MODULE 2: VBA

DATA BOOTCAMP
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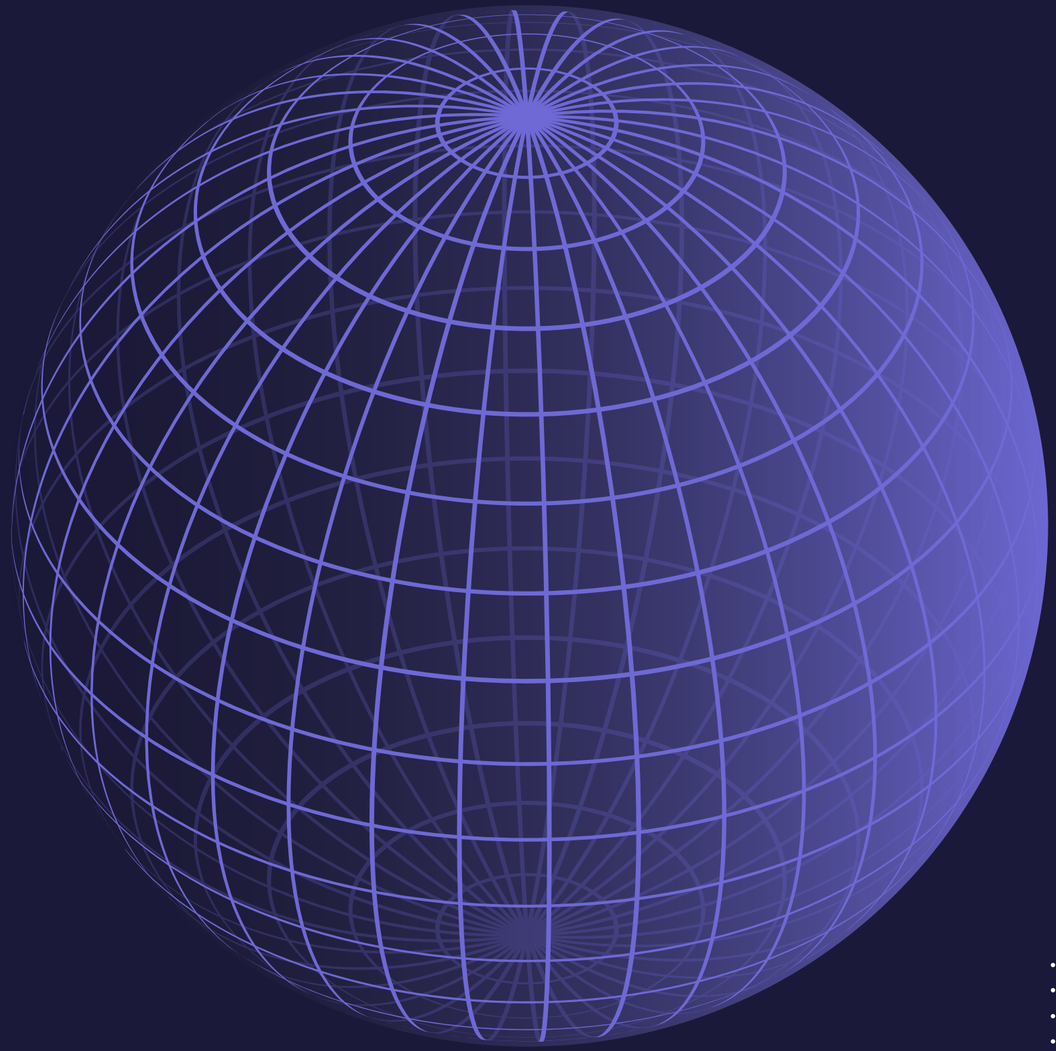
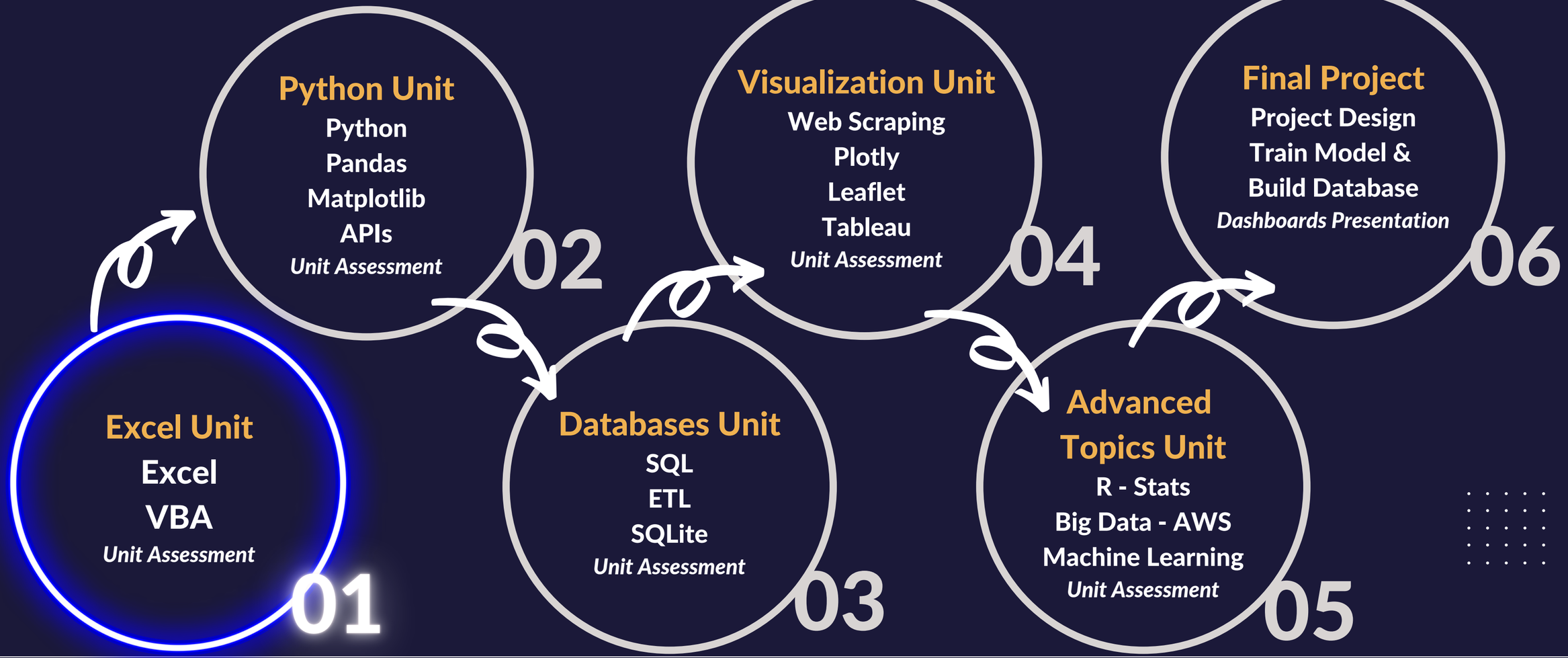
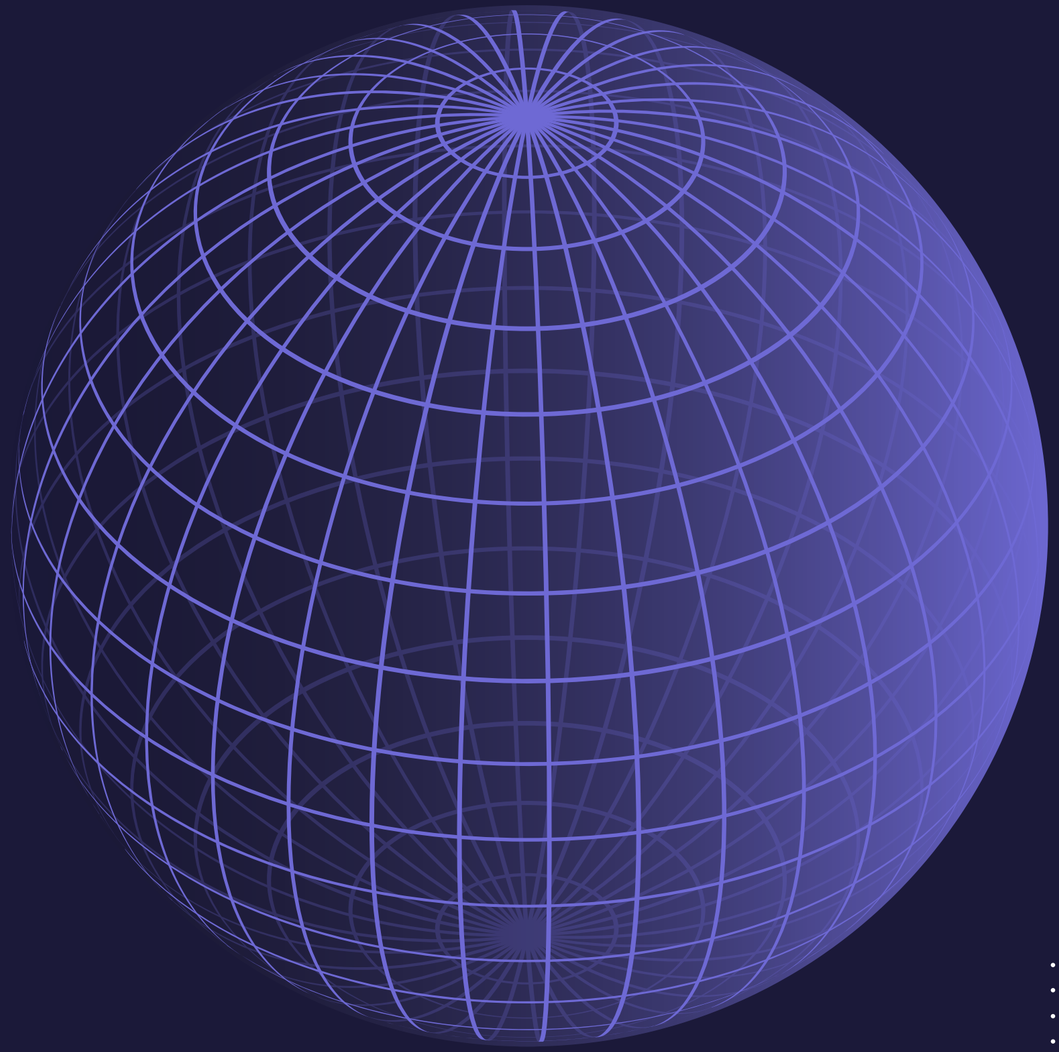


THE BIG PICTURE



GITHUB



003

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GITHUB IS A HOSTING SERVICE FOR SOURCE CODE

GitHub is a web interface for Git.

Git is version control software that can:

- **Track source code history**
- **Allow for collaboration on the same code files across a team or organisation**
- **Easily update and rollback software versions**

Since 2019, GitHub is used by over 2.1 million companies. Proficiency in Git and GitHub are highly desired skills in many industries.

WE WILL USE GIT AND GITHUB THROUGHOUT THE CURRICULUM

- You will **submit your homework assignments** using GitHub
- Your **individual project work** will be version controlled using Git
- You will be **collaborating with teammates** using GitHub
- By the end of the curriculum, you should be **proficient** with the basic Git and GitHub functionality

DEMO

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CHECK IN

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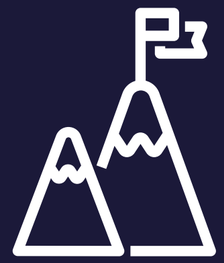
THIS WEEK: VBA & STOCK ANALYSIS

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



Wall Street Refactor Challenge

Explore green energy stock performance by analyzing financial data using VBA.

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

- **Deliverable 1**: Refactor VBA code and Measure performance
  - *This deliverable will include an updated workbook and a folder with PNGs of the pop-ups with script run time*
- **Deliverable 2:** A written analysis of your results (README.md)

BOOT CAMP POINTERS

As you work through this module, remember the following:

01

Take full advantage of office hours and your support network!

02

The Refactoring Challenge code might be tricky!

03

Don't worry if you need help with GitHub!

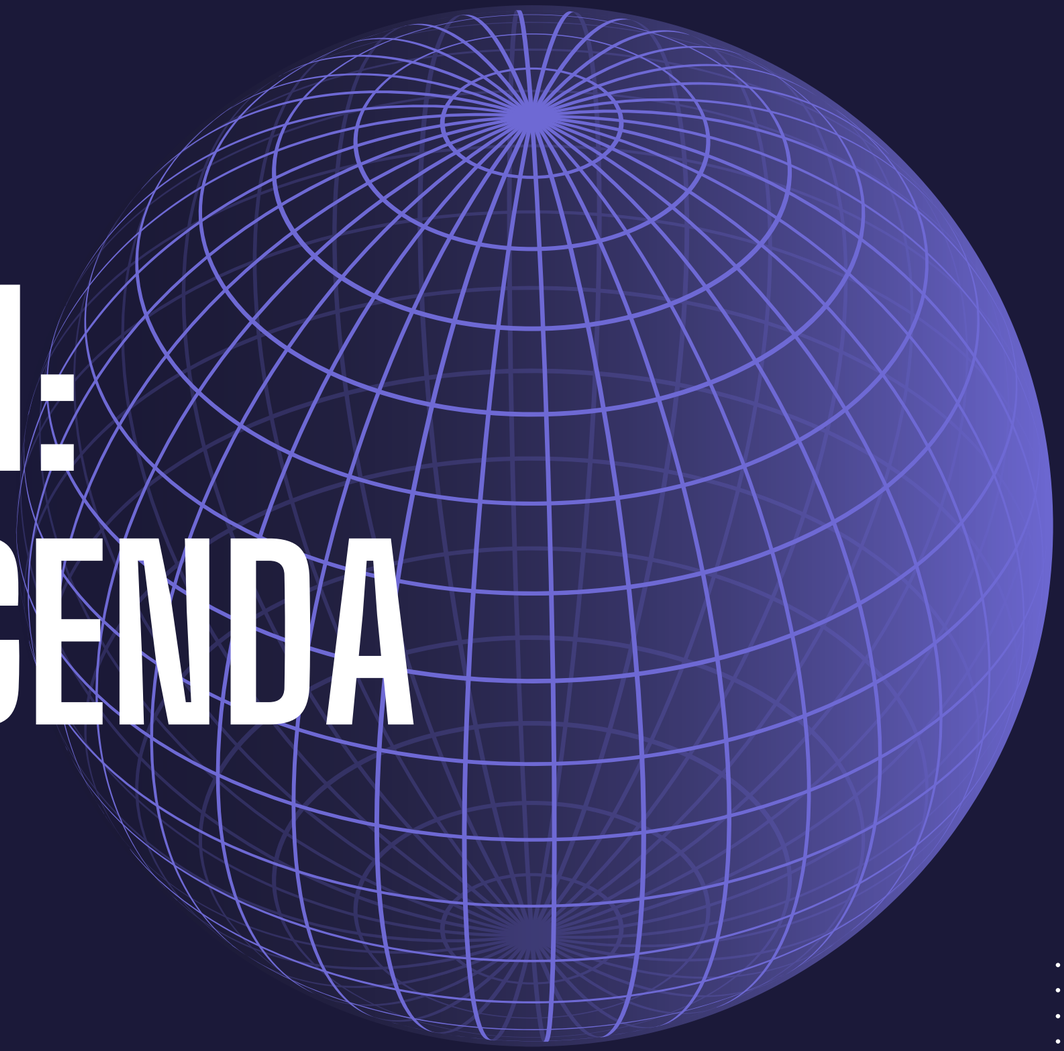
WHAT IS VBA?

- VBA (Visual Basic for Applications) is human-readable (and editable) programming code used to write macros in Excel
- A macro is a set of commands that are stored in a special place in Excel so that they are always available when you need to execute them.
- VBA is just the language that macros are written with. If your macro is a story, VBA is the grammar and dictionary it's written with.

WHY IS VBA IMPORTANT?

Automate simple and complex tasks in Excel.

MODULE 2.1: TODAY'S AGENDA



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TODAY'S AGENDA

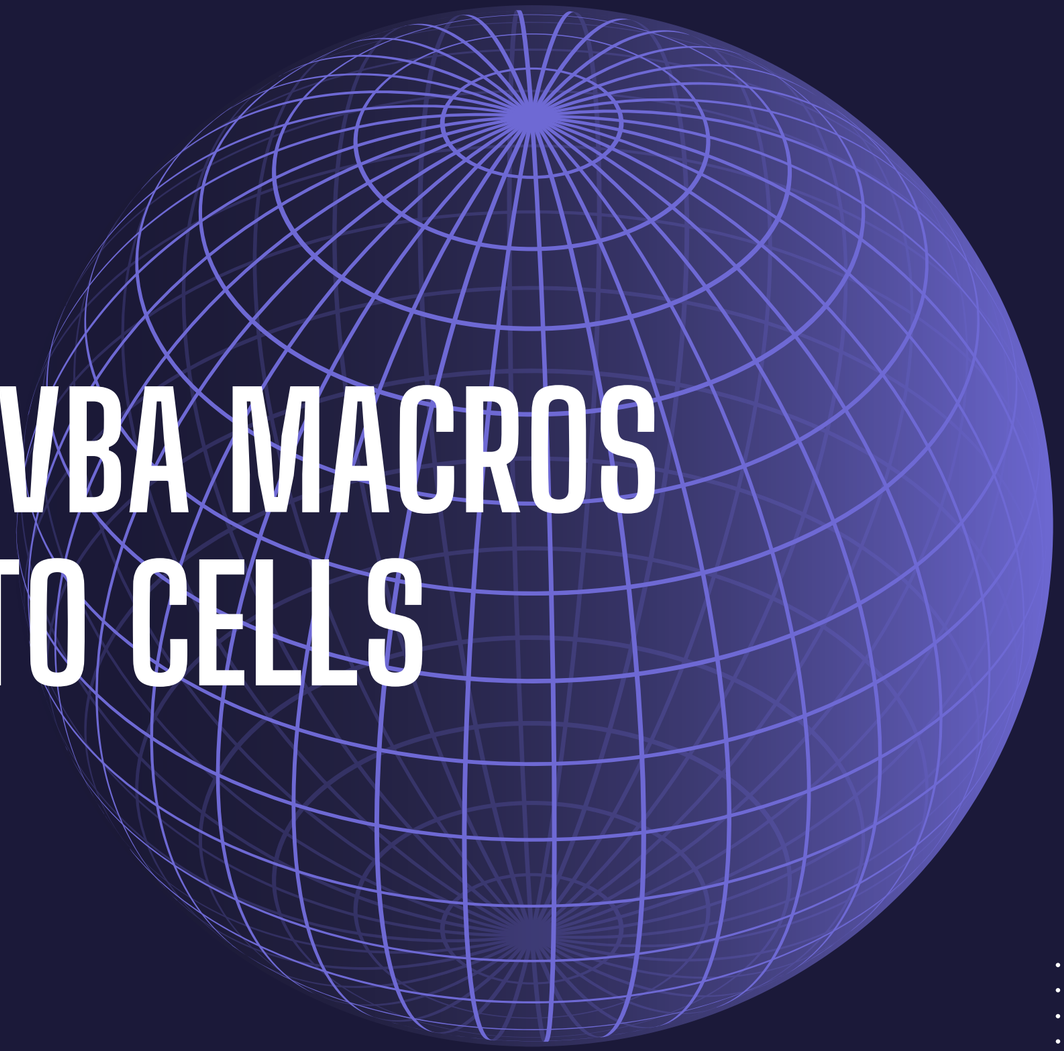
By completing today’s activities, you’ll learn the following skills:

- How to create VBA macros to write data to cells
- How to create variables and assign data types to variables with VBA
- How to implement logic and control programmatic flow using VBA

Make sure you’ve downloaded any relevant class files!

014

HOW TO CREATE VBA MACROS TO WRITE DATA TO CELLS



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VBA provides two primary ways to modify the contents of a spreadsheet:

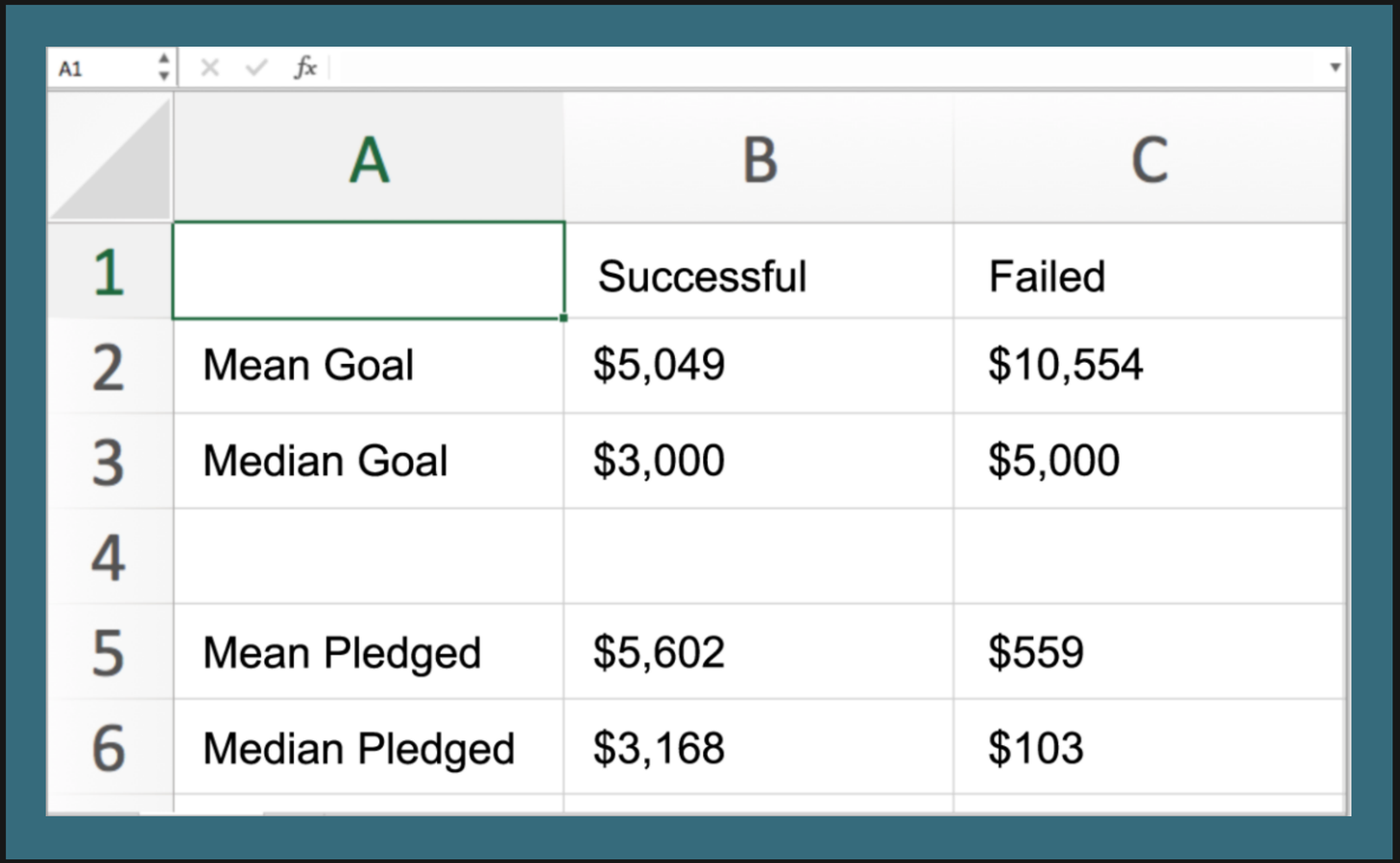
1. Cells
2. Ranges

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.

Q: What is the value of Cells(2,2)?

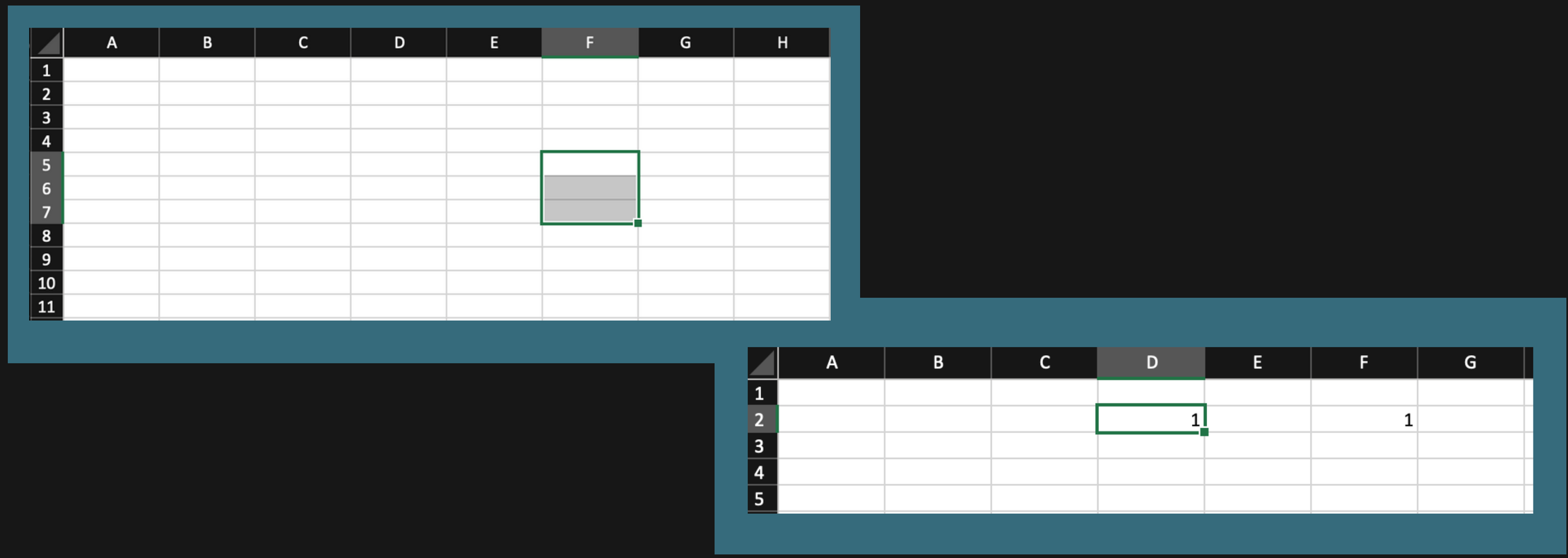


	A	B	C
1		Successful	Failed
2	Mean Goal	$5,049	$10,554
3	Median Goal	$3,000	$5,000
4			
5	Mean Pledged	$5,602	$559
6	Median Pledged	$3,168	$103

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

RANGES

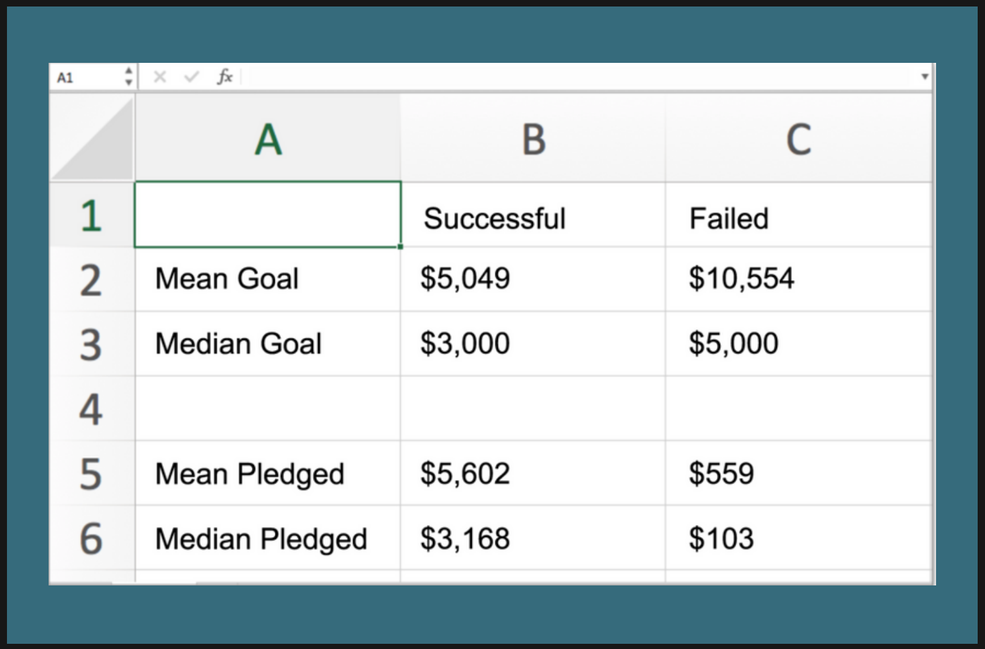
Ranges can be contiguous (e.g. "F5:F7") or non-contiguous (e.g. "D2,F2").



CELLS VS RANGES

CELLS

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



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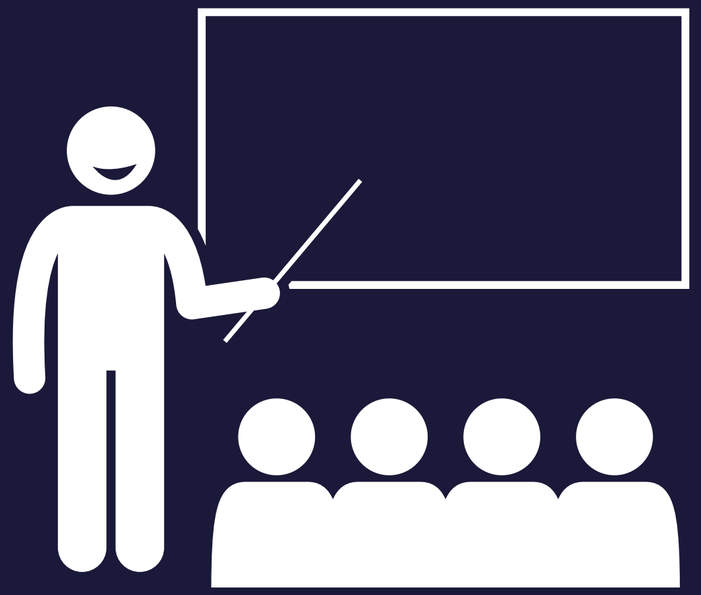
RANGES

Allows a developer to capture multiple cells at a time.

For this reason, ranges are used more often.

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

.Value: 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.



INSTRUCTOR DEMONSTRATION

Cells and Ranges

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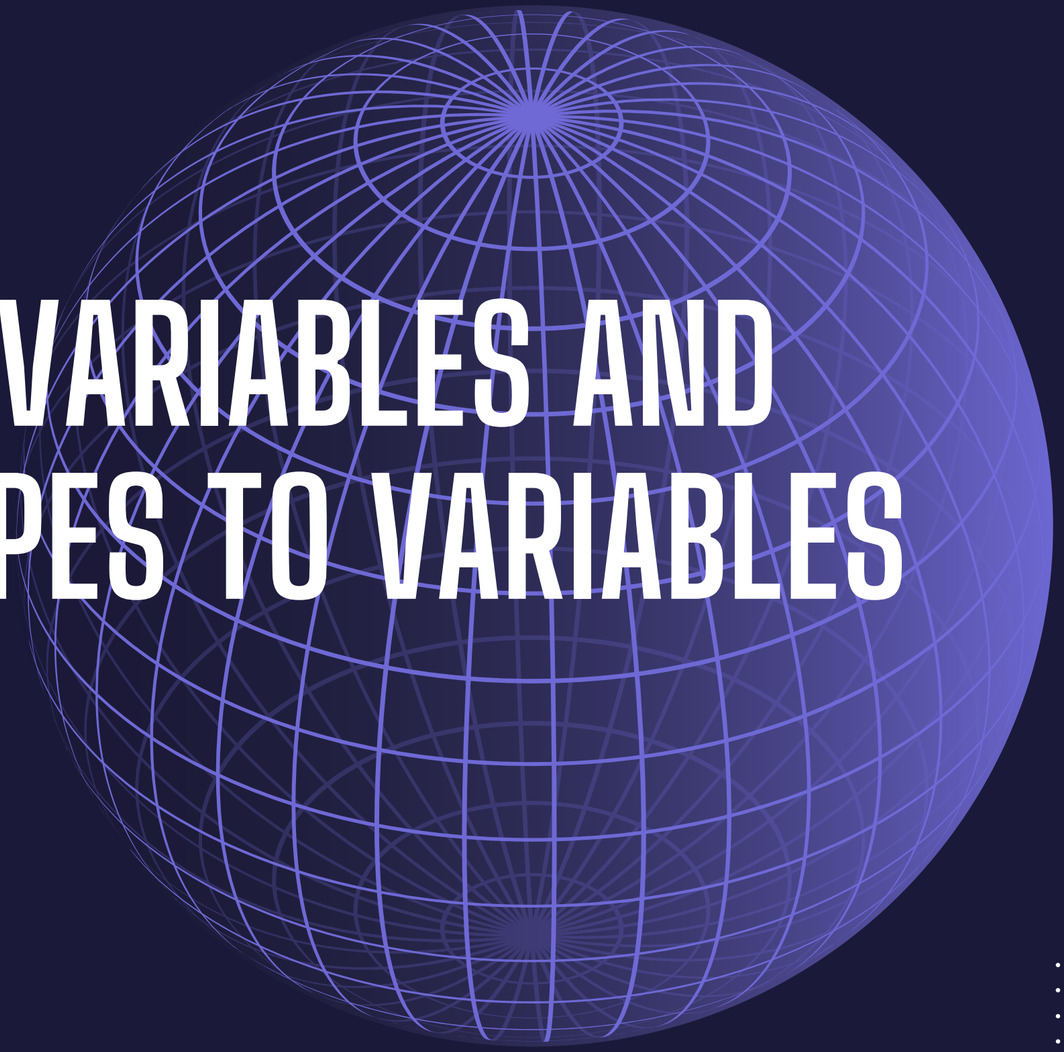
023

HOW TO CREATE VARIABLES AND ASSIGN DATA TYPES TO VARIABLES WITH VBA



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Variables: Named items in programming.

VBA Syntax

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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 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)
```

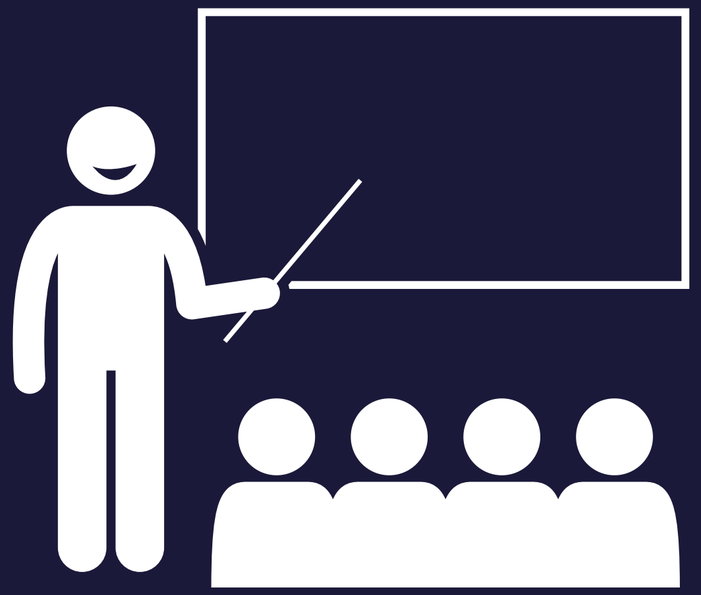
VBA SYNTAX

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.")
```



INSTRUCTOR DEMONSTRATION

Variables

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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

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ACTIVITY: TYPERIGHTER

Instructions

Five variables have been created, but they're declared as Object types, so the lines of code assigning values to them are causing errors!

For each variable, change the data type in its Dim statement so that the code will run without errors.

Hint: A list of VBA data types can be found in the official documentation

TIME'S UP

Let's Review

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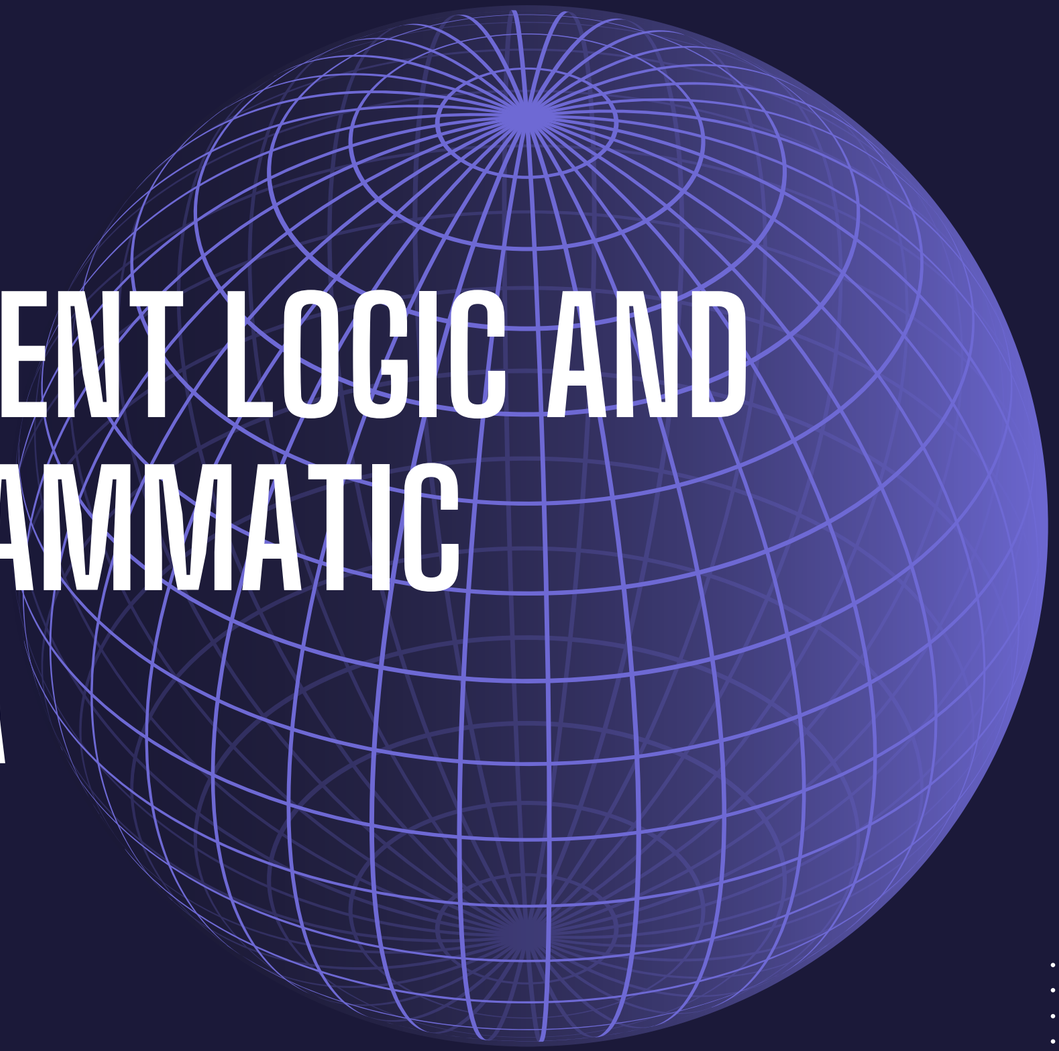
036

HOW TO IMPLEMENT LOGIC AND CONTROL PROGRAMMATIC FLOW USING VBA

CONDITIONALS



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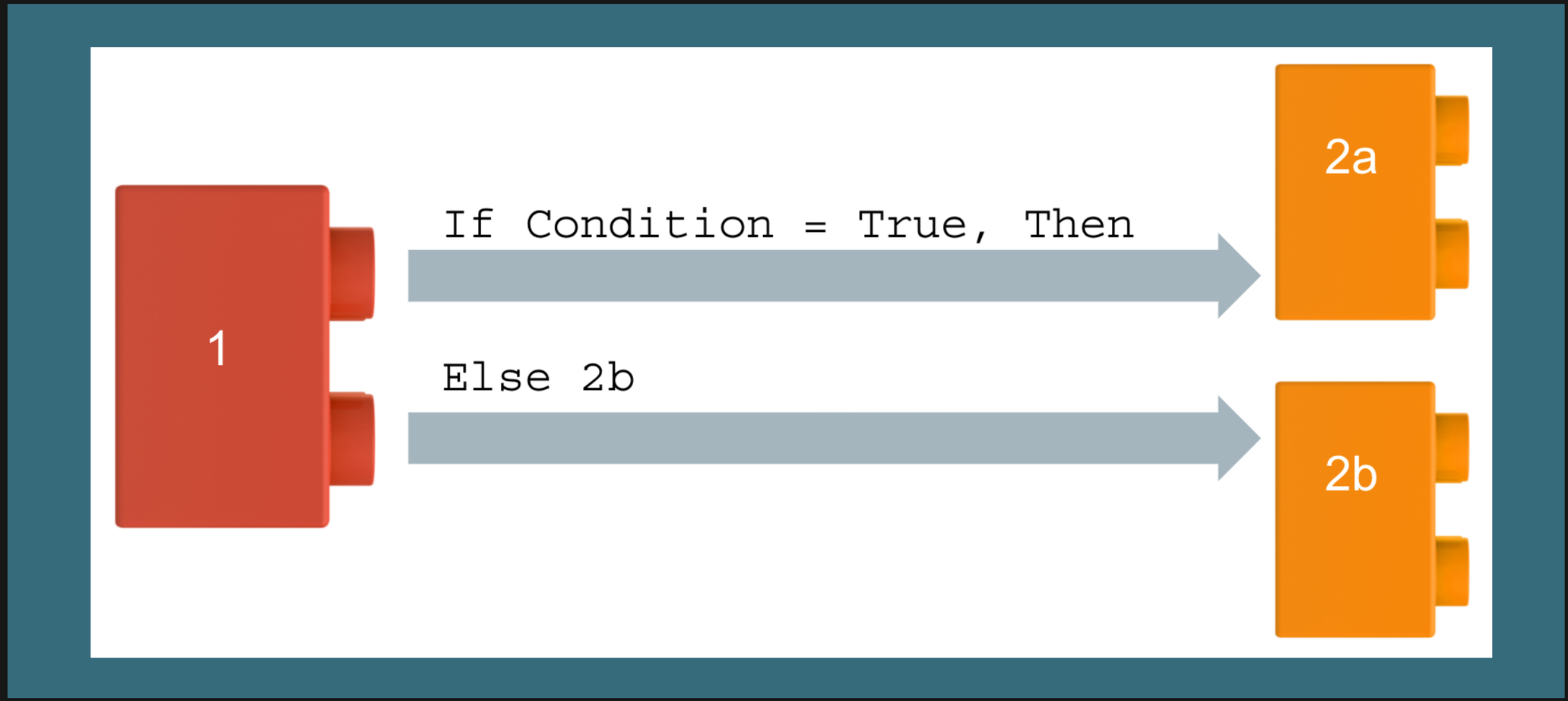
Conditionals: Can control the flow of logic based on if the conditions are being met.

CONDITIONALS: IF THIS, THEN THAT

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



SIMPLE CONDITIONAL EXAMPLE


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

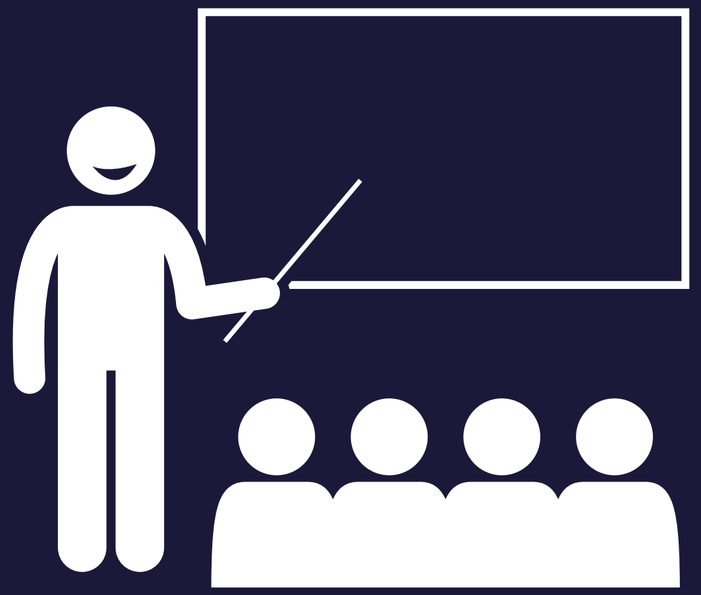
IF, ELSE, AND ELSEIF


```
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

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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

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ACTIVITY: CHOOSE YOUR STORY

Instructions

Create a simple Excel workbook and VBA macro.

Based on the number provided in the text box, a different message box will appear.

- ***If the user enters a value of 1, display:*** **"You choose to enter the wooded forest of doom!"**
- ***If the user enters a value of 2, display:*** **"You choose to enter the fiery volcano of doom!"**
- ***If the user enters a value of 3, display:*** **"You choose to enter the terrifying jungle of doom!"**
- ***If the user enters a value of 4, display:*** **a similar custom message.**
- ***If the user enters anything else, display:*** **"Try following directions"**

TIME'S UP

Let's review.

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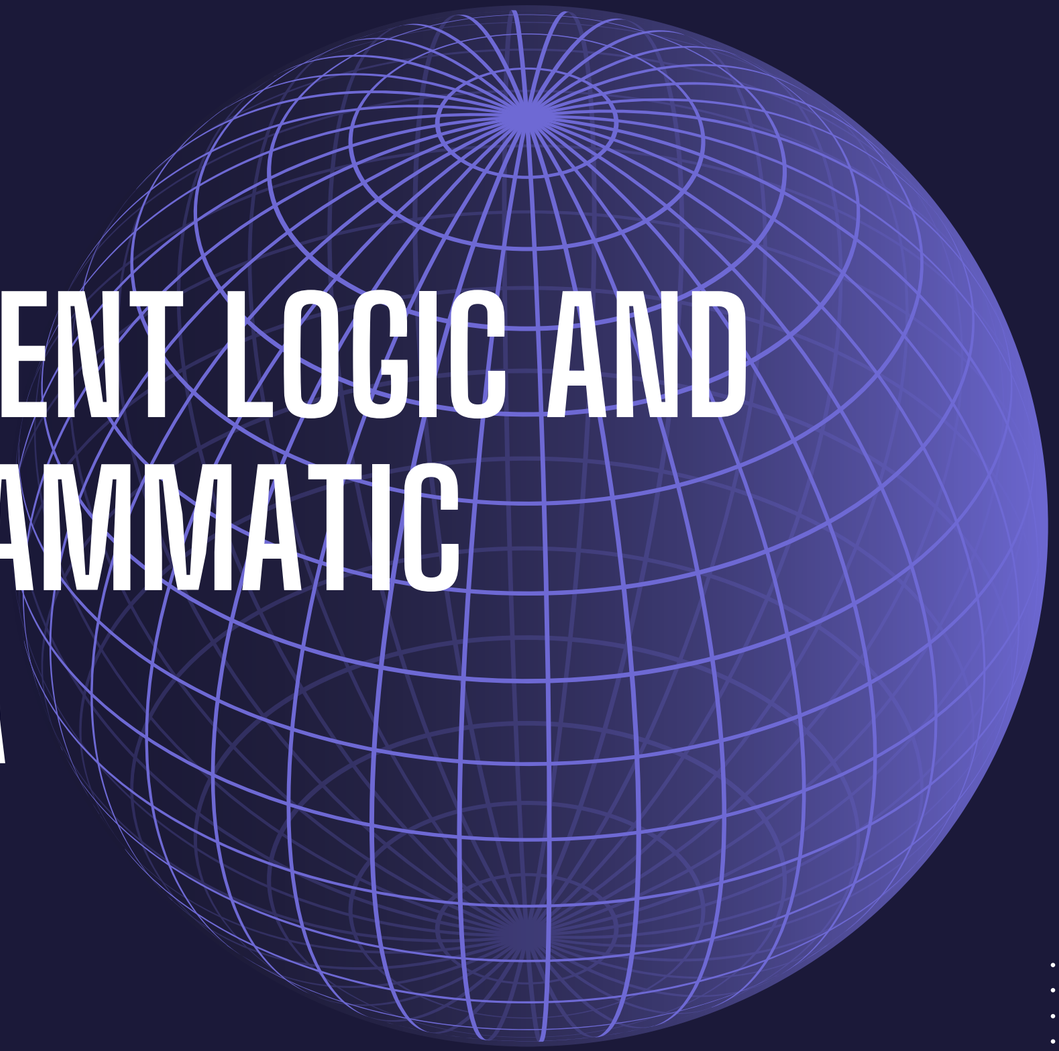
044

HOW TO IMPLEMENT LOGIC AND CONTROL PROGRAMMATIC FLOW USING VBA

FOR LOOPS



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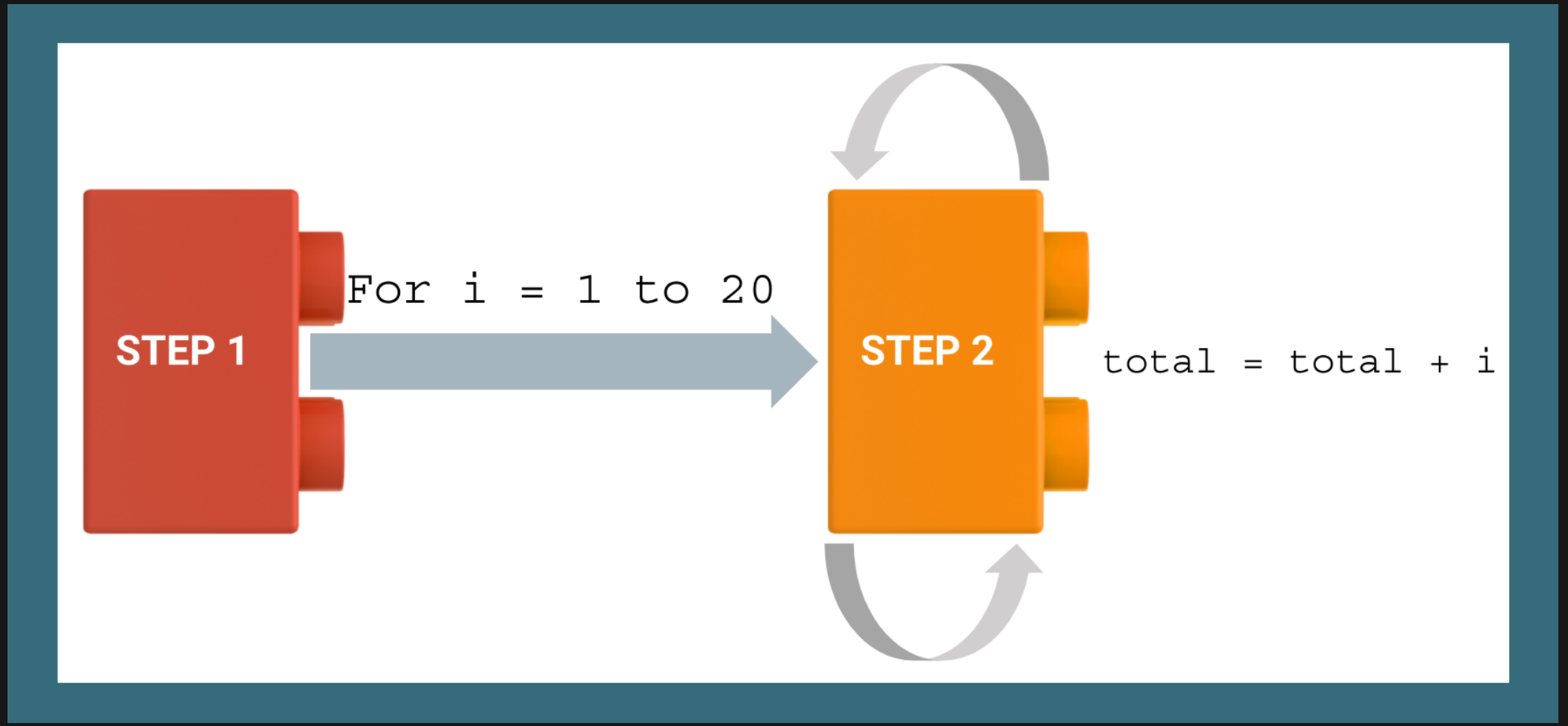
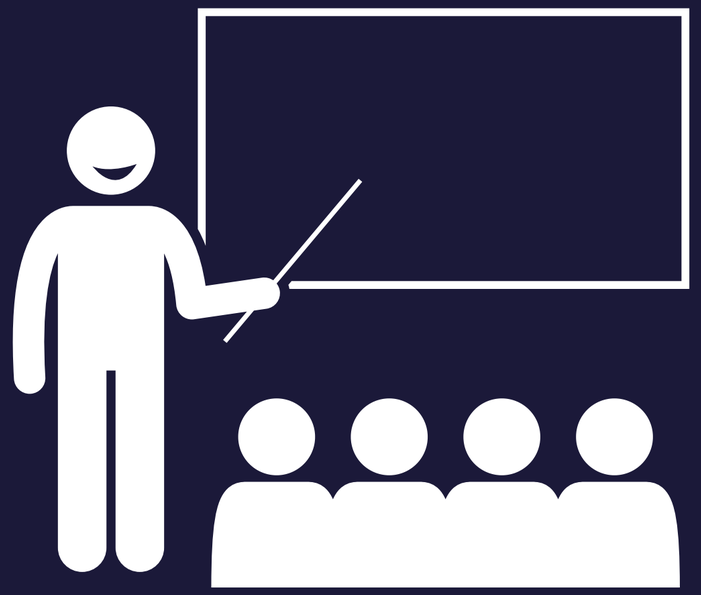
For Loop: A repetition statement to iterate over a sequence of numbers or items in an array.

FOR LOOP





INSTRUCTOR DEMONSTRATION

For Loop

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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: 25 minutes

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ACTIVITY: CHICKEN NUGGET LOOP

Instructions

Create a for loop that will produce the following example. The lines signify new cells.

TIME'S UP

Let's review.

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SUMMARY

- Creating variables was covered in Lesson 2.1.4.
- Adding values to cells using the Cells() and Range() functions was covered in Lesson 2.2.1.
- Conditional statements and for loops were covered in Lesson 2.2.3.