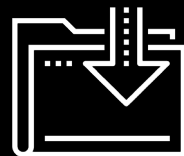


Data Boot Camp
Lesson 2.2



Today, this is you.



Refresher



What does “coding requires thinking procedurally” mean?

How a Computer Thinks (Procedurally)

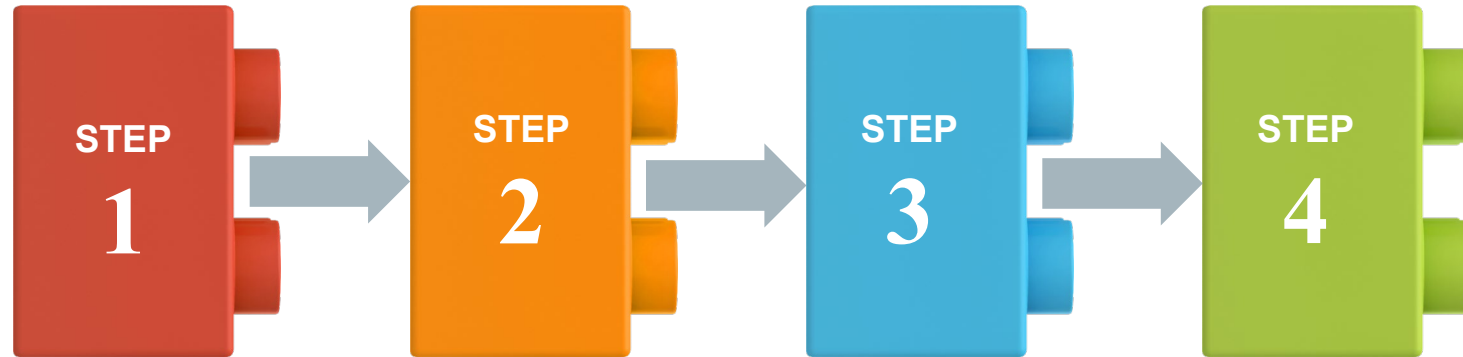
Every software development problem begins with a complex and abstract real-world need.



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"
```

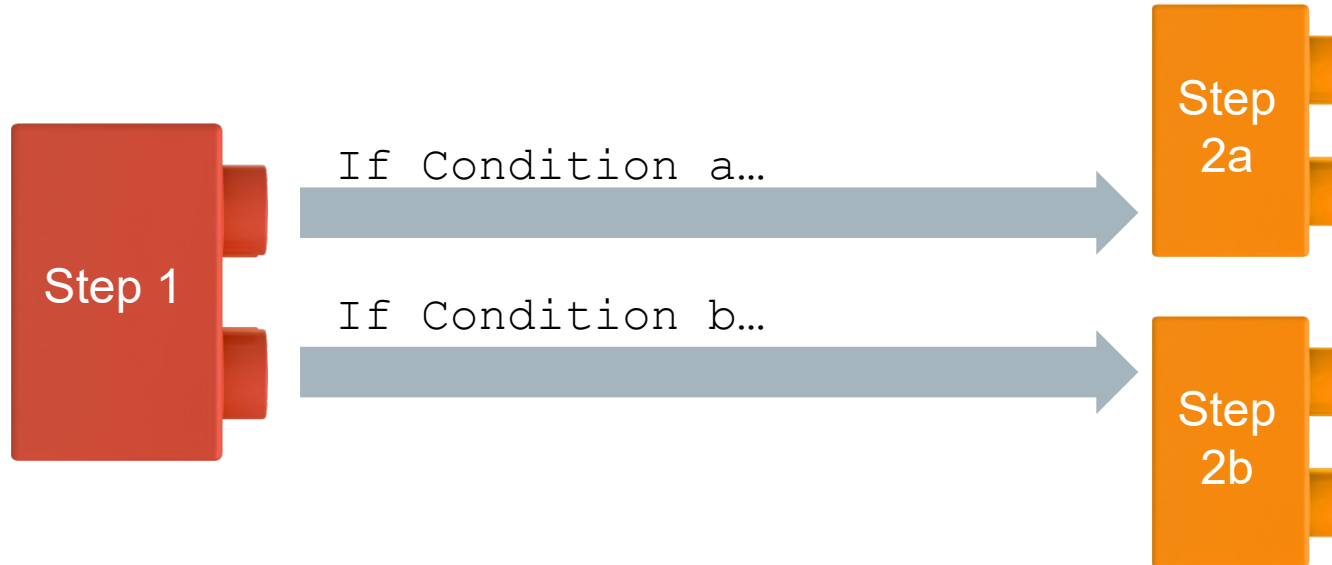
Conditionals: If This, Then That



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



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



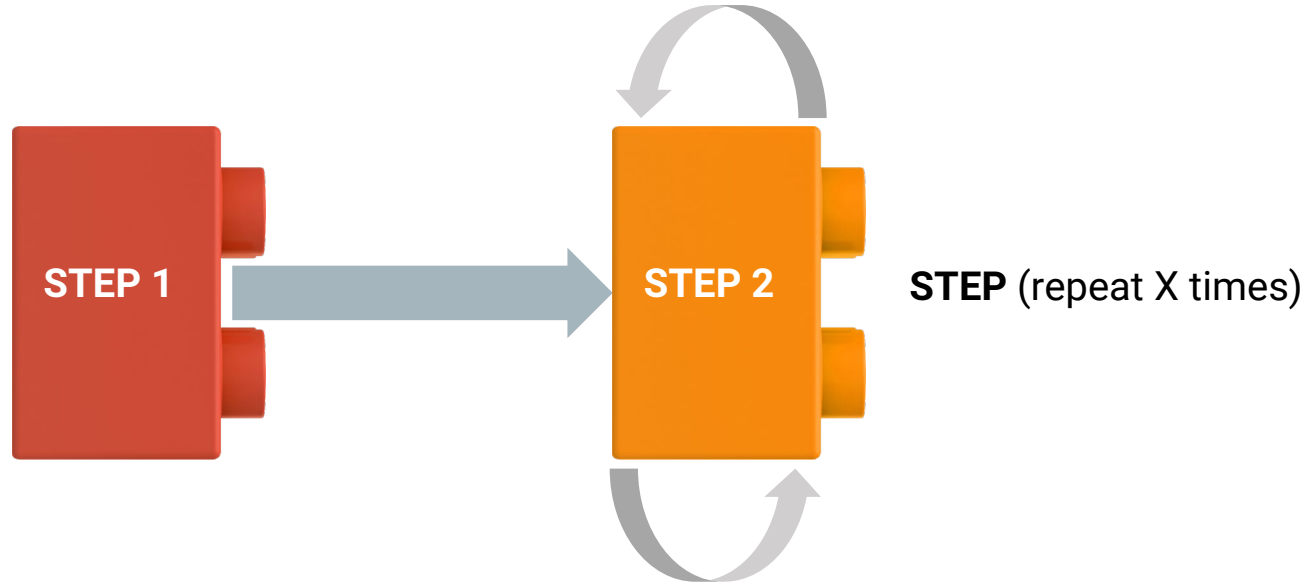
Iteration: Round and Round We Go!



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.

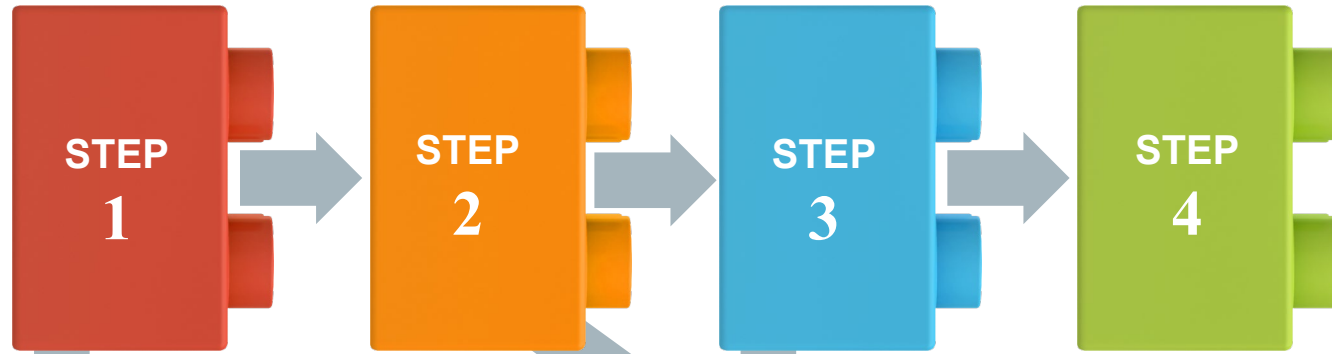


Functions

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.

Main Process



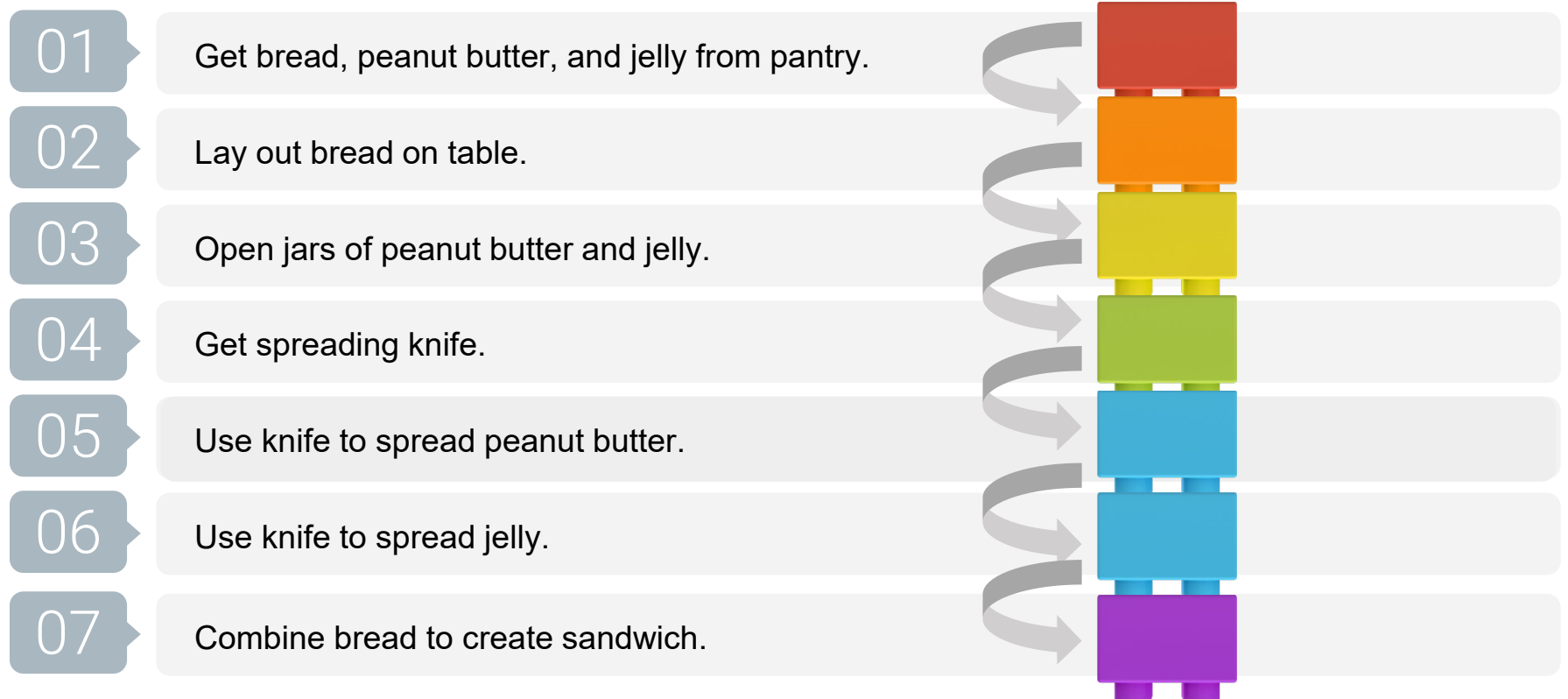
Sub-Processes



Thinking Procedurally

To Make a Sandwich:

Logical Procedure:



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!