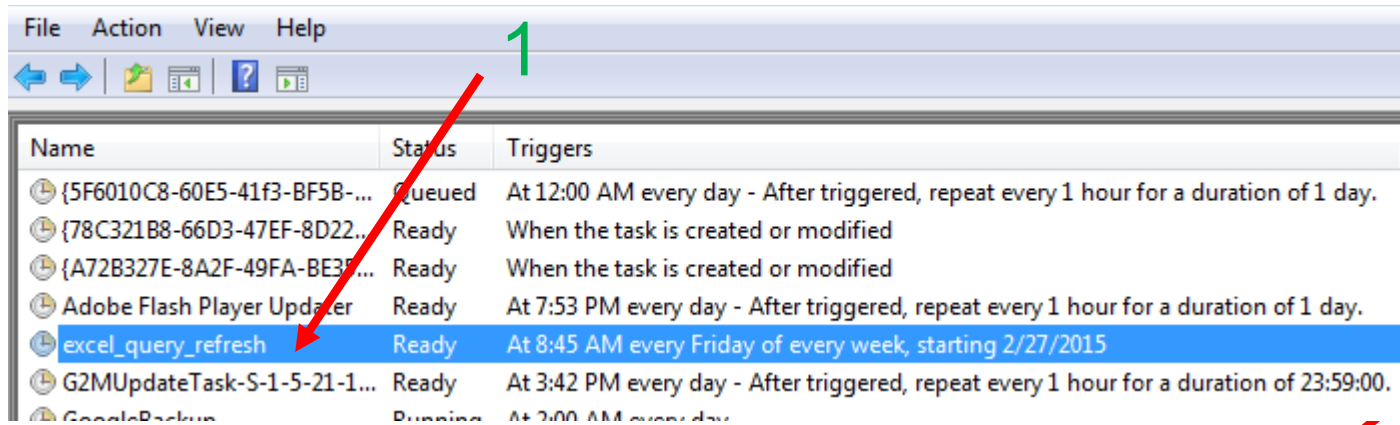
Task Name	Next Run Time	Triggers	Location
RegIdleBackup	3/5/2015 12:48:07 AM	At 12:00 AM every 10 days	\Microsoft\Windows\Re...
Extractor Definitions Update Task	3/6/2015 10:03:20 AM	Multiple triggers defined	\Microsoft\Windows Liv...
KernelCeipTask	3/5/2015 3:30:00 AM	At 3:30 AM every Thursd...	\Microsoft\Windows\C...
excel_query_refresh	3/6/2015 7:05:35 AM	At 7:05 AM every Friday ...	\
{78C321B8-66D3-47EF-8D22-404FF...}		When the task is created...	\

Last refreshed at 2/27/2015 8:23:35 AM

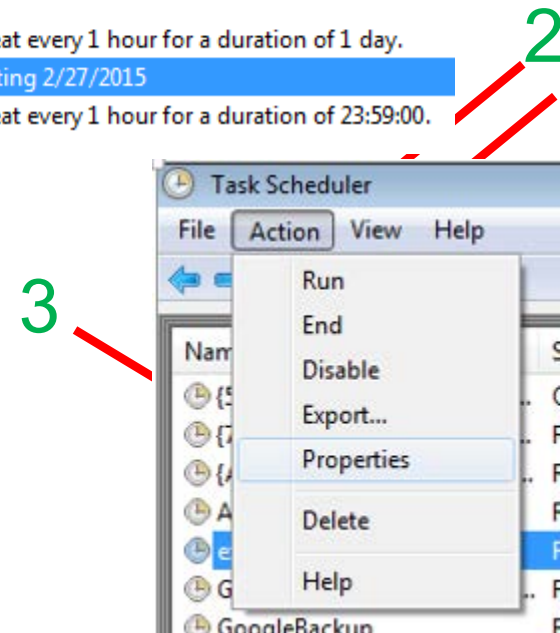
Refresh

Monitoring/editing a scheduled task

1. Click on the scheduled task under the Action Pane inside Task Scheduler:

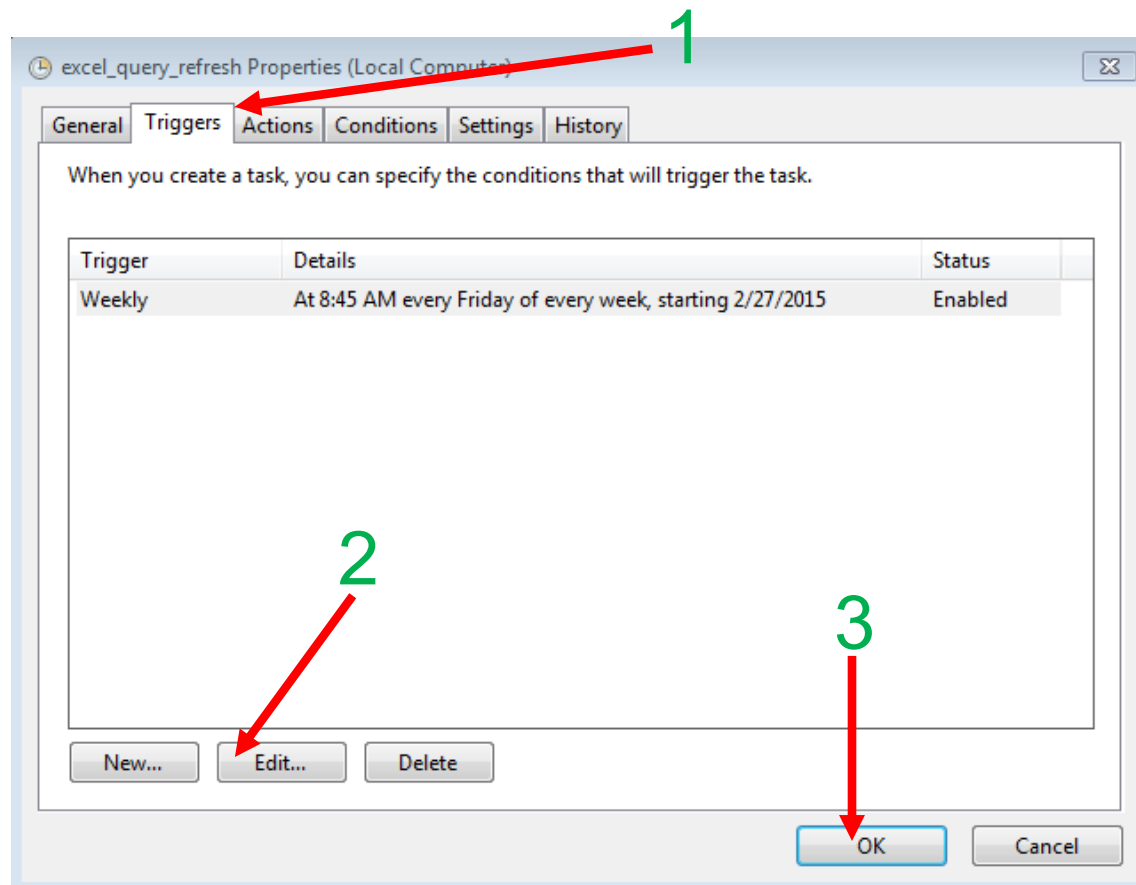


2. Click on Action on the menu bar
 - From here you can run, end, disable, delete and view the properties
3. Click on Properties to change the day, time or recurrence settings



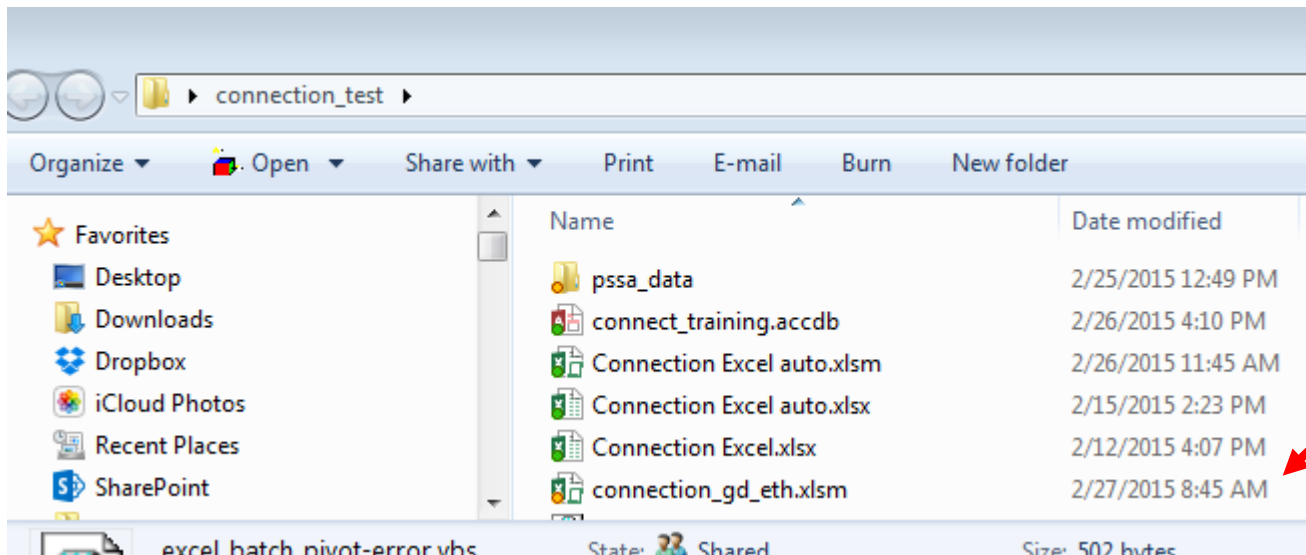
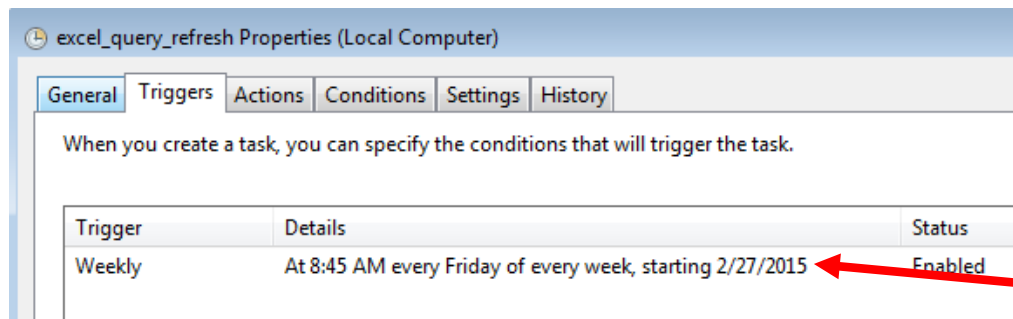
Monitoring/editing a scheduled task

1. Using the tabs across the top of the Properties pane, you can edit various aspects of the scheduled task
2. On a particular tab, click Edit to change details about the scheduled task
3. Click OK when finished editing



Alignment of task trigger and file time stamp

1. Note trigger of 8:45 AM on Fridays
2. Note time stamp on file when scheduled task runs



Potential problems

- If time stamp on file fails to update...
 - On initial use, check code in .vbs file to ensure no errors were made in copy-paste
 - Was your computer inadvertently shut down or powered down at the scheduled time?
 - Was the server or machine where database source is located inadvertently shut down or powered down at the scheduled time?
 - Have there been any changes to the database source (e.g. Access SQL), such as table name changes, connection information change (path or server name)?

Questions/Need help

Contact:

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704-307-9395



Please visit www.relmidatlantic.org for other data tools!