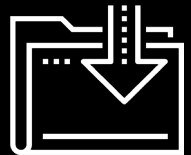




Getting Real with VBA

Data Boot Camp
Lesson 2.3



Today, this is you.





What does “coding requires thinking procedurally” mean?

How a Computer Thinks (Procedurally)

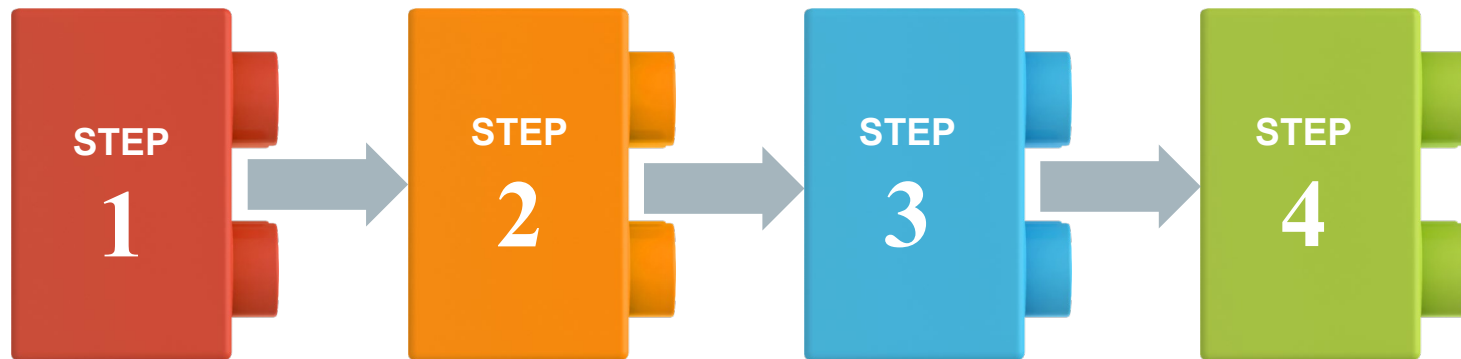
Every software development problem begins with a complex and abstract real-world need.



How a Computer Thinks (Procedurally)

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

Complex Real-World Problem



How Code Is Written (Procedurally)

Code (JavaScript)

```
1 // STEP 1
2 // -----
3 var thingamagig = 500;
4 var doodad = 200;
5
6 // STEP 2
7 // -----
8 var combinedThing = thingamagig + doodad
9
10 // STEP 3
11 // -----
12 runContraption (combinedThing);
13
14 // STEP 4
15 // -----
16 resetContraption ();
```





What are the four fundamental tools of programming?

Fundamental Tools of Programming

These structures are found in nearly all programming languages:



Conditionals



Iterations



Functions



Variables / 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 a 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 = "Peanut Butter"  
ing1 = "Jelly"  
budget = 5.00
```

Array: A Collection of Items

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

Item 0

Item 1

Item 2

["Peanut Butter" ,	"Jelly" ,	"Bread"]
---------------------	-----------	-----------

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

```
ingredients (0) = "Peanut Butter"
```

```
ingredients (1) = "Jelly"
```

```
ingredients (2) = "Bread"
```

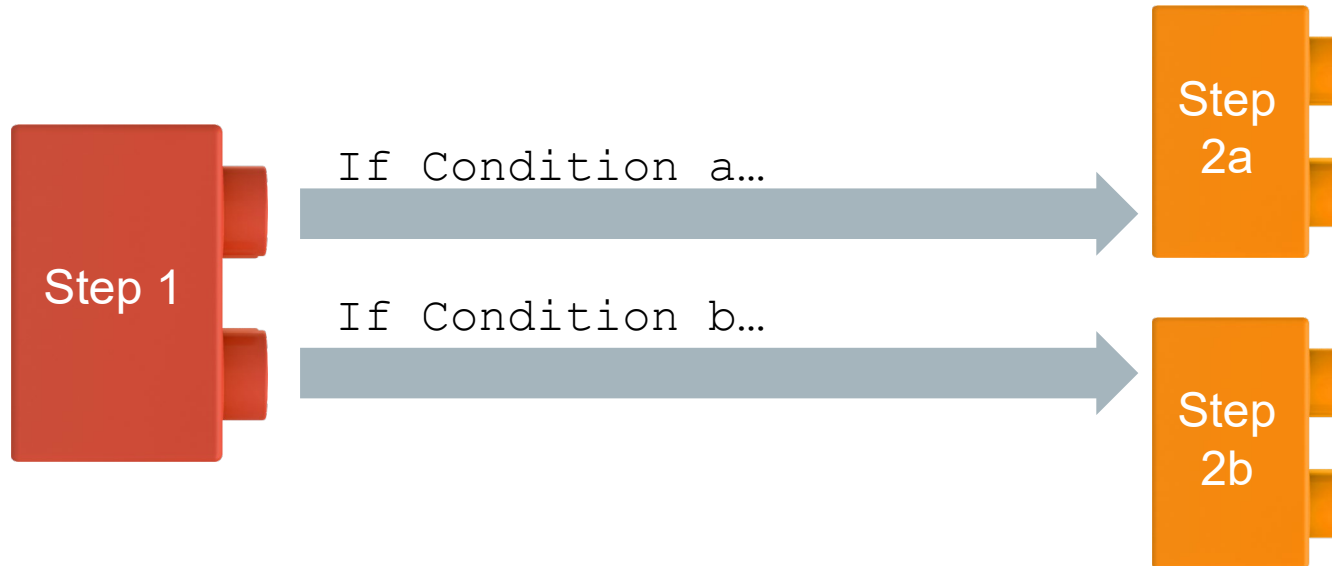
Conditionals: If This, Then That



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



Most programming languages use **if/else** code for this purpose.



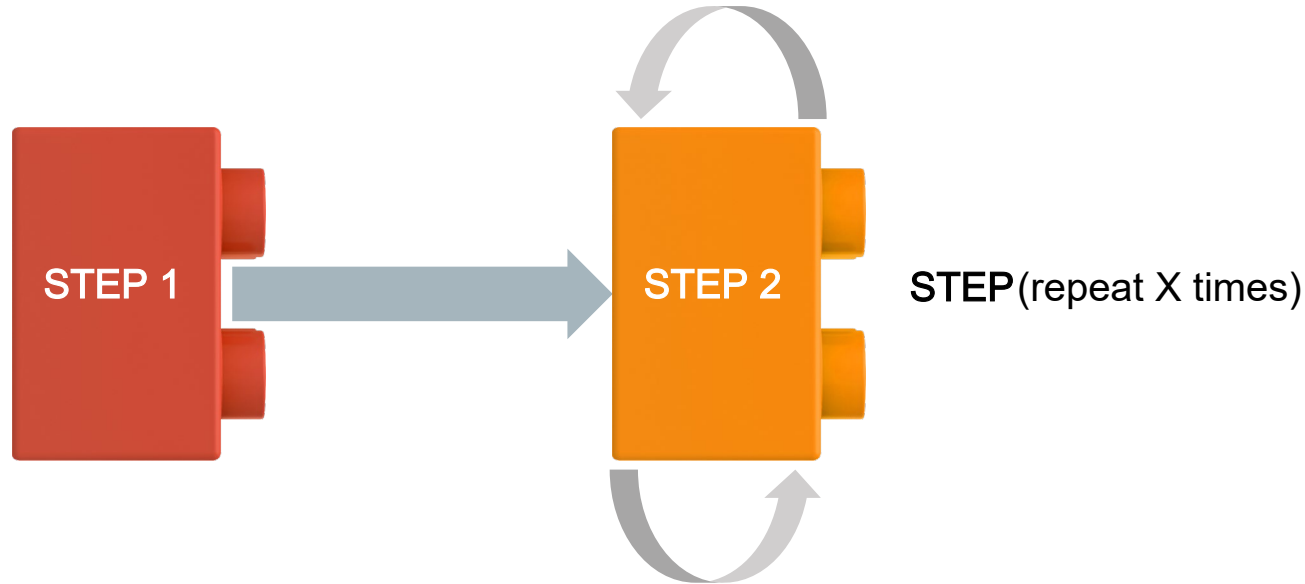
Iteration: Round and Round We Go!



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



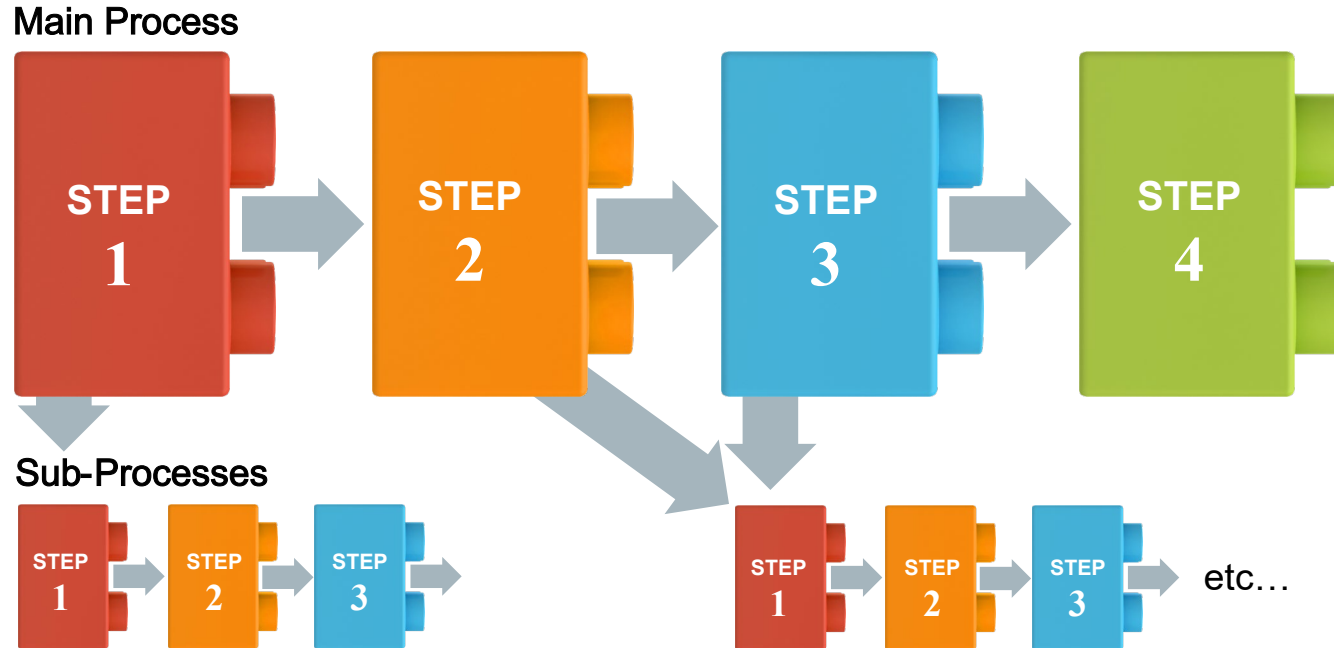
Almost all programming languages use **for loops** and **while loops** for iteration.



Functions

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

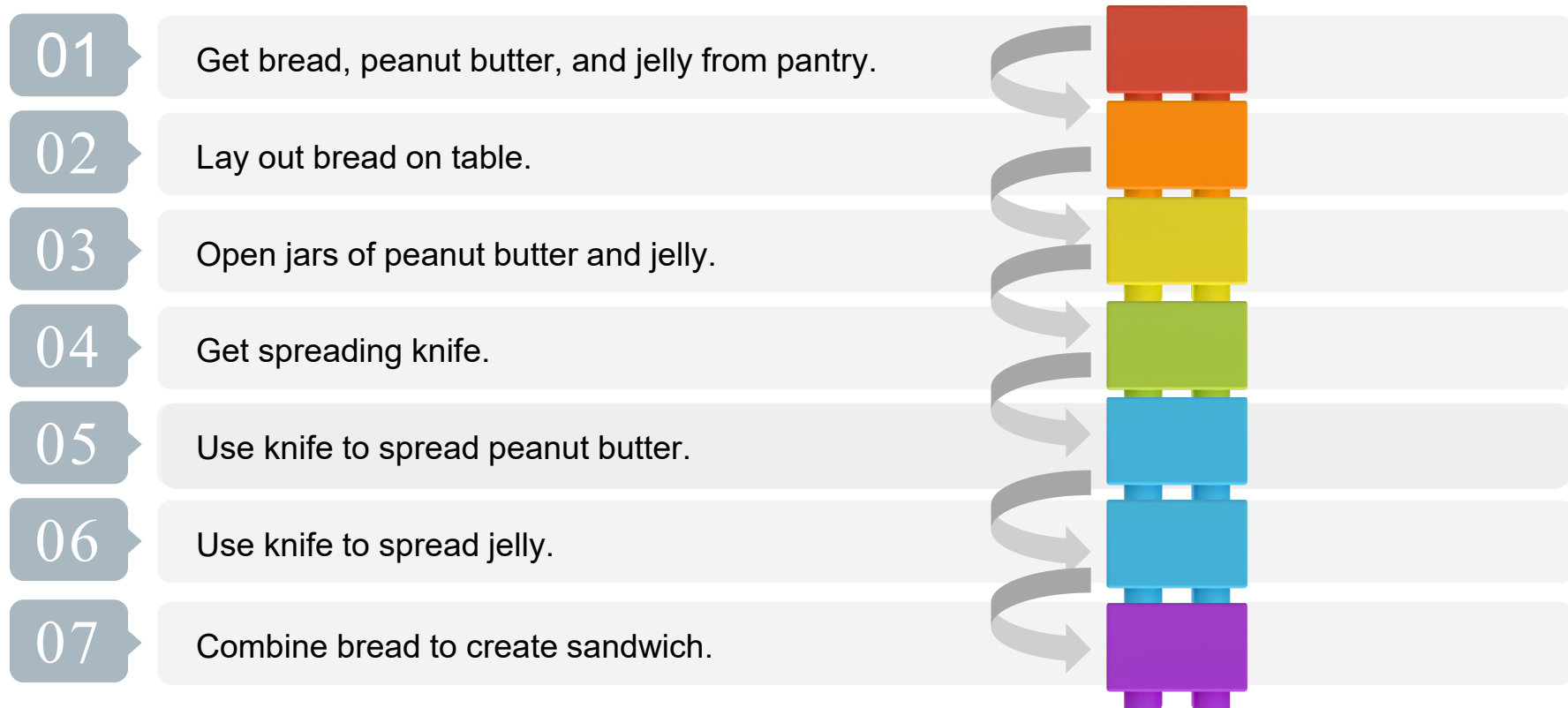
Functions are, in essence, a sort of sub-process. They allow us to create premade, reusable blocks of code that can be called on demand.



Thinking Procedurally

To Make a Sandwich:

Logical Procedure:





Words of Advice

Advice #1

There is no cram.



Advice #2

If you ever spend more than 10 hours on homework in a week without seeing progress, ask for help!

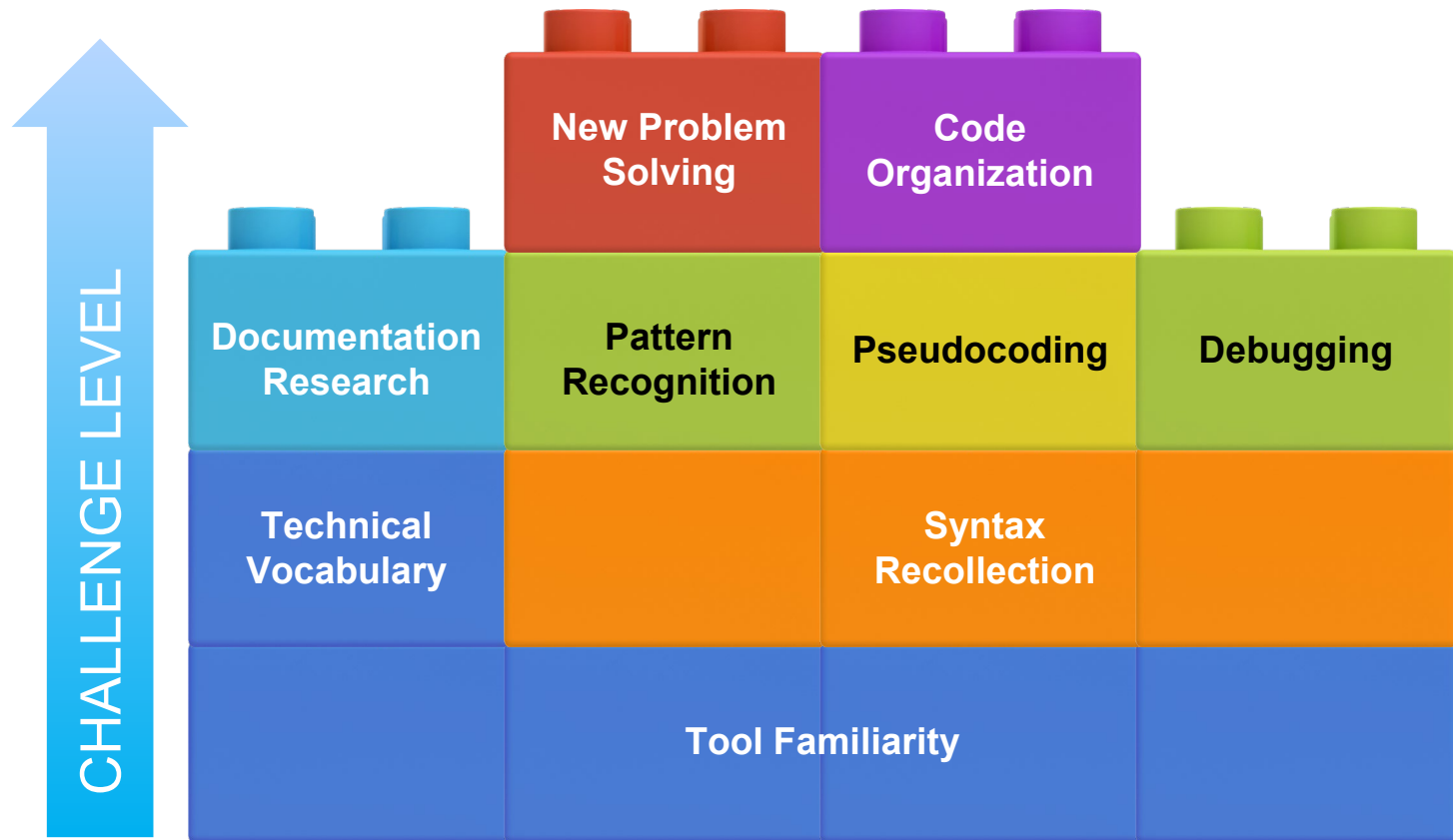


Advice #3

Study the right way.



Study the Right Way



For Loops













Explain to a Baby

What is a **for loop** ?



What Will This Code Do?

```
Sub QuickLoop()  
    For i = 1 to 3  
        MsgBox(Cells(i, 1))  
    Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 1

```
Sub QuickLoop()  
  For i = 1 to 3  
    MsgBox(Cells(i, 1))  
  Next i  
End Sub
```













	A	B	C
1	Michael i = 1 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 2

```
Sub QuickLoop()  
  For i = 1 to 3  
    MsgBox(Cells(i, 1))  
  Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan i = 2 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 3

```
Sub QuickLoop()  
  For i = 1 to 3  
    MsgBox(Cells(i, 1))  
  Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie i = 3 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

Not going to:

i = 4

```
Sub QuickLoop()  
  For i = 1 to 3  
    MsgBox(Cells(i, 1))  
  Next i  
End Sub
```

	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie  i = 3	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 













Explain to a Baby

What is a **nested** for loop?



What Will This Code Do?

```
Sub QuickLoop()  
    For i = 1 to 4  
        For j = 1 to 3  
            MsgBox(Cells(i, j))  
        Next j  
    Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 1 **j** = 1

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael i = 1 j = 1 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 1 **j** = 2

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael i = 1 	Luis j = 2 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 1 **j** = 3

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael i = 1 	Luis 	Jin Yong j = 3 
2	Evan 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 2 **j** = 1

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan i = 2 j = 1 	Mariah 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 2 **j** = 2

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan i = 2 	Mariah j = 2 	Ricky 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 2 **j** = 3

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```













	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan i = 2 	Mariah 	Ricky j = 3 
3	Jamie 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

What Will This Code Do?

When:

i = 3 **j** = 1

```
Sub QuickLoop()  
  For i = 1 to 4  
    For j = 1 to 3  
      MsgBox(Cells(i, j))  
    Next j  
  Next i  
End Sub
```

	A	B	C
1	Michael 	Luis 	Jin Yong 
2	Evan 	Mariah 	Ricky 
3	Jamie i = 3 j = 1 	Ron 	Mateo 
4	John 	Lakshmi 	Adhira 

Oh... and one more thing...

Data Types!

Here are a few that we have covered.

More can be found in the [VBA documentation](#).

(also available in your Student Guide)

Data type	Storage size	Range
String (variable-length)	10 bytes + string length	0 to approximately 2 billion
Integer	2 bytes	-32,768 to 32,767
Double (double-precision floating-point)	8 bytes	-1.79769313486231E308 to -4.94065645841247E-324 for negative values 4.94065645841247E-324 to 1.79769313486232E308 for positive values
Long (Long integer)	4 bytes	-2,147,483,648 to 2,147,483,647
Date	8 bytes	January 1, 100, to December 31, 9999
Boolean	2 bytes	True or False



Let's Get Coding!