

The Centinel: Guardian of Your Dollars & Cents



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Executive Summary

There is one thing that most people, regardless of nationality or culture, have in common: Concerns about money. My project is not meant to solve the world's monetary issues, but rather it is meant to be a helpful tool in the quest to get a handle on one's everyday expenses. I call my project "The ¢entinel: Guardian of Your Dollars and ¢ents" because I look at it as a guard against ignorant spending.

Over my adult life I have used several different software solutions to keep track of my personal finances and have been seriously disappointed in all of them for various reasons—cost and/or functionality being the two biggest. The ¢entinel is my preliminary attempt at a solution to these and other personal finance pickles.

In its current form, this tool is able to automatically download personal checking account data (only from Wells Fargo's website at this time), format the data and categorize the data according to customized spending categories. This tool can also "learn" over time—meaning that new or unfamiliar expenses will trigger a manual categorization process that the tool will use in future auto-categorization processes. In its final form, this tool will eventually evolve into a total financial tool, both for short-term management as well as long-term planning.

Introduction

Despite Thomas Friedman's somewhat sensationalist attempt to convince readers that the world is flat, there is still a lot of social and political distance between the peoples of the world. However, there is one thing that most people, regardless of nationality or culture, have in common: Concerns—and even unhealthy obsessions—about money. For some, money makes the world go 'round while for others it is the root of all evil. I say it depends on who owns who—do you manage your money or does your money manage you?

My project is not meant to solve the world's monetary issues (maybe sovereign debt really *is* the new sub-prime!), but rather it is meant to be a helpful tool in the quest to get a handle on everyday expenses we as members of a non-bartering global society incur. I call my project "The ¢entinel: Guardian of Your Dollars and ¢ents" because I look at it as a guard—a weapon, even—against ignorant spending, as well as a guide to informed personal financial planning.

Over my adult life I have used several different software solutions to keep track of my personal finances and have been seriously disappointed in all of them for various reasons—cost and/or functionality being the two biggest. I have yet to come across any software solution that is quick and easy to use, that is effective at keeping me on track with my budget, that is flexible enough to allow me to do some custom charting/graphing and historical analysis, and that is powerful enough to be considered a high-level "one-stop-shop" for mid- and long-term financial planning.

Project Description

The ¢entinel is my preliminary attempt at a solution to these and other personal finance pickles. In its current form, this tool is able to automatically download personal checking account data (only from Wells Fargo's website at this time), format the data and categorize the data according to customized spending categories. This tool can also "learn" over time—meaning that new or unfamiliar expenses will trigger a manual categorization process that the tool will use in future auto-categorization processes.

First off, let's talk security. Before attempting to play around with any financial data, I decided some security measures were in order. When the tool is launched for the first time, the user form (displayed to the right) automatically launches and asks the user to set up a user name and a password for future

A screenshot of a "Security Setup" dialog box. The dialog has a title bar with "Security Setup" and a close button (X). Inside, there are three input fields: "User Name:" with the text "rsw44", "Password:" with a masked password "*****", and "Confirm Password:" with a masked password "*****". An "OK" button is located at the bottom right of the dialog.

access. I built checks into the user form to make sure the user has not left the “User Name”, “Password” or “Confirm Password” fields blank and that the “Password” and “Confirm Password” fields match exactly. When the aforementioned criteria are violated, messages such as these pop up:



Once a user name and password have been set up for the first time, the user is asked to supply the correct user name and password (see below, right) each time the Centinel is launched or if the “Disable Security” button is pressed:

The user also has the option to modify security settings at any time. The user can either change their user name and password or simply just their password (user forms for both security change options are displayed below):

A dialog box titled 'Enter Login Credentials' with a close button in the top right corner. It contains two text input fields: 'User Name:' with the text 'rsw44' and 'Password:' with masked characters '*****'. There is an 'OK' button at the bottom right.A dialog box titled 'Change User Name & Password' with a close button in the top right corner. It contains five text input fields: 'Current User Name:', 'Current Password:', 'New User Name:', 'New Password:', and 'Confirm New Password:'. There are 'OK' and 'Cancel' buttons at the bottom.A dialog box titled 'Change Password' with a close button in the top right corner. It contains four text input fields: 'User Name:', 'Current Password:', 'New Password:', and 'Confirm New Password:'. There are 'OK' and 'Cancel' buttons at the bottom.

Again, I built checks into the user form to make sure the user has entered their current security credentials correctly and that the new credentials are valid.

As previously mentioned, the ¢entinel is able to access the internet in order to download personal financial data (again, Wells Fargo’s website is currently the only financial provider’s website that can be accessed, but building the tool out to access other sites will not be too difficult or time-consuming given that I have the Wells Fargo code as a starting point). A CSV file is downloaded based on a date range that the ¢entinel automatically determines and a sub-procedure is launched that captures all of the relevant data (date of transaction, withdrawal amount, check number, and transaction description) in a dynamic-sized array (i.e. the array must be “re-dimmed” based on the amount of data to be captured). An array, rather than a series of copies and pastes, was used to accomplish this so that the user can maintain control of the Windows clipboard at all times. The follow block of code demonstrates the methodology for migrating data from the CSV file downloaded from Wells Fargo’s website to the ¢entinel without commandeering the clipboard:

```

rowCount = Range("A1").End(xlDown).row
numRows = rowCount - firstRow + 1
ReDim dataArray(numRows * 4 - 1) As String

n = 0
For Each cell In Range("A" & firstRow & ":D" & rowCount)
    dataArray(n) = cell.Value
    n = n + 1
Next

```

The real magic—categorization—happens once the raw data has been transferred to and formatted in the tool. The “Categories” tab in the ¢entinel currently contains several (around twenty or so) custom categories in which any of the newly-downloaded transactions could find themselves. Accompanying these custom categories are lists of some of the most common key words associated with transactions that would fall under the corresponding category. As long as the ¢entinel recognizes key words within the description of a transaction, the categorization process will clip along without the need for any human interaction, as can be seen below:

Transaction Date	Withdrawal Amount	Check No.	Description	Category
1/25/2010	33.14		MCG, INC. WMM, INC. WILCOX, RICHARD S	Paycheck/Direct Deposit
1/26/2010	-50.00	1809	CHECK	Misc.
1/29/2010	-8.68	1807	CHECK	Misc.
1/29/2010	-25.00		COLORADO CASUALT PACKAGE 080926 PLPW321943 WILCOX	Insurance
1/29/2010	-150.00		AMERICAN EXPRESS ELEC REMIT SHARLENE WILCOX	Credit Card Payment
1/29/2010	-100.00		CHASE EPAY XXXXX7290 SHARLENE A WILCOX	
1/30/2010	100.00		MERCER (US) INC. DIR DEP WILCOX,RICHARD S	
2/1/2010	-46.38		GAP, INC CHECKPAYMT 1808 XXXXXXXXXXXXXXXXXX43537	
2/2/2010	-20.00		ATM WITHDRAWAL - 797 W. STATE RD. AMERICAN FRKS UT 5804	
2/3/2010	-46.84	1810	CHECK	
2/6/2010	-17.00	1811	CHECK	
2/14/2010	-18.27		Questar Gas Co. QGC Richard S. Wilcox	
2/15/2010	5.32		DEPOSIT	
2/15/2010	100.00		MERCER (US) INC. DIR DEP WILCOX,RICHARD S	
2/16/2010	-28.00	1812	CHECK	
2/21/2010	-10.00		PACIFICORP E BILL SHARLENE WILCOX	

In terms of sheer logic, the code to make this auto-categorization process possible was the most difficult for me to write. It is essentially a rather complex “Do Loop” with a few embedded “For” and “If” statements:

```
Do
  For x = 1 To catCount
    Worksheets("Categories").Select
    cat = Range("E2").Offset(0, x - 1).Text
    numKeyWords = Range("E1").Offset(0, x - 1).Value
    currColumn = Mid(Range("E1").Offset(0, x - 1).Address, 2, 1)
    Worksheets("WellsFargoChecking").Select
    description = UCase(ActiveCell.Offset(0, -1).Text)
    Worksheets("Categories").Select
    Range(currColumn & "3").Select
    For n = 0 To numKeyWords
      keyWord = UCase(ActiveCell.Text)
      If description <> "" And keyWord <> "" And InStr(1, _
        description, keyWord, vbTextCompare) Then
        Worksheets("WellsFargoChecking").Select
        Application.ScreenUpdating = True
        ActiveCell.Value = cat
        Application.ScreenUpdating = False
        Exit For
      Else
        Worksheets("Categories").Select
        ActiveCell.Offset(1, 0).Select
      End If
    Next
    Worksheets("WellsFargoChecking").Select
    If ActiveCell <> "" Then
      Exit For
    End If
  Next
  If ActiveCell = "" Then
    Set chgCategory = ActiveCell
    prelimNewKeyWords = LCase(description)

    ActiveCell.EntireRow.Select
    With Selection.Interior
      .Pattern = xlSolid
      .PatternColorIndex = xlAutomatic
      .Color = 49407
    End With
    ActiveCell.Offset(0, 4).Select

    Application.ScreenUpdating = True

    Call manCat
```

```

Application.ScreenUpdating = False

ActiveCell.EntireRow.Select
With Selection.Interior
    .Pattern = xlSolid
    .PatternColorIndex = xlAutomatic
    .ThemeColor = xlThemeColorDark1
End With
ActiveCell.Offset(0, 4).Select
End If

ActiveCell.Offset(1, 0).Select

Loop Until ActiveCell.Offset(0, -1) = ""

```

As elegant as the preceding code may be (pat, pat), the ¢entinel may still need a little help from time to time. If the tool doesn't recognize a transaction by its description, the entire line of the transaction is temporarily highlighted in orange (merely for convenience) and a user form prompts the user to pick a category. Whether an existing category is selected or a new category is created, key words can be entered in the "New key word(s)" field and the tool will "know" how to categorize similar transactions in the future. Since these key words are so essential to increasing the automation of the tool, the user gets a little help with the key words. As soon as an existing category is selected from the dropdown box or the typing of a new category is started (both scenarios displayed below), the ¢entinel automatically populates the "New key word(s)" field with the text of the description in question. Once populated, the "New key word(s)" field can be edited or deleted as desired. If the new key words correspond to an existing category, those key words are stored on the "Categories" tab in the appropriate location. If the new key words correspond to a new category, the new category is created on the "Categories" tab along with the corresponding key words.

Withdrawal Amount	Check No.	Description	Category
33.14		MCG, INC. WMM, INC. WILCOX, RICHARD S	
-50.00	1809	CHECK	
-8.68	1807	CHECK	
-25.00		COLORADO CASUALT PACKAGE 080926 PLPW321943 WILCOX	
-150.00		AMERICAN EXPRESS ELEC REMIT SHARLENE WILCOX	
-100.00		CHASE EPAY XXXXX7290 SHARLENE A WILCOX	
100.00		MERCER (US) INC. DIR DEP WILCOX, RICHARD S	
-46.38		GAP, INC CHECKPAYMT 1806 XXXXXXXXXXXXXXXXXXXX43537	
-20.00		ATM WITHDRAWAL - 797 W. STATE RD. AMERICAN FRKS UT 5804	
-46.84	1810	CHECK	
-17.00	1811	CHECK	
-18.27		Questar Gas Co, QGC Richard S. Wilcox	
5.32		DEPOSIT	
100.00		MERCER (US) INC. DIR DEP WILCOX, RICHARD S	
-28.00	1812	CHECK	
-10.00		PACIFICORP E BILL SHARLENE WILCOX	

Let's Pick a Category

Select a category: Autos

New key word(s): Baby Sitting/Daycare

Create new category: Clothing

New key word(s): Costco

Add

Withdrawal Amount	Check No.	Description	Category
33.14		MCG, INC. WMM, INC. WILCOX, RICHARD S	
-50.00	1809	CHECK	
-8.68	1807	CHECK	
-25.00		COLORADO CASUALTY PACKAGE 080926 PLPW321943 WILCOX	
-150.00		AMERICAN EXPRESS ELEC REMIT SHARLENE WILCOX	
-100.00		CHASE EPAY XXXXX7290 SHARLENE A WILCOX	
100.00		MERCER (US) INC. DIR DEP WILCOX, RICHARD S	
-46.38		GAP, INC CHECKPAYMT 1808 XXXXXXXXXXXXXXXXXXXX43537	
-20.00		ATM WITHDRAWAL - 797 W. STATE RD. AMERICAN FRKS UT 5804	
-46.84	1810	CHECK	
-17.00	1811	CHECK	
-18.27		Questar Gas Co. QGC Richard S. Wilcox	
5.32		DEPOSIT	
100.00		MERCER (US) INC. DIR DEP WILCOX, RICHARD S	
-28.00	1812	CHECK	
-10.00		PACIFICORP E BILL SHARLENE WILCOX	

Let's Pick a Category

Select a category:

New key word(s):

Confirm

Create new category:

New key word(s):

Add

While I was not able to incorporate all of my ideas into this first iteration of the ¢entinel (I have already surpassed 40 hours of work up to this point), I am determined to build upon what I have thus far accomplished.

Next Steps

In its final form, the ¢entinel will assist the user in setting up a custom budget, seamlessly import banking and credit card transaction data from multiple financial websites, manipulate that data into a clean and simple format, and give the user some graphical feedback on budgeted versus actual expenditures for the week/month/quarter, etc. It will also have an "Export to Excel" option for custom analysis at the user's discretion.

Because of my educational background in finance and statistics and my expertise in actuarial pension consulting, I have other plans for this tool such as mortgage and retirement planning modules. I also plan to build in email/text message alerts that alert the user when certain customized spending limits are reached, when a paycheck has been direct-deposited or when potentially fraudulent charges are made on one of the user's accounts.

Whether I could ever be able to monetize the ¢entinel is questionable. At the very least, I plan to share later iterations of this potentially powerful tool with friends and family so that they too can manage their money without their money managing them.