VBA Vibes

Data Boot Camp

Lesson 2.1

Introduction to Programming Logic

Ooh, Coding! (Sort of…)

In a way, using Excel has introduced you to a sort of proto-programming. When writing scripts in VBA, you will rely on `functions` (methods) that do something to or with `arguments`.

`=`	`SUM(`	`1, 2, 3`	`)`
	Function	**Arguments**	**Function**

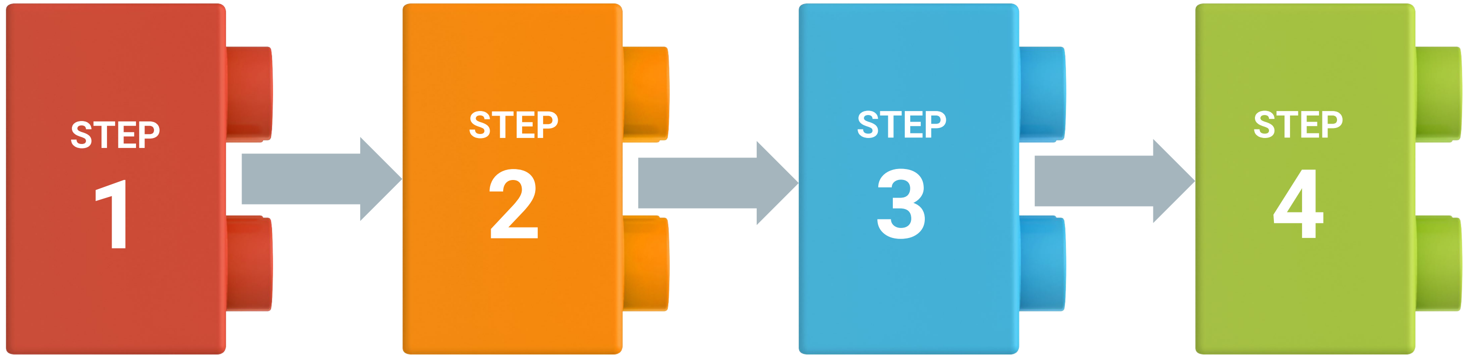
How a Computer Thinks (Procedurally)

Every problem in software development begins with a complex and abstract real-world need.

How a Computer Thinks (Procedurally)

In order for a computer to interpret it, the real-world problem must be broken down into a set of procedural steps.

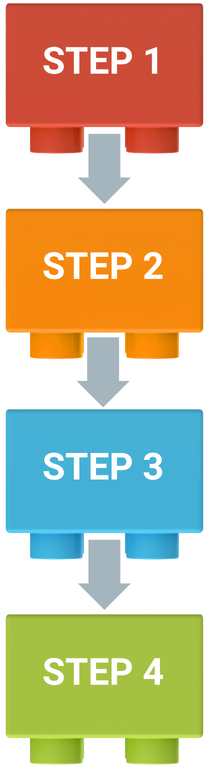
Complex Real-World Problem



How Code Is Written (Procedurally)

Code (Python)

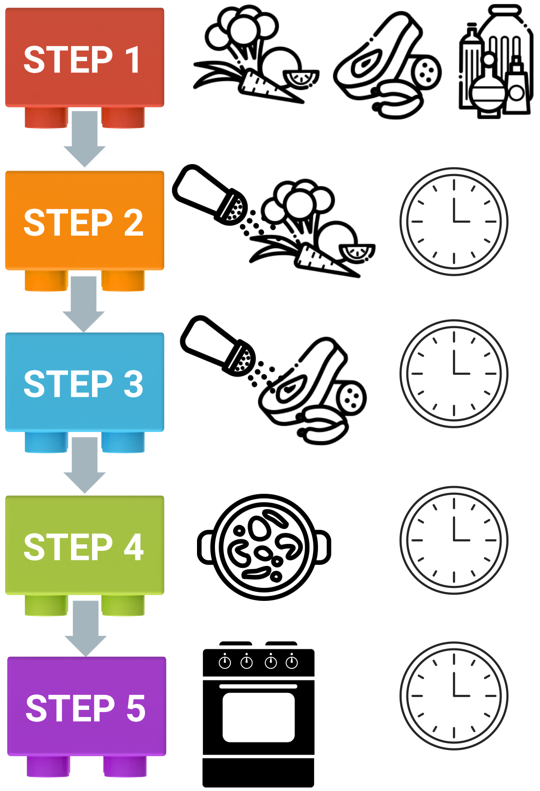
```
# STEP 1
# ------------------------
thingamagig = 500
doodad = 500

# STEP 2
# ------------------------
combinedThing = thingamagig + doodad

# STEP 3
# ------------------------
runContraption(combinedThing)

# STEP 4
# ------------------------
resetContraption()
```



When Procedures Aren't Enough... We Need More Tools!

Code (Python)

```
# STEP 1
# ------------------------
ingredient1 = vegetables
ingredient2 = meat
ingredient3 = spices

# STEP 2
# ------------------------
season(vegetables)

# STEP 3
# ------------------------
season(meats)

# STEP 4
# ------------------------
stirfry(vegetables)

# STEP 5
# ------------------------
roast(meats)
```



Fundamental Tools of Programming

These structures are found in nearly all programming languages:

- Conditionals
- Iterations
- Functions
- Variables/Arrays

To Make Vegemite on Toast

To Make Vegemite on Toast

Logical Procedure:

01 Get bread, butter, and Vegemite from pantry.

02 Lay out bread on table.

03 Open your butter and Vegemite jar.

04 Get spreading knife.

05 Toast bread to your desire.

06 Use knife to spread butter.

07 Use knife to spread thin layer of Vegemite.

Fundamental Tools Can Help Make our Vegemite on Toast

We use these tools as building blocks to make an ideal sandwich procedure:

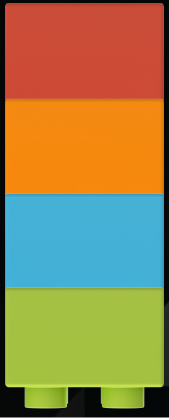
Conditionals—If butter is too thin, use less spread.

Iterations—While there is more unbuttered area of toast, add more butter.

Functions—Spread the condiments using a knife.

Variables/Arrays—The ingredients are bread, butter, and Vegemite.

VBA Building Blocks



Variables and Arrays

Variables: The Nouns of Code

- **Variables** are effectively the items in a procedure.
- They can be **physical things** (like an ingredient) or **abstractions** (like a counter).
- In VBA, items can be **declared** as variables by using dim followed by the type. Then they can be **assigned** a value.

Variable Declaration

```
dim ing1 as String
dim ing2 as String
dim budget as Double
```

Variable Assignment

```
ing1 = "Vegemite"
ing1 = "Butter"
budget = 5.00
```

Array: A Collection of Items

Arrays are effectively **groups** of related items. They present another way to store and reference similar pieces of information.

Item 0	**Item 1**	**Item 2**
`["Vegemite",`	`"Butter",`	`"Bread"]`

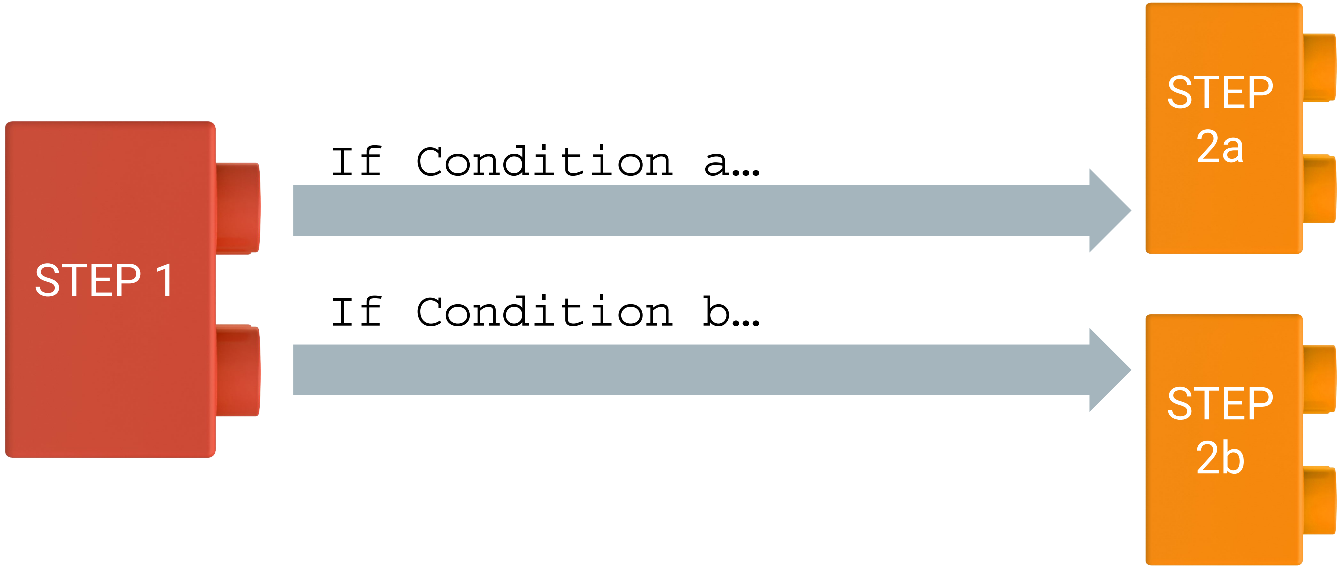
```
dim ingredients(0 to 2) as String

ingredients(0) = "Vegemite"
ingredients(1) = "Butter"
ingredients(2) = "Bread"
```

Conditionals

Conditionals: If This, Then That

Conditionals can control the flow of logic based on certain conditions being met.

In most languages, you use **if/else** code for this purpose.

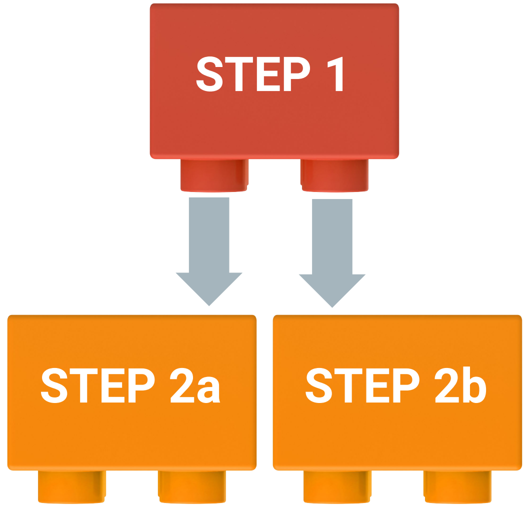


Conditionals: If This, Then That

In VBA, conditionals are declared using the keywords **If**, **Then**, **Elseif, Else**, and **End if**.

VBA lets us create far more sophisticated conditional logic than with Excel formulas alone.

```
If (btThickness > 1.0) Then
   stopSpreading()

Else
   stopMore()

End if
```

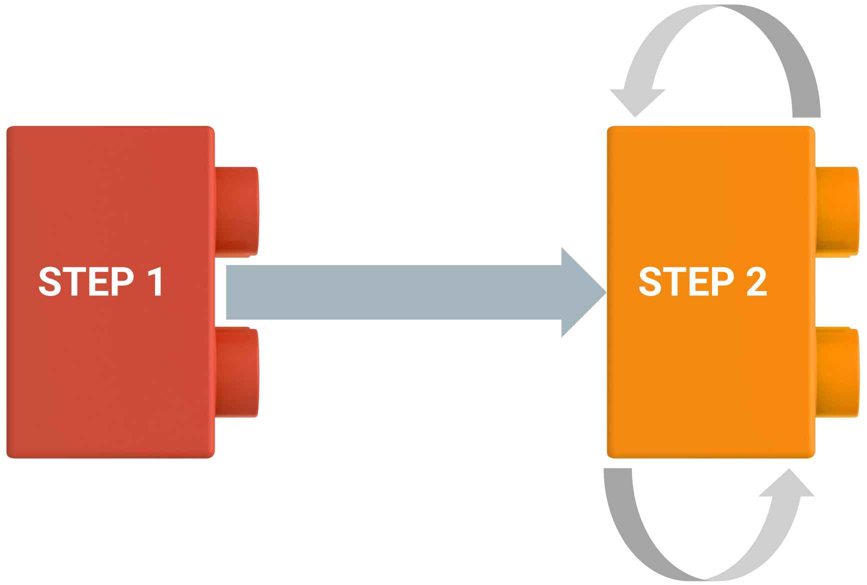


Iteration (Looping)

Iteration: Round and Round We Go!

Iteration is the concept of using loops to perform a group of tasks repeatedly a number of times.

Almost all programming languages use **for loops** and **while loops** for iteration.



STEP (repeat X times)

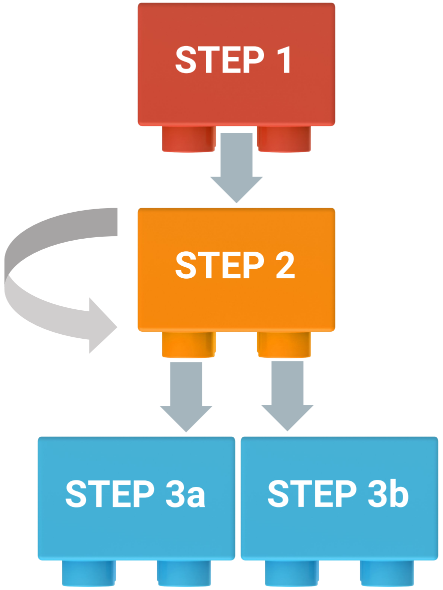
Iteration: Round and Round We Go!

This code will make more sense later. Basically, it’s the VBA way of repeating the same block multiple times.

```
' Repeat the same step until i becomes 20
For i = 0 to 20

    ' Each time spread more
    spreadMore()

' Add one to the value of i each time
Next i
```

Build the Program!

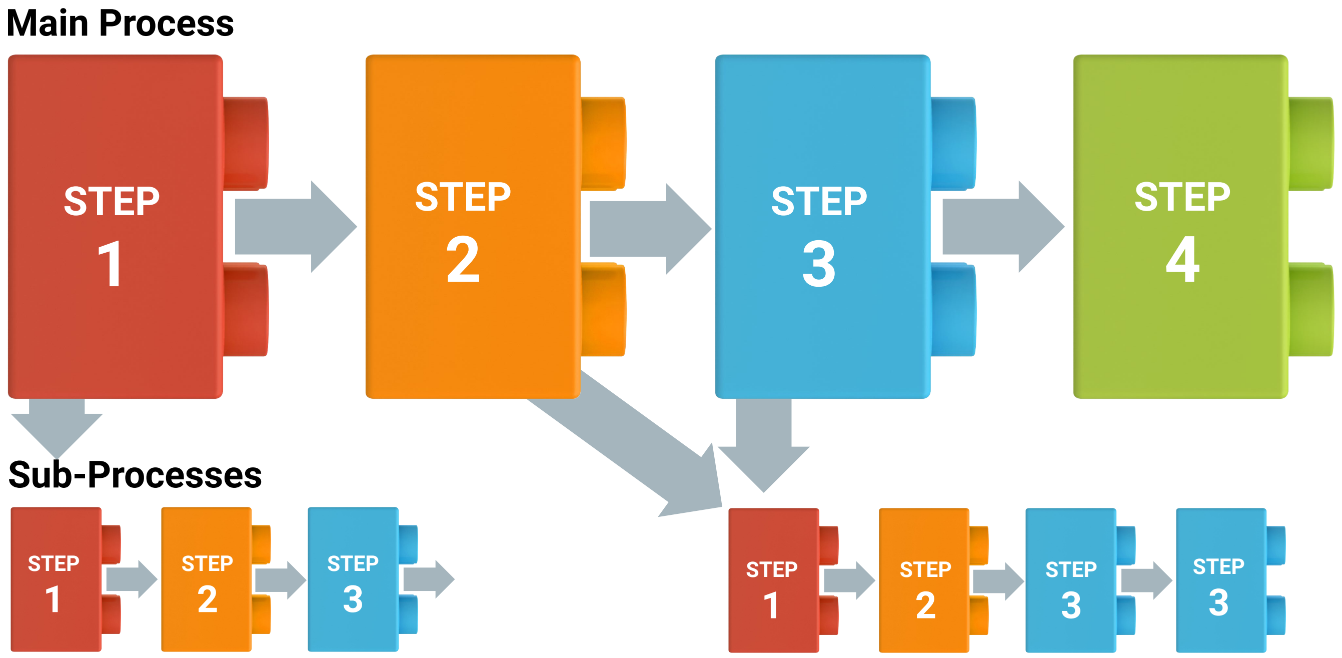
```
' Get ingredients
dim ing1, ing2, ing3 as String
ing1 = "Vegemite"
ing2 = "Butter"
ing2 = "Bread"

' Repeat this spreading process a max of 5 times
for i = 1 to 5

    ' Each time, check that you haven't spread too much.
    if vegemiteThicknewss >= 1.0 then

       ' If you have spread too much, stop spreading.
       stopSpreading()

    ' Otherwise...
    else:

        ' Keep spreading.
        SpreadMore()
    end if

next i
```



Functions

Functions: When One Block Can't Do It All!

In essence, **functions** are a sort of sub-process. They let you create premade, reusable blocks of code that can be called on demand.



Putting It All Together

To Make Vegemite on Toast

Logical Procedure:

01 Get bread, butter, and Vegemite from pantry.

02 Lay out bread on table.

03 Open your butter and Vegemite jar.

04 Get spreading knife.

05 Toast bread to your desire.

06 Use knife to spread butter.

07 Use knife to spread thin layer of Vegemite.

To Make Vegemite on Toast (One Full Set of Logic Steps)

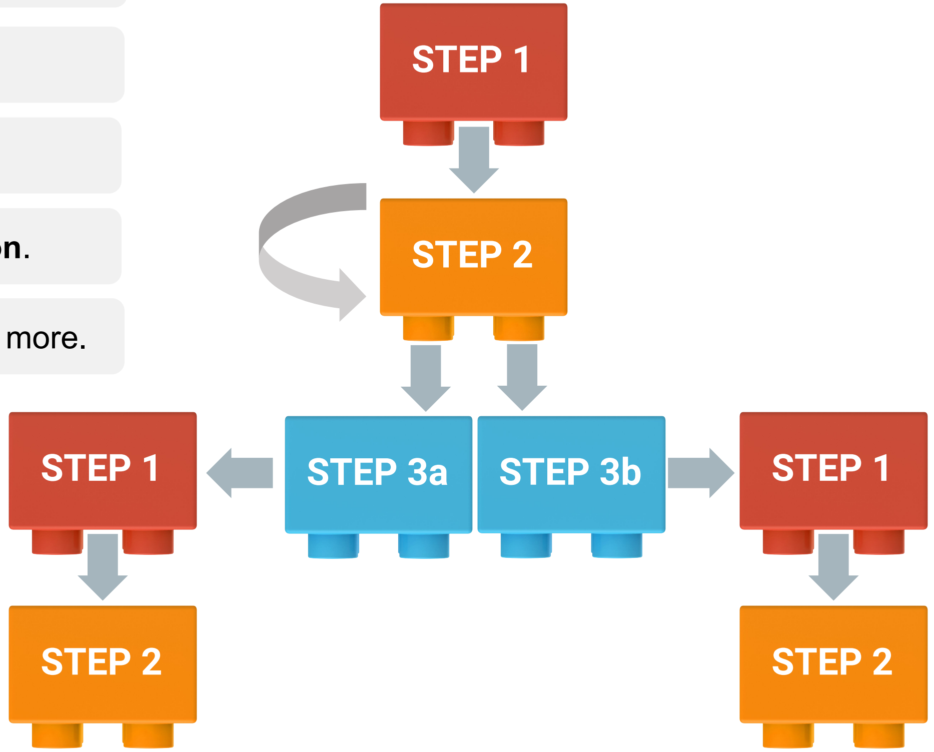
01 Get items.

02 **Repeatedly** ‘spread the butter’.

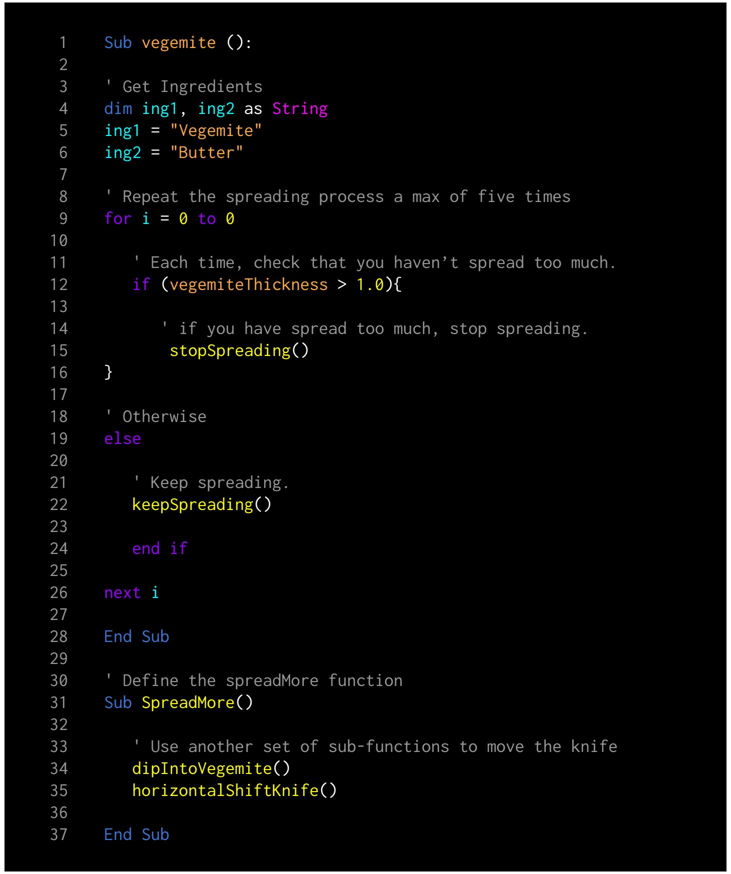
03 Check if thickness **condition** is met.

3a If thickness condition is met, run stop **function**.

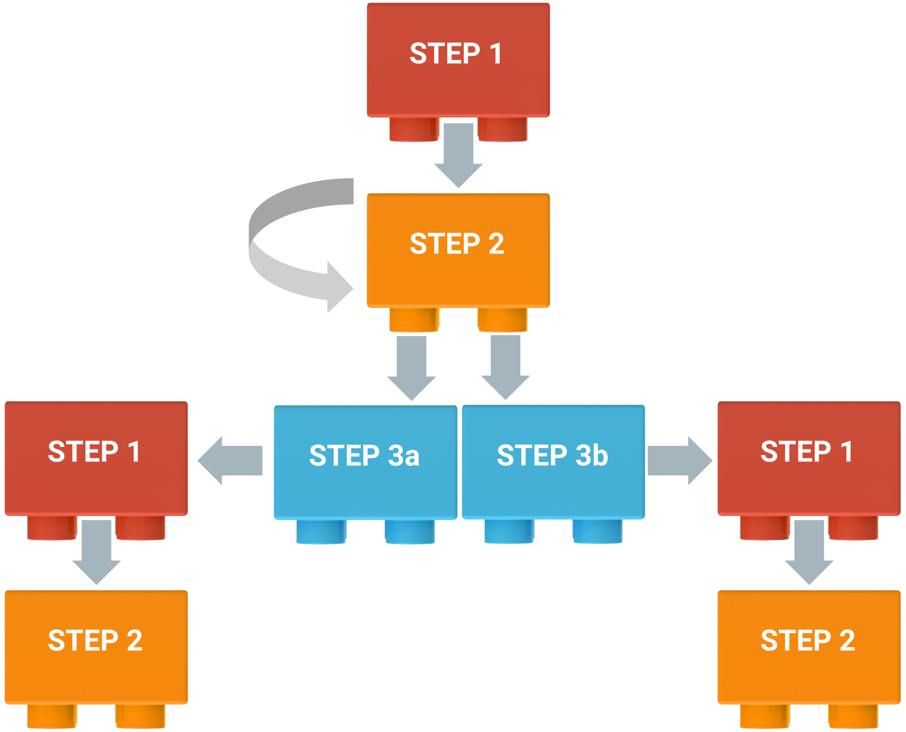
3b If thickness condition is **not** met, then spread more.



To Make a Sandwich (in Code)



```
Sub vegemite ():

' Get Ingredients
dim ing1, ing2 as String
ing1 = "Vegemite"
ing2 = "Butter"

' Repeat the spreading process a max of five times
for i = 0 to 0

   ' Each time, check that you haven’t spread too much.
   if (vegemiteThickness > 1.0){

      ' if you have spread too much, stop spreading.
       stopSpreading()
}

' Otherwise
else

   ' Keep spreading.
   keepSpreading()

   end if

next i

End Sub

' Define the spreadMore function
Sub SpreadMore()

   ' Use another set of sub-functions to move the knife
   dipIntoVegemite()
   horizontalShiftKnife()

End Sub
```



Big Picture!

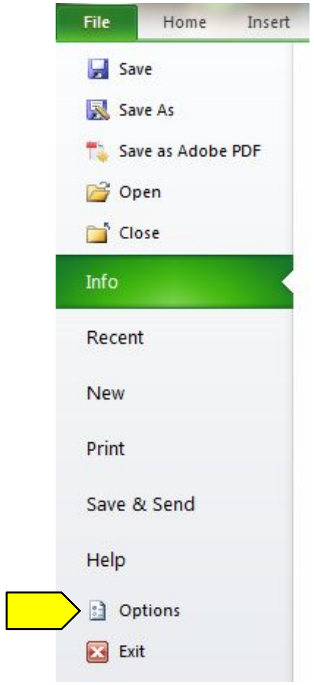
Coding = creating building blocks and putting them together

Let’s Get Coding!

Add Developer Tools: Windows

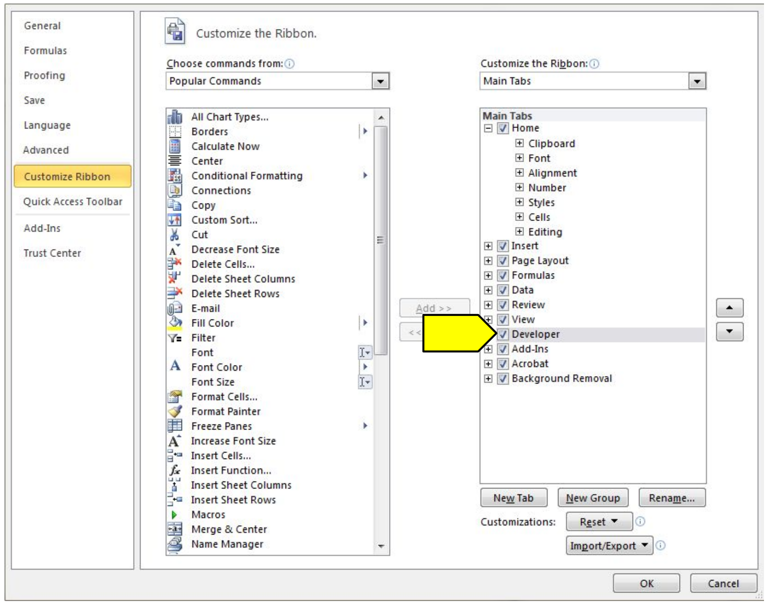
01

Go to **File > Excel Options**.



02

Then go to **Customise Ribbon**, choose **Main Tabs** in the right pane, and make sure **Developer** is checked.


Customize the Ribbon.

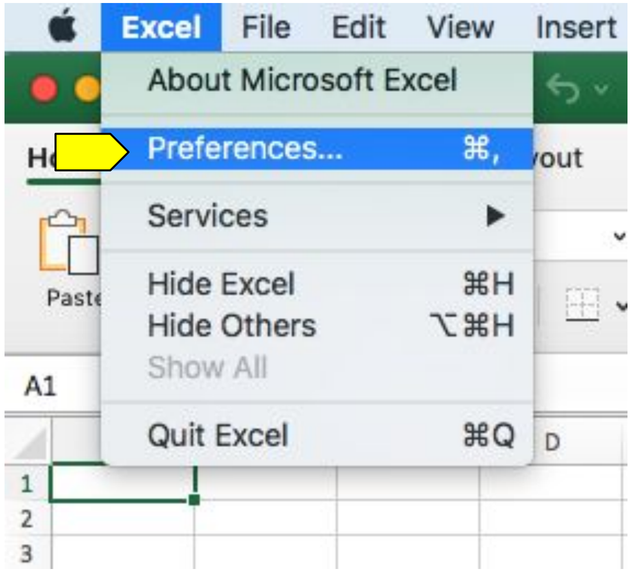
Choose commands from: Popular Commands

Customize the Ribbon: Main Tabs

Add Developer Tools: Mac

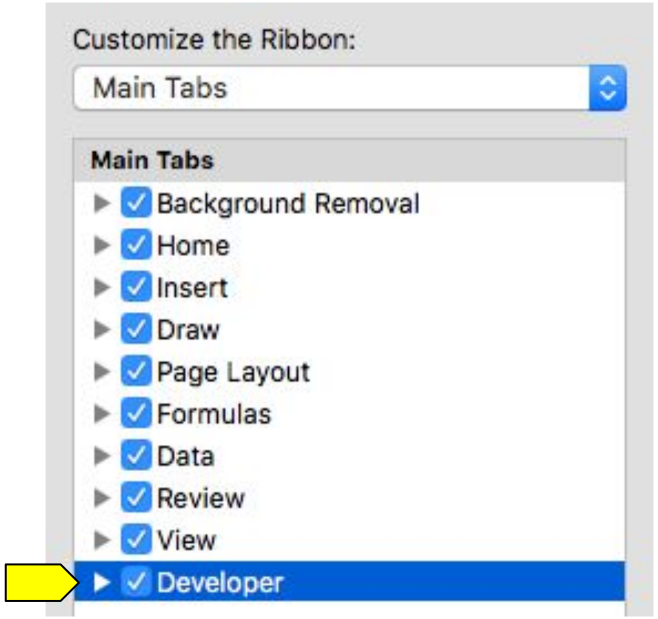
01

Go to **Excel > Preferences**.



02

Then go to **Ribbon & Toolbar**, select **Main Tabs** in the right pane, and make sure **Developer** is checked.



Customize the Ribbon: Main Tabs

Main Tabs

- ✓ Background Removal
- ✓ Home
- ✓ Insert
- ✓ Draw
- ✓ Page Layout
- ✓ Formulas
- ✓ Data
- ✓ Review
- ✓ View
- ✓ Developer

Questions?