**Activity: Using VBA with Excel**

The purpose of this activity is to familiarize the student with simple programming code as used in VBA, Visual Basic for Applications. VBA is designed for most of MS Office applications. We will be working with Excel since you are already familiar with that application.

We will try to illustrate graphically what is known as the law of large numbers. If you flip a coin 5 times you might get 5 heads. If you flip a coin 100, 500 or 1000 times, the probability of heads will approach 0.5.

1. Open an Excel worksheet and name it Activity\_yourname.
2. Enter the VBA editor by pressing ALT+F11, then press F5 and name this macro ‘coin\_flipper’.
3. In the edit window enter the code that appears at the end of this handout. Carefully enter the code, starting with *Sub coin\_flipper()* and ending with *End Sub*. You can omit the remarks but read them – the remarks are the lines of code that begin with an apostrophe. You don’t have to save the code. It is part of the Excel file.
4. After entering the code, create a macro RUN button:
a) Is the ‘Developer’ tab showing in the ribbon? If not: click on the File tab, Options, Customize Ribbon, and under *Customize the Ribbon – Main Tabs* check the box in front of the word *Developer*.

b) Click on the Developer tab, select Insert, then select the first tool which is a ‘form control’ button. Draw a rectangle in the right half of your worksheet that is about 2 columns wide and 3 rows deep.
c) After the button is drawn, assign the macro ‘coin\_flipper’ to the button (in the Assign Macro box which automatically pops up – double click on “coin\_flipper”.)
d) Rename the button to ‘Flip coin 100 times’. Carefully highlight the old name to do this, then rename it.
e) Close the toolbox window

1. You can now RUN the macro by clicking on the “Flip coin 100 times” button
2. If the macro runs and doesn’t stop (it can happen), press Esc and select STOP or DEBUG.

**CODE** for Coin Toss Excel program using a macro

You do not need to enter the comments in the code below; comments are preceded by an apostrophe and italicized in the code below. However, it is a good idea to include the comments which explain the lines that follow. If you review this code much later, the comments help you remember what the code is for.

Sub coin\_flipper()

***‘first spin the random number generator***

Randomize

***' clear values in cells, first 4 columns***

For Row = 1 To 100

 For Col = 1 to 4

 Cells(Row, Col) = Null

 Next Col

Next Row

***' recalculate spreadsheet***

Calculate

***' put 1-100 in first column***

For Row = 1 To 100

Cells(Row, 1) = Row

Next Row

***' put 1 or 0 in column 2 (if <0.5, put 1, else 0)***

For Row = 1 To 100

R = Rnd()

If R < 0.5 Then

Cells(Row, 2) = 1

Else
Cells(Row, 2) = 0

End If

Next Row

***' accumulate the number of 1s ( heads) in column 3***

Cells(1, 3) = Cells(1, 2)

For Row = 2 To 100

Cells(Row, 3) = Cells(Row - 1, 3) + Cells(Row, 2)

Next Row

***' divide heads count by row number (this is percentage of heads)***

For Row = 1 To 100

Cells(Row, 4) = Cells(Row, 3) / Row

Calculate

Next Row

End Sub

Be sure ‘End Sub’ occurs only once. It should already be there – do not add an extra ‘End Sub’ to the program code.