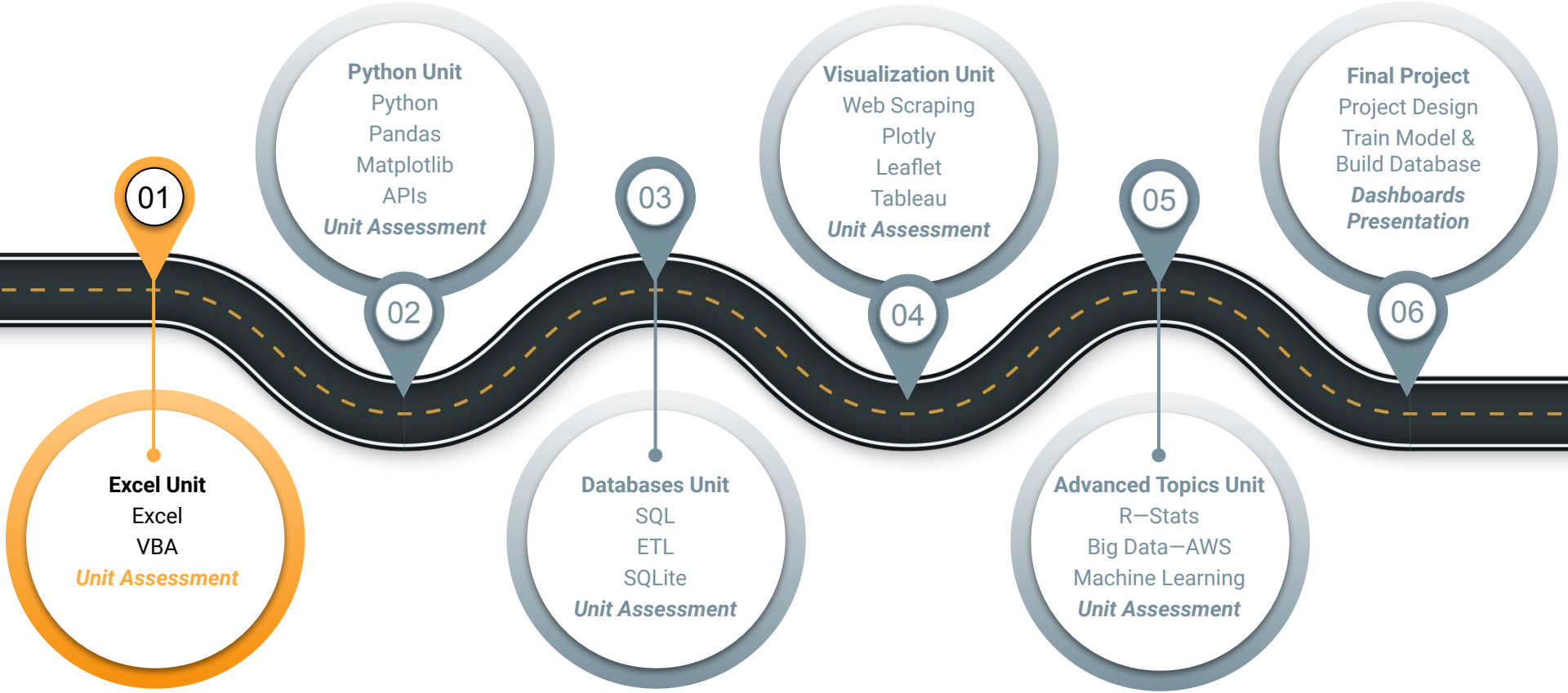
VBA

Data Boot Camp

Lesson 2.1

The Big Picture



Module 2

This Week: VBA

This Week: VBA

By the end of this week, you'll know how to:

- Create a macro that can trigger pop-ups and inputs, read and change cell values, and format cells
- Use for loops and conditionals to direct logic flow
- Use nested for loops
- Apply coding skills such as syntax recollection, pattern recognition, problem decomposition, and debugging

This Week's Challenge

Using the skills learned throughout the week, refactor existing code to make a VBA macro run more efficiently.

Career Connection

How will you use this module's content in your career?

Module 2

How to Succeed This Week

Quick Tip for Success:

Take full advantage of office hours and your support network. Refactoring this Challenge code might be tricky! Don’t be worried if you also need help with GitHub.

Module 2

Today’s Agenda

Today’s Agenda

By completing today’s activities, you’ll learn the following skills:

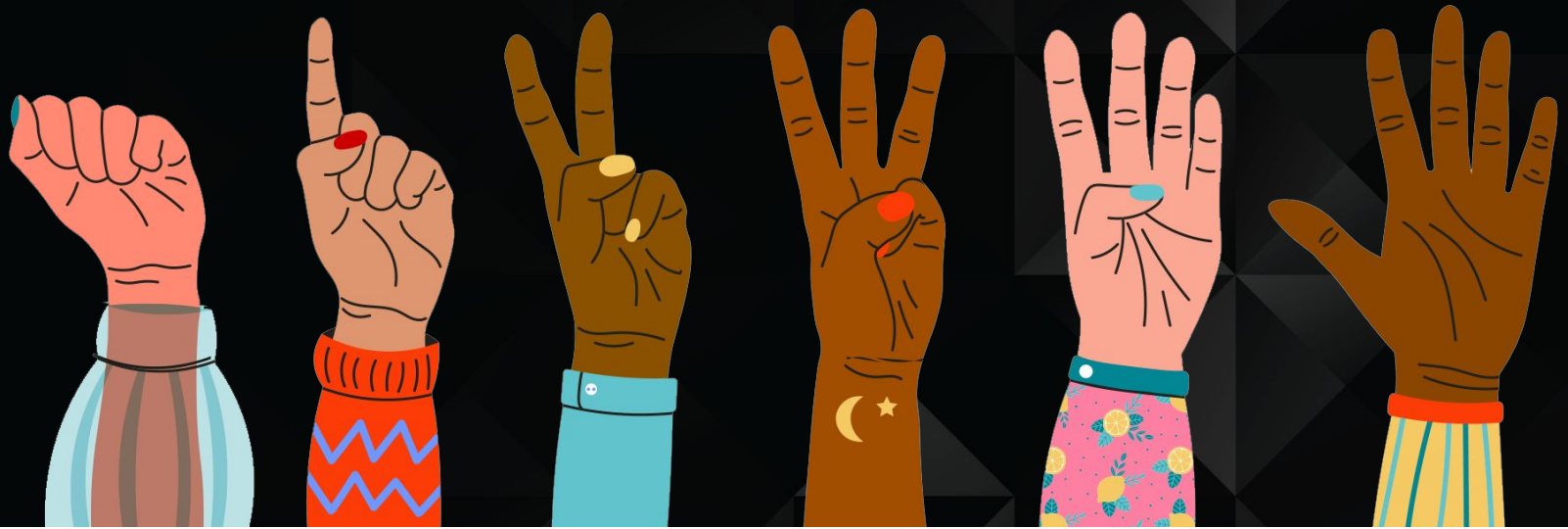
01 VBA Macros

02 Conditionals

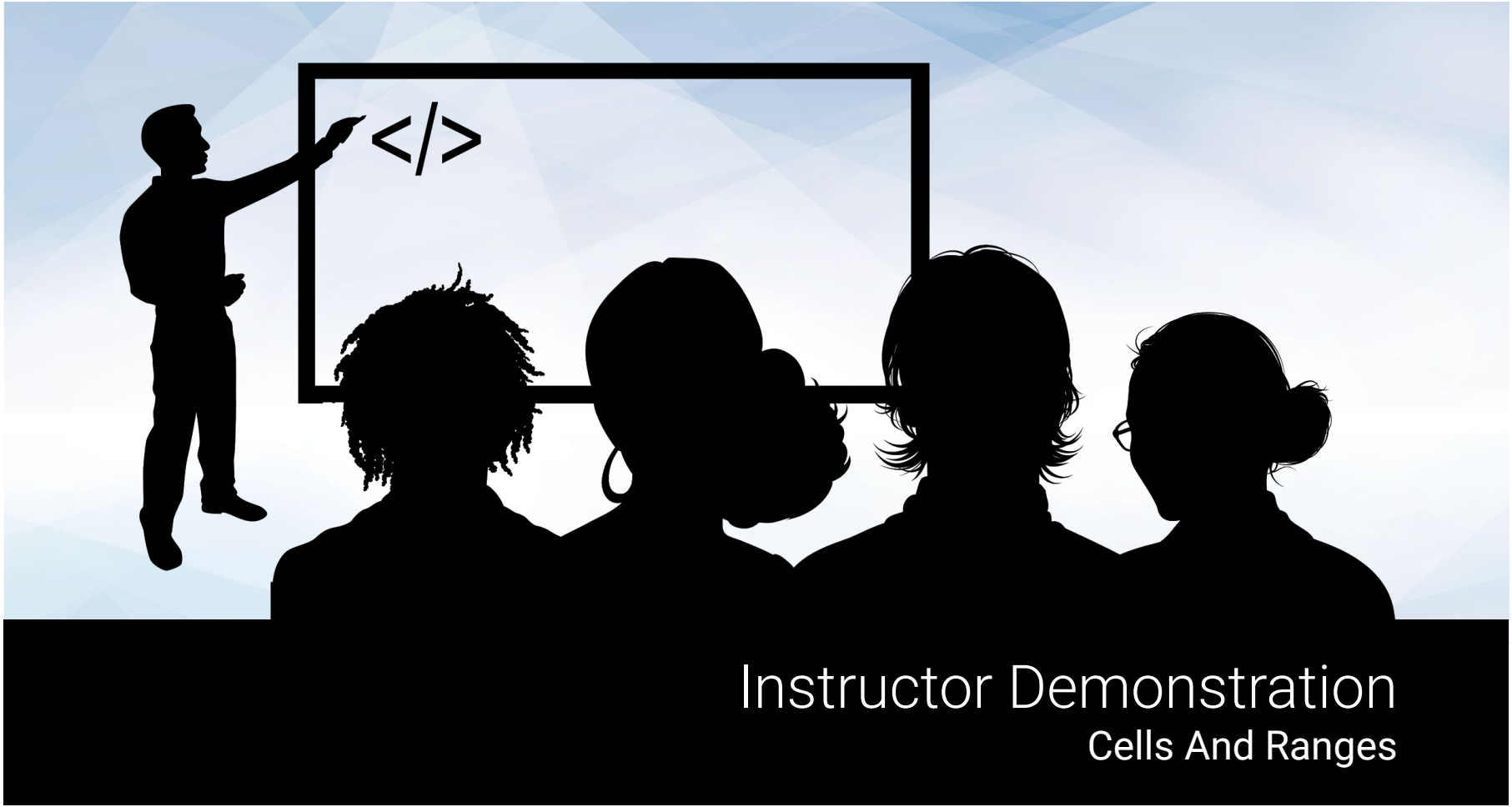
Make sure you’ve downloaded any relevant class files!

FIST TO FIVE:

How comfortable do you feel with this topic?



Cells and Ranges



Instructor Demonstration

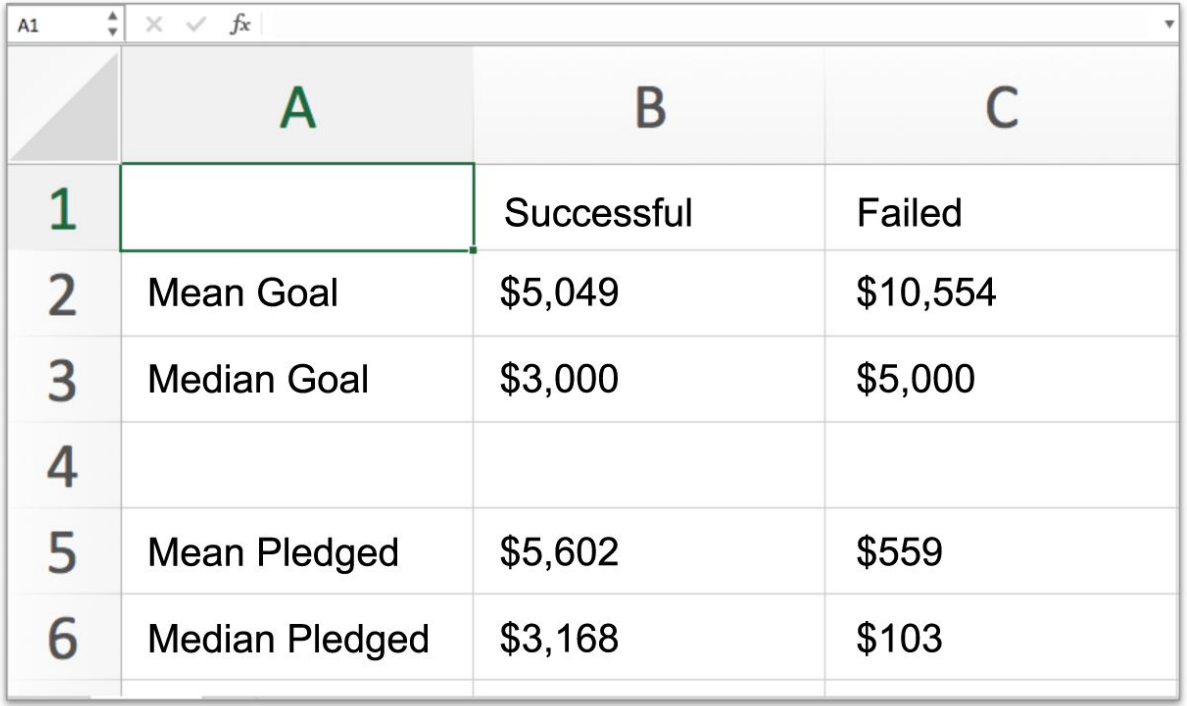
Cells And Ranges

VBA provides two primary ways to modify the contents of spreadsheet: cells and ranges.

Cells provide a numeric, coordinate-based method for referencing cells of a spreadsheet.

Cells

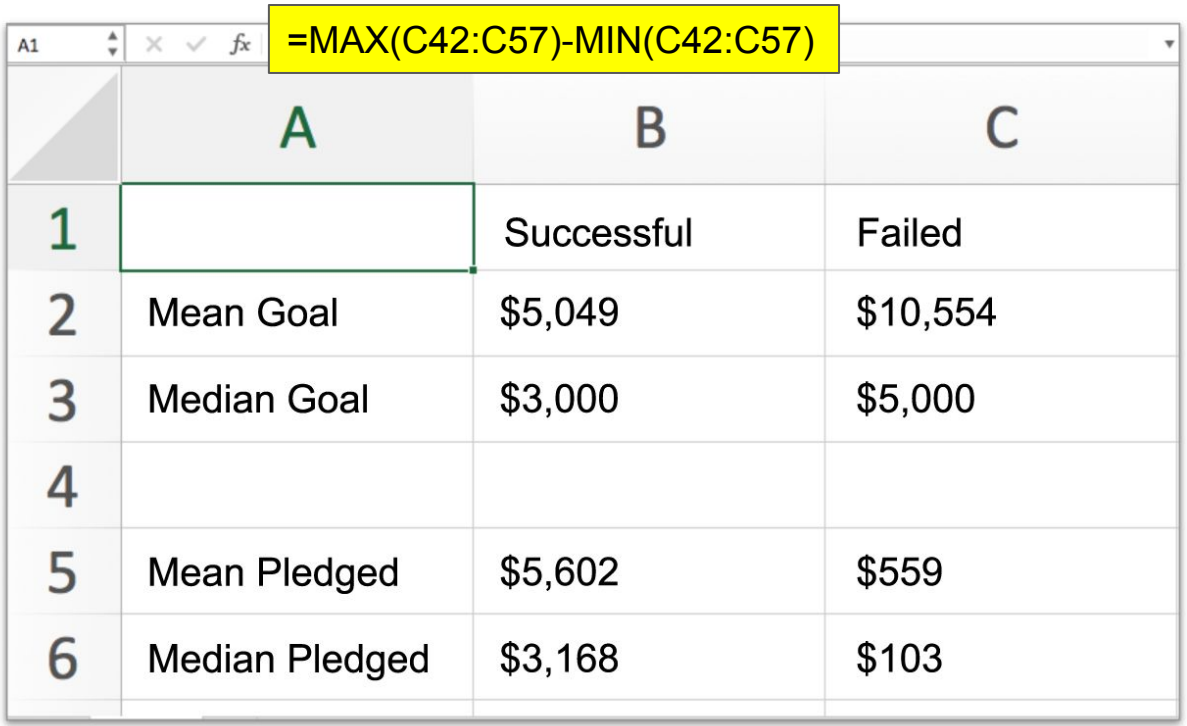
Cells are organized in a (Row, Column) format where integers 1, 2, 3 denote columns A, B, C.



Ranges provide a more customary excel-based method for specifying cells of a spreadsheet.

Ranges

Ranges can be contiguous (e.g. "F5:F7") or non-contiguous (e.g. "R2,D2").

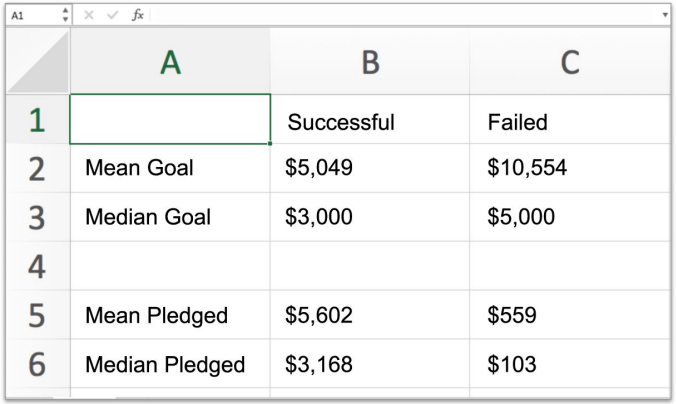


.Value is a method we add to the end of our cell or range reference to specify that we want to change the content value of these cells.

Cells vs Ranges

Cells

Allow a developer to capture a single cell at a time.



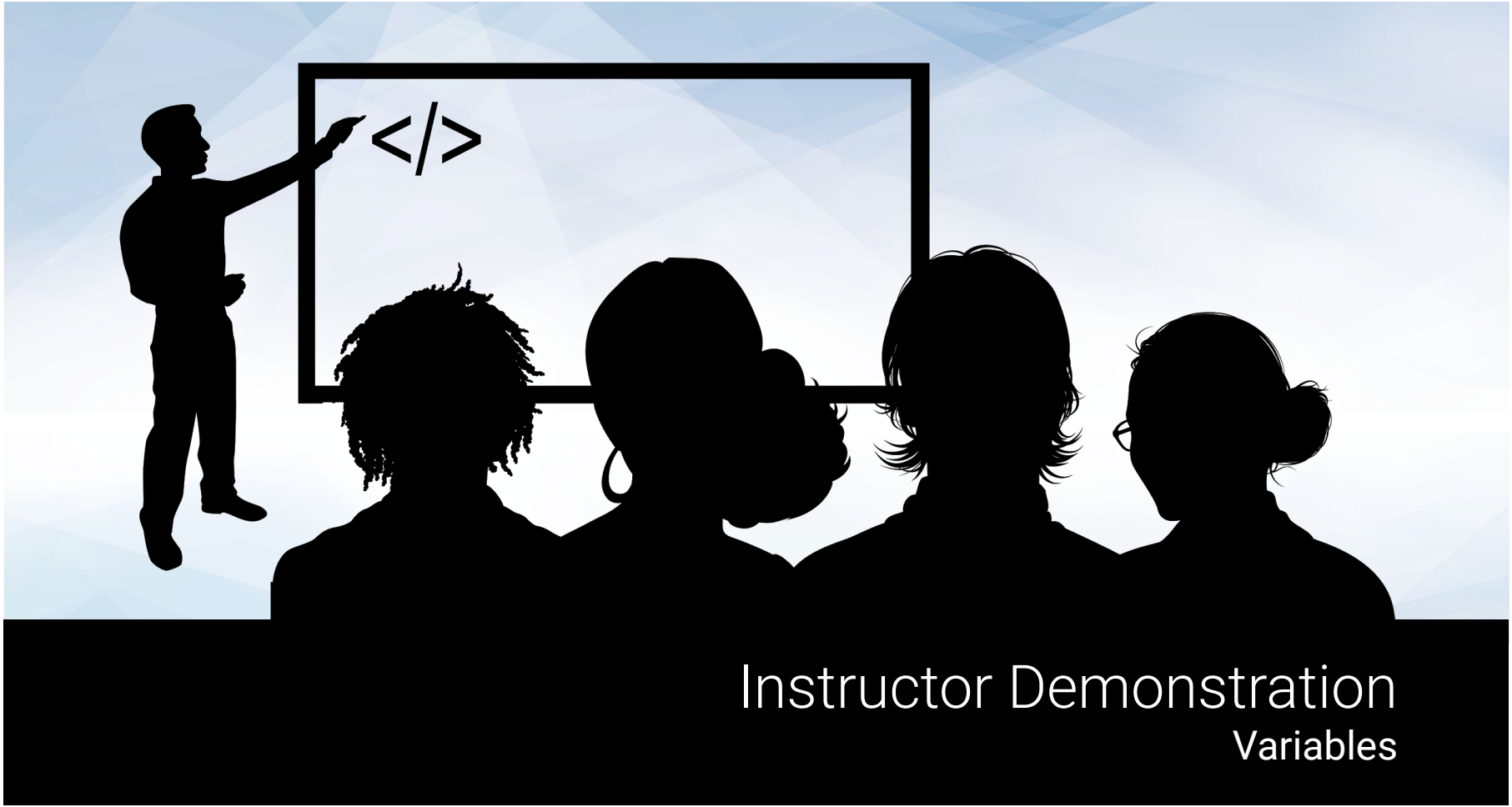
	A	B	C
1		Successful	Failed
2	Mean Goal	$5,049	$10,554
3	Median Goal	$3,000	$5,000
4			
5	Mean Pledged	$5,602	$559
6	Median Pledged	$3,168	$103

Ranges

Allow a developer to capture multiple cells at a time.

For this reason, ranges are used more often.

```
=MAX(C42:C57)-MIN(C42:C57)
```



Instructor Demonstration

Variables

Activity Workbook: Cells and Ranges

As your review the file, think about the following questions:

- Where have we used this before?
- How does this activity equip us for the Challenge?
- What can we do if we don't completely understand this?

VBA Syntax

Variables are named items in programming.

VBA Syntax

Variables can be **physical things** (like a name) or **abstractions** (like an age).

Variable Declaration

```
Dim name As String
Dim age As Integer
```

VBA Data Types

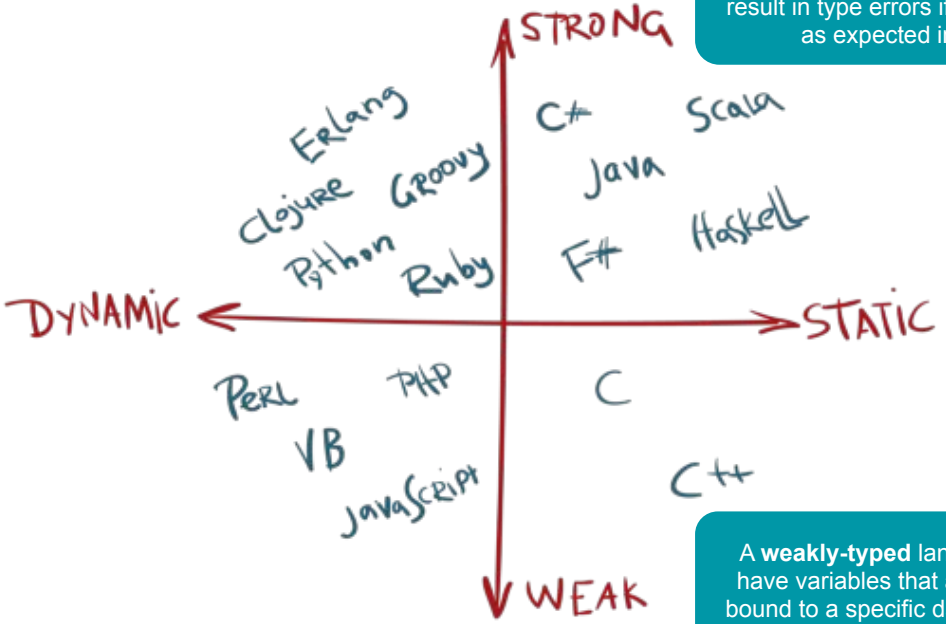
Data Type	Bytes Used	Range of Values
Boolean	1 bytes	True or False
Integer	2 bytes	-32,768 to 32,767
Long (long integer)	4 bytes	-2,147,483,648 to 2,147,483,647
Single	4 bytes	-3.402823E38 to -1.401298E-45 for negative values; 1.401298E-45 to 3.402823E38 for positive values
Double	8 bytes	-1.79769313486231E308 to-4.94065645841247E-324 for negative values; 4.94065645841247E-324 to 1.79769313486232E308 for positive values
Decimal	14 bytes	+/-79,228,162,514,264,337,593,543,950,335 with no decimal point;+/-7.9228162514264337593543950335 with 28 places to the right of the decimal
Date	8 bytes	January 1, 100 to December 31, 9999
Object	4 bytes	Any Object reference
String (variable-length)	10 bytes + string length	0 to approximately 2 billion
String (fixed-length)	Length of string	1 to approximately 65,400
Variant (with numbers)	16 bytes	Any numeric value up to the range of a Double
Variant (with characters)	22 bytes + string length	Same range as for variable-length String

In VBA, if you don't declare the type of the variable, it automatically becomes a variant type, which takes up more memory and makes the code take longer to run

Dynamic vs. Static, Strong vs. Weak Typing

Different programming languages have different behaviors when it comes to type checking. The reason that programming languages check for types is to minimize the possibility of errors.

Strongly typed languages have variables that are bound to specific data types, and will result in type errors if types do not match up as expected in the expression



Type-checking done at run-time. Possible to bind the same variables to objects of different types during the execution of the program.

Type-checking done at compile time. Once a variable has been declared with a type, it cannot ever be assigned to some other variable of different type

A **weakly-typed** language have variables that are not bound to a specific data type

VBA Syntax

In VBA, items can be **declared** as variables by using Dim followed by the type. We can then utilize these variables using their names by **assigning** them a value.

Variable Declaration

```
Dim name As String
Dim title As String
```

Variable Assignment

```
name = "Gandalf"
title = "The Great"
```

VBA Syntax

We can "concatenate" strings by combining them.

```
Dim fullname As String
fullname = name + " " + title
```

VBA Syntax

And we can perform mathematical functions by combining numeric variables with operators.

```
Dim price As Double
Dim tax As Double
Dim total As Double
price = 19.99
tax = 0.05
total = price * (1 + tax)
```

VBA Syntax

We can also use these variables to set the value of our cells.

```
Cells(1,1).Value = price * (1 + tax)
```

VBA Syntax

We can combine numerics and strings by first "casting" our numerics into string format using the `Str()` method. And, we can cast strings into integers using the `Int()` method.

```
Dim my_age As Integer

my_age = 30

MsgBox("I am " + Str(my_age) + "years old.")
```

Questions?

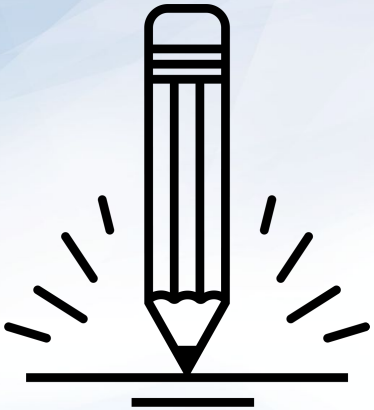
Activity Workbook: Variables

As your review the file, think about the following questions:

Where have we used this before?

How does this activity equip us for the Challenge?

What can we do if we don't completely understand this?



Activity: TypeRighter

In this activity, you will need to change the data types of variables so that the code runs without errors.

Suggested Time:
15 minutes

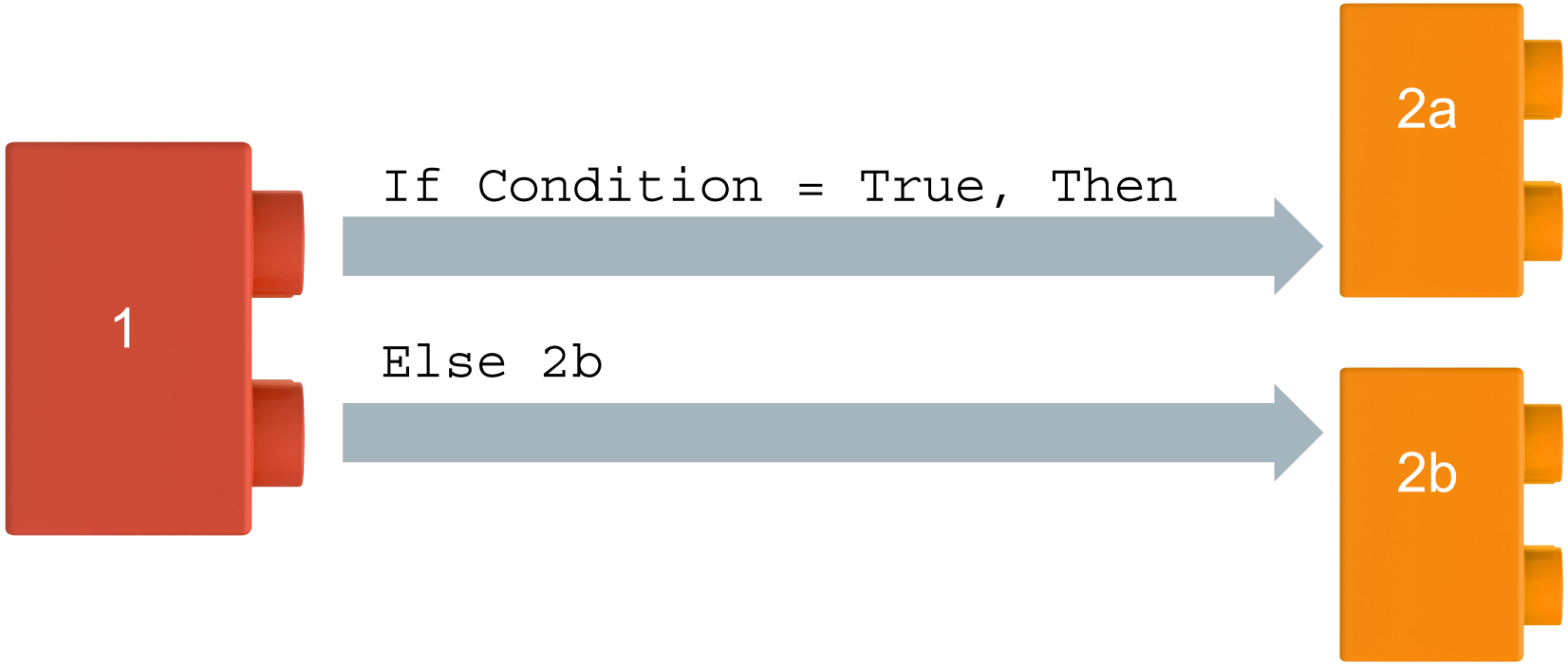
Let's Review

Conditionals

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

Conditionals: If This, Then That

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



Simple Conditional Example

Simple Conditional Example

```
If Range("A2").Value > Range("B2").Value Then
      MsgBox ("Num 1 is greater than Num 2")
End If
```

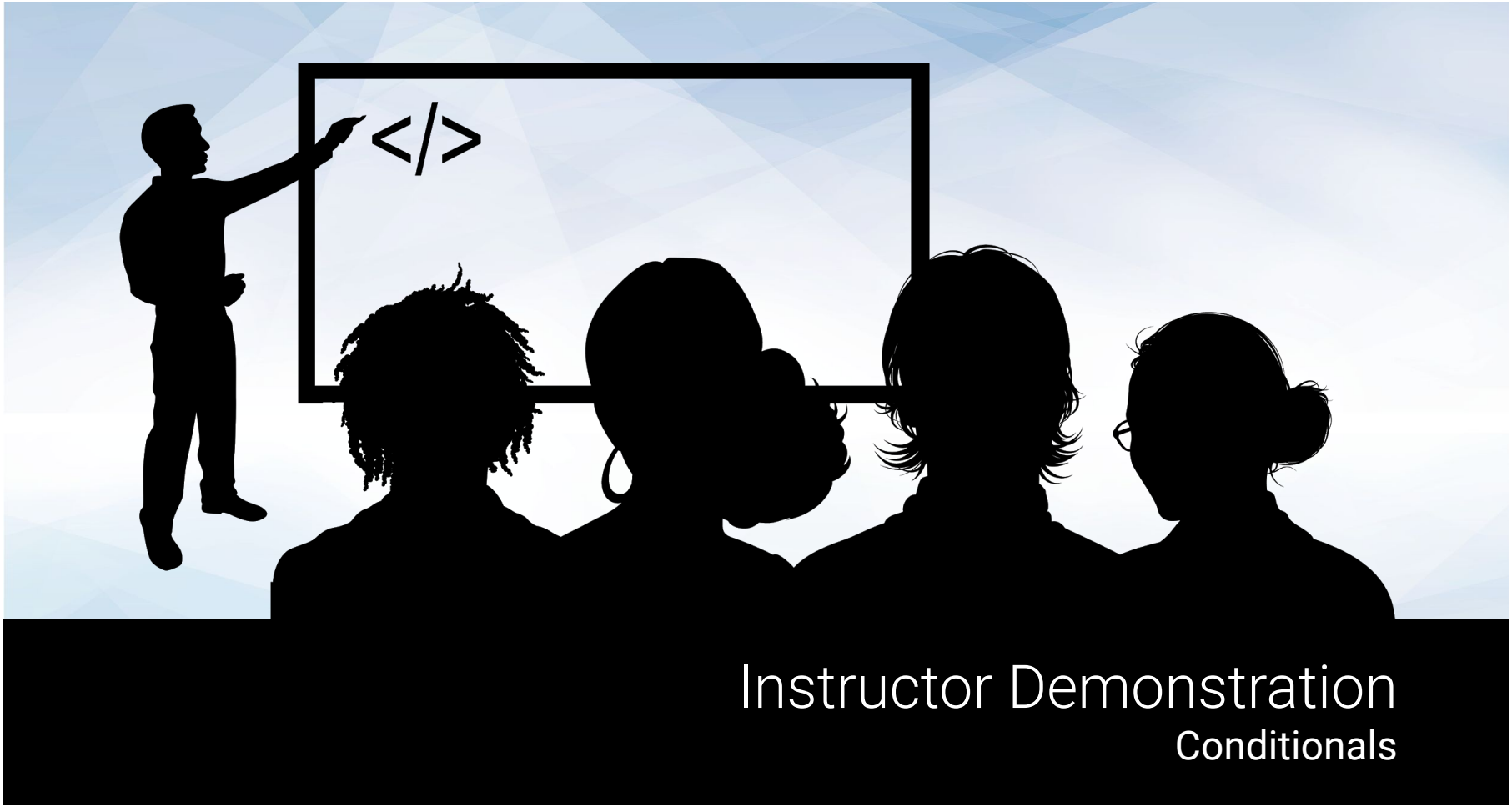
If, Else, and ElseIf

```
If Range("A5").Value > Range("B5").Value Then
    MsgBox ("Num 3 is greater than Num 4")

ElseIf Range("A5").Value < Range("B5").Value Then
    MsgBox("Num 4 is greater than Num 3")

Else
    MsgBox("Num 3 and Num 4 are equal")

  End If
```



Instructor Demonstration

Conditionals

Activity Workbook: Conditionals

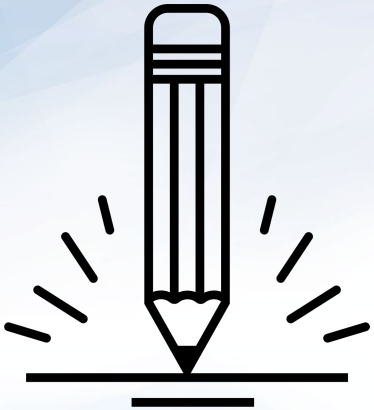
As your review the file, think about the following questions:

Where have we used this before?

How does this activity equip us for the Challenge?

What can we do if we don't completely understand this?

Questions?



Activity: Choose Your Story

In this activity, work in groups to create a simple game that outputs a message box based on the user's input number.

Suggested Time:
15 minutes

Let's Review

Activity Workbook: Choose Your Story

As we review, think about the following questions:

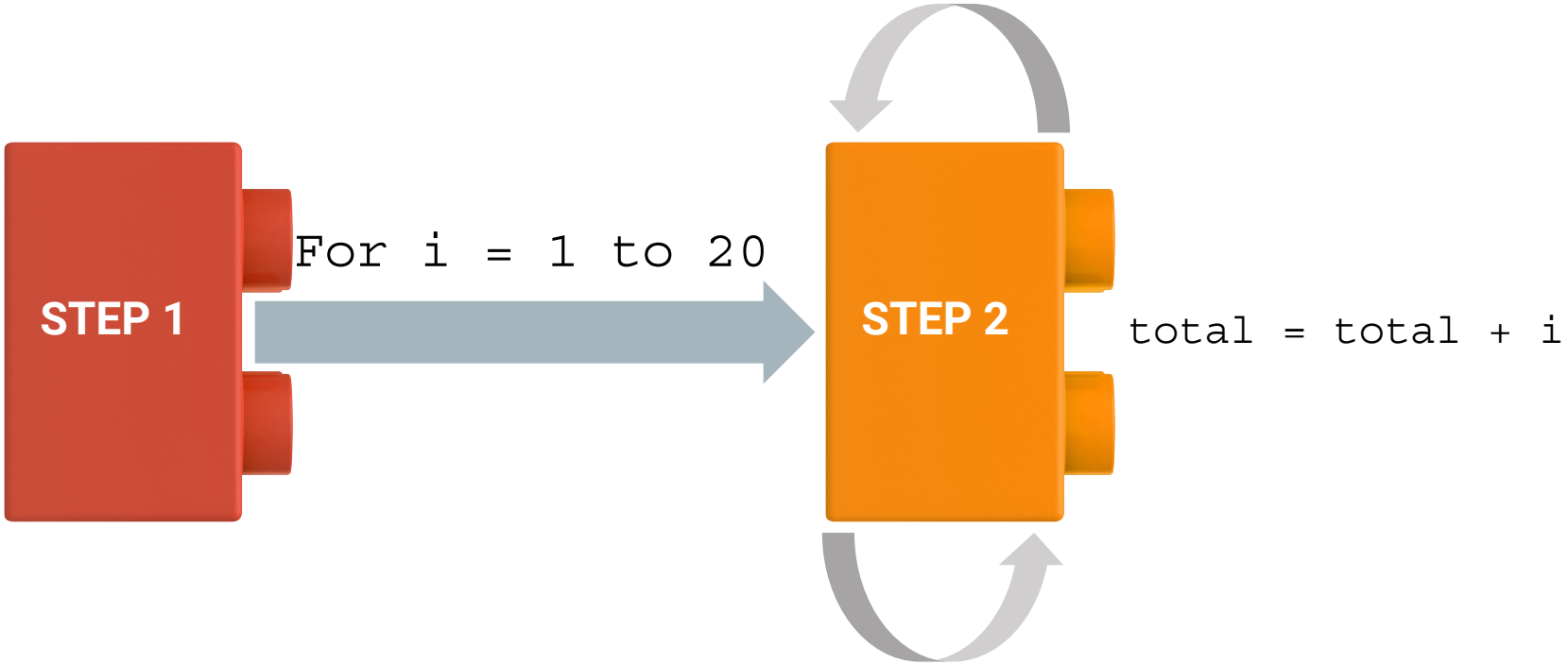
Will the program run correctly if you don't add the `.Value` at the end of the `Range()` method? Why or why not?

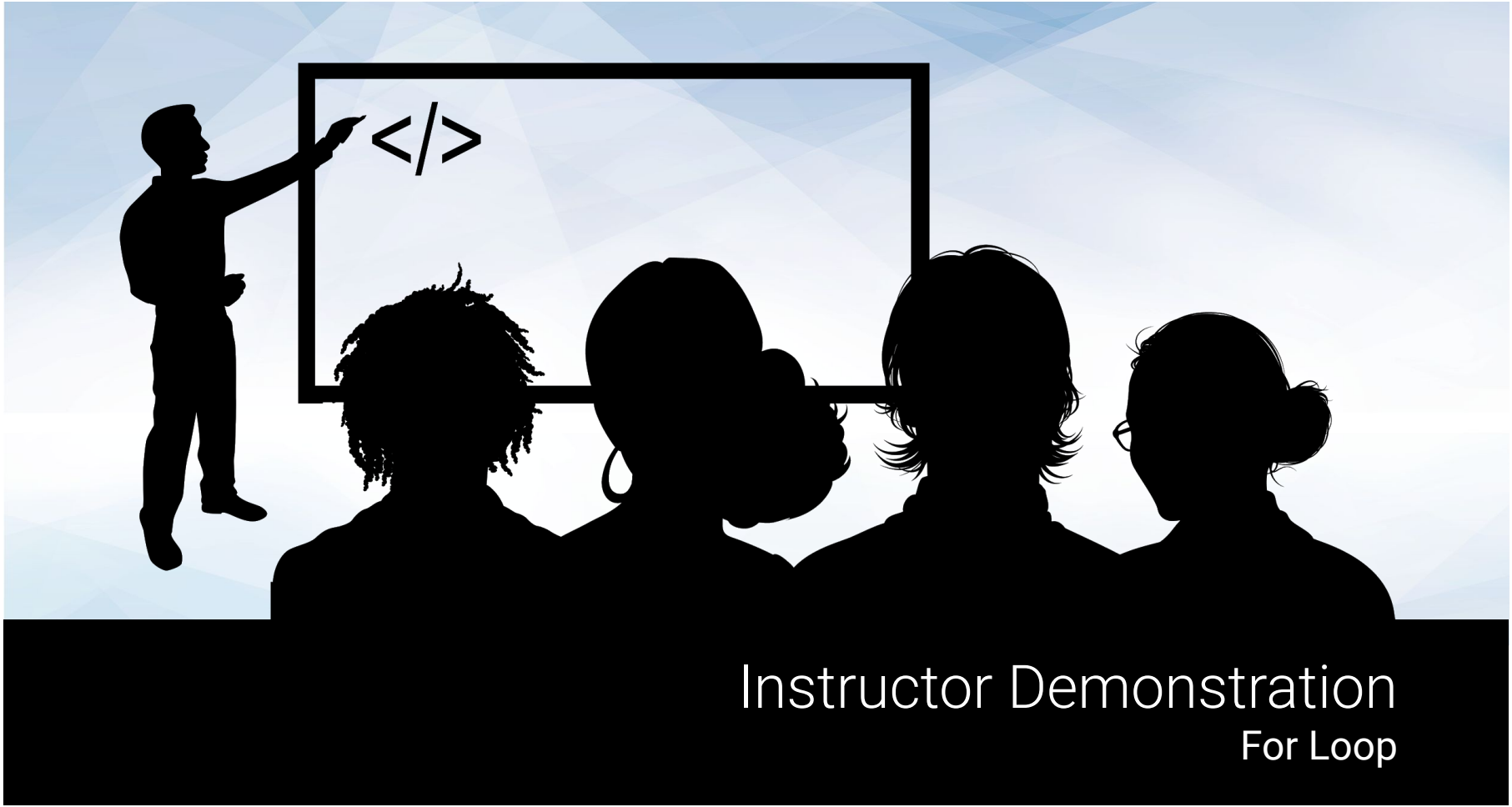
What can we do if we don't completely understand this?

For Loop

For loop is a repetition statement to iterate over a sequence of numbers or items in an array.

For Loop





Instructor Demonstration

For Loop

Activity Workbook: For Loop

As your review the file, think about the following questions:

Where have we used this before?

How does this activity equip us for the Challenge?

What can we do if we don't completely understand this?

Activity: Chicken Nugget Loop

In this activity, you will create a VBA script with a for loop that prints "I will eat “i” Chicken Nuggets," where the value of “i” changes within the for loop.

Suggested Time:
20 minutes

Questions?