COMP1022Q
Introduction to Computing with Excel VBA

Using For Each Loops

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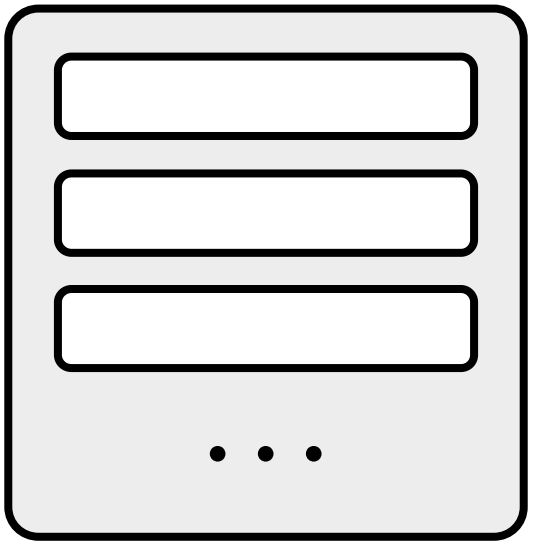
Outcomes

- After completing this presentation, you are expected to be able to:
  1. Understand that some things in Excel are organized in collections
  2. Use For Each loops to go through the collections

Simple Variables and Objects

- We have seen simple variables such as Integer/Long, Single/Double, String and Boolean
- We have also learned different Excel objects such as cells, worksheet and shapes

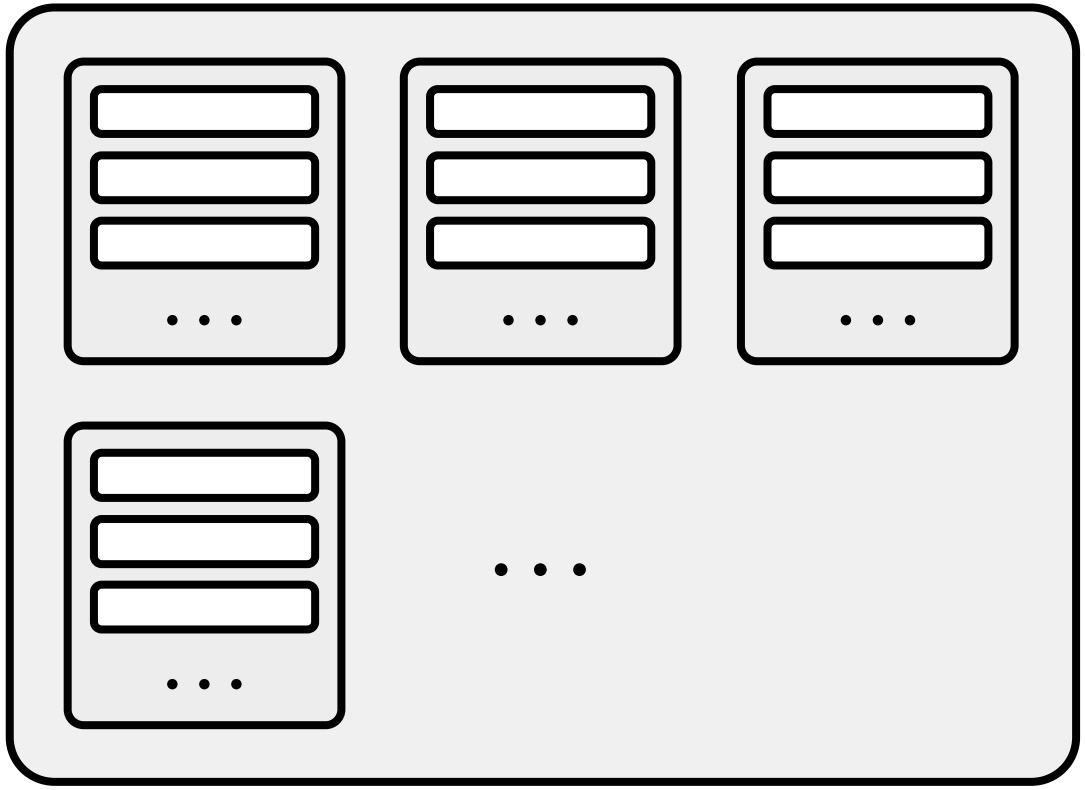
A simple variable with a single value



An Excel object containing different properties

A Collection of Objects

- Sometimes we want to do things with a *collection* of objects



Example Collections

- Here are some example collections in VBA:
  - `Range("A1:A10")` is a collection of 10 cells from cell A1 to cell A10
  - `ActiveSheet.Shapes` is a collection of shapes inside the active worksheet
  - `Worksheets` is a collection of all worksheets in the Excel file
- You can use a For Each loop to look at each object inside a collection easily

For Each…Next

```
For Each object In collection
    . . .statement(s). . .
Next object
```

- A For Each loop executes the statement(s) in the loop for each *object* inside a *collection* of objects
- The For Each loop is particularly useful when you need to work with a collection of things such as some cells in a worksheet

Using For Each Loop with Cells

- You can get a collection of cells using the `Range` command, i.e. `Range("A1:A10")`
- A For Each loop can run for each cell using such collection
- For example, the following loop runs for each cell from cell B1 to B5:

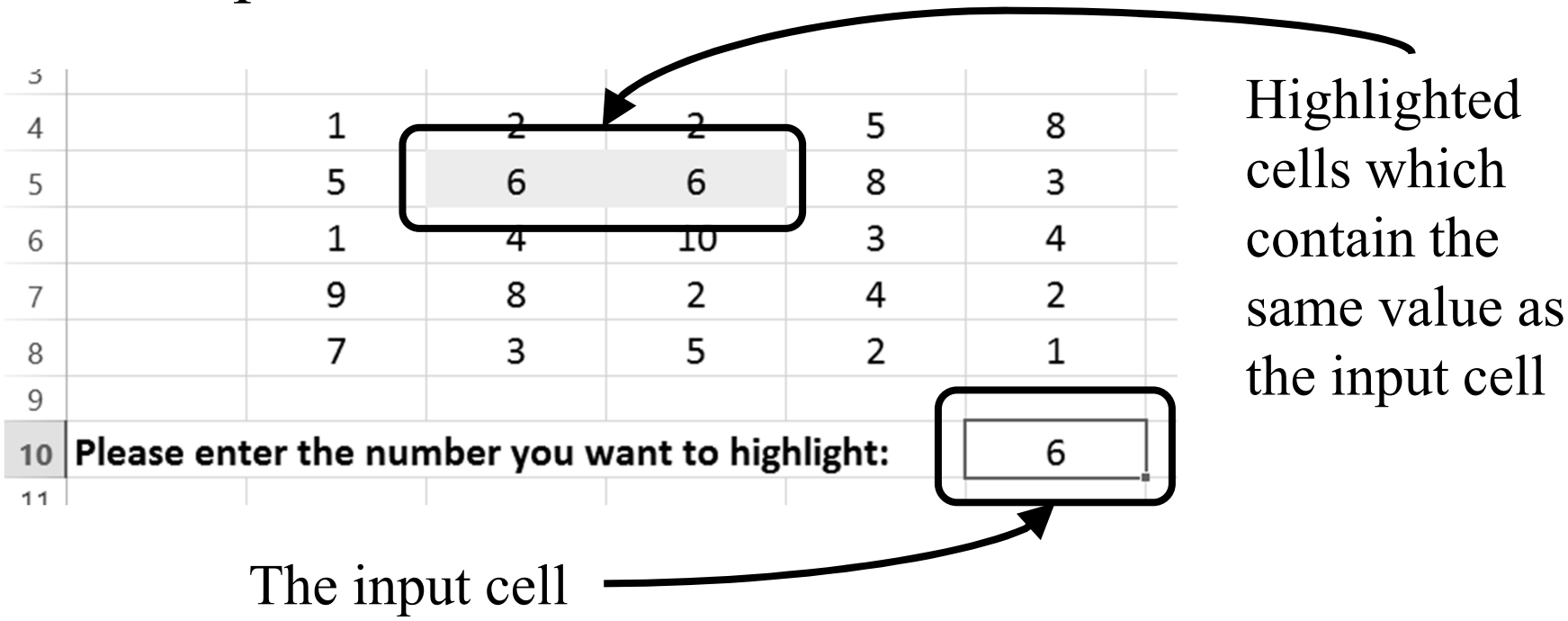
```
Dim Cell As Range

For Each Cell In Range("B1:B5")
    ...
Next Cell
```

You need to use the correct type for the variable

One at a time, each cell is stored in this variable; there is no need to use `Set` here

An Example – Highlighting Cells

- In this example, a For Each loop is used to highlight cells which contain the same value as the input cell



Highlighting Cells – The Loop

- Some numbers to be highlighted by the For Each loop is in cells B4:F8, i.e. `Range("B4:F8")` in VBA

	B	C	D	E	F
4	1	2	2	5	8
5	5	6	6	8	3
6	1	4	10	3	4
7	9	8	2	4	2
8	7	3	5	2	1

- The loop therefore looks like this:

The loop first looks at B4, then C4, … up to F8

```
For Each Cell In Range("B4:F8")
    ...
Next Cell
```

Highlighting Cells – Loop Content

- The content of the loop simply compares the content of the current cell with the input cell
- If they are the same, the code will highlight the cell with yellow; otherwise, it will be white

The input cell

```
For Each Cell In Range("B4:F8")
    If Cell.Value = Range("F10").Value Then
        Cell.Interior.ColorIndex = 6
    Else
        Cell.Interior.ColorIndex = 0
    End If
Next Cell
```

Highlight the cell using a yellow background

Otherwise, no background colour

Using For Each Loop with Shapes

- The For Each loop works for any collection of things
- For example, it can also work with Excel shapes
- You can get all the shapes in the current worksheet using `ActiveSheet.Shapes`
- The following loop runs for each shape in the worksheet:

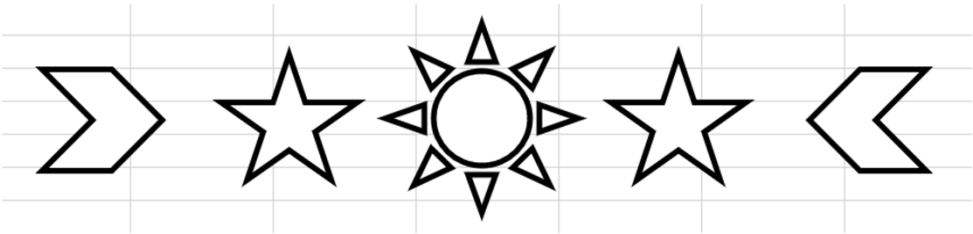
```
Dim ThisShape As Shape

For Each ThisShape In ActiveSheet.Shapes
    ...
Next ThisShape
```

ActiveSheet means 'the worksheet you are currently using'

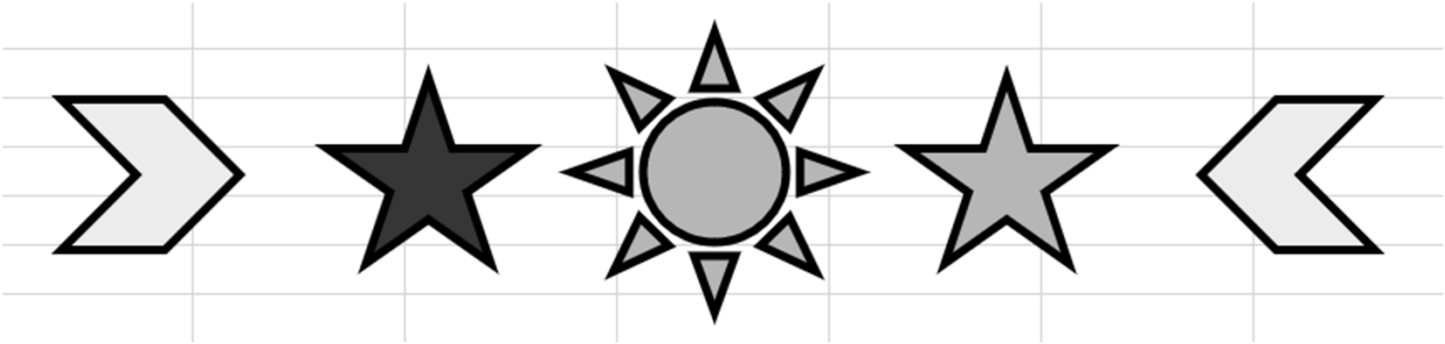
One at a time, each shape in the worksheet is stored in this variable

An Example with Shapes

- In this example, a few shapes have been inserted in a worksheet



- When the macro in the example is run, the shapes are changed to different colours randomly



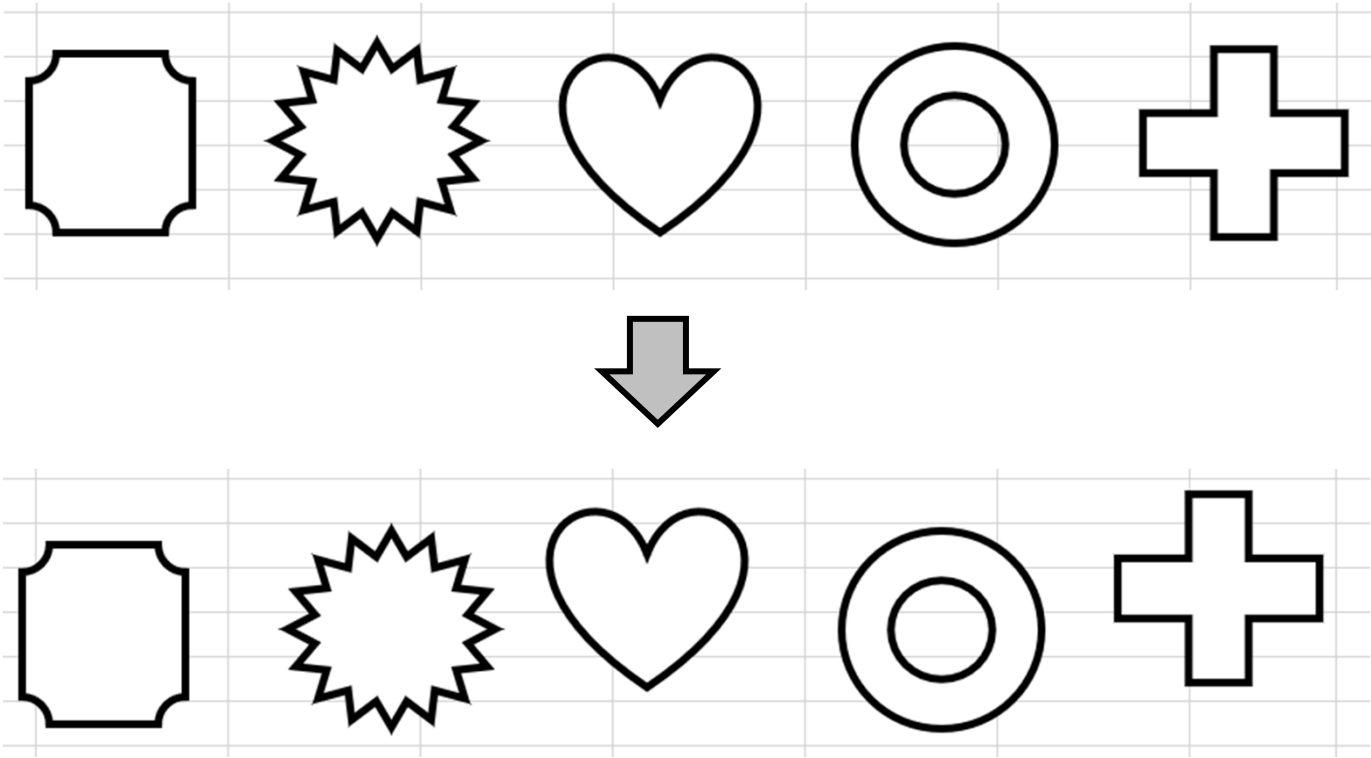
The For Each Loop With Shapes

- Here is the loop of the example
- It changes each shape using a random colour:

```
For Each ThisShape In ActiveSheet.Shapes
  RandomValue = Int(Rnd() * 3) + 1

  If RandomValue = 1 Then
    ThisShape.Fill.ForeColor.RGB = vbYellow
  ElseIf RandomValue = 2 Then
    ThisShape.Fill.ForeColor.RGB = vbGreen
  ElseIf RandomValue = 3 Then
    ThisShape.Fill.ForeColor.RGB = vbRed
  End If
Next ThisShape
```

Another Example

- Here is another example that changes the position of some shapes in a worksheet



Moving the Shapes

- The For Each loop goes through the shapes and moves them randomly

```
For Each ThisShape In ActiveSheet.Shapes
  RandomX = Int(Rnd() * 11) - 5
  RandomY = Int(Rnd() * 11) - 5

  ThisShape.Left = _
    ThisShape.Left + RandomX
  ThisShape.Top = _
    ThisShape.Top + RandomY
Next ThisShape
```

Generate random numbers from -5 to 5

The Left and Top properties set the position of a shape

Using For Each Loop with Worksheets

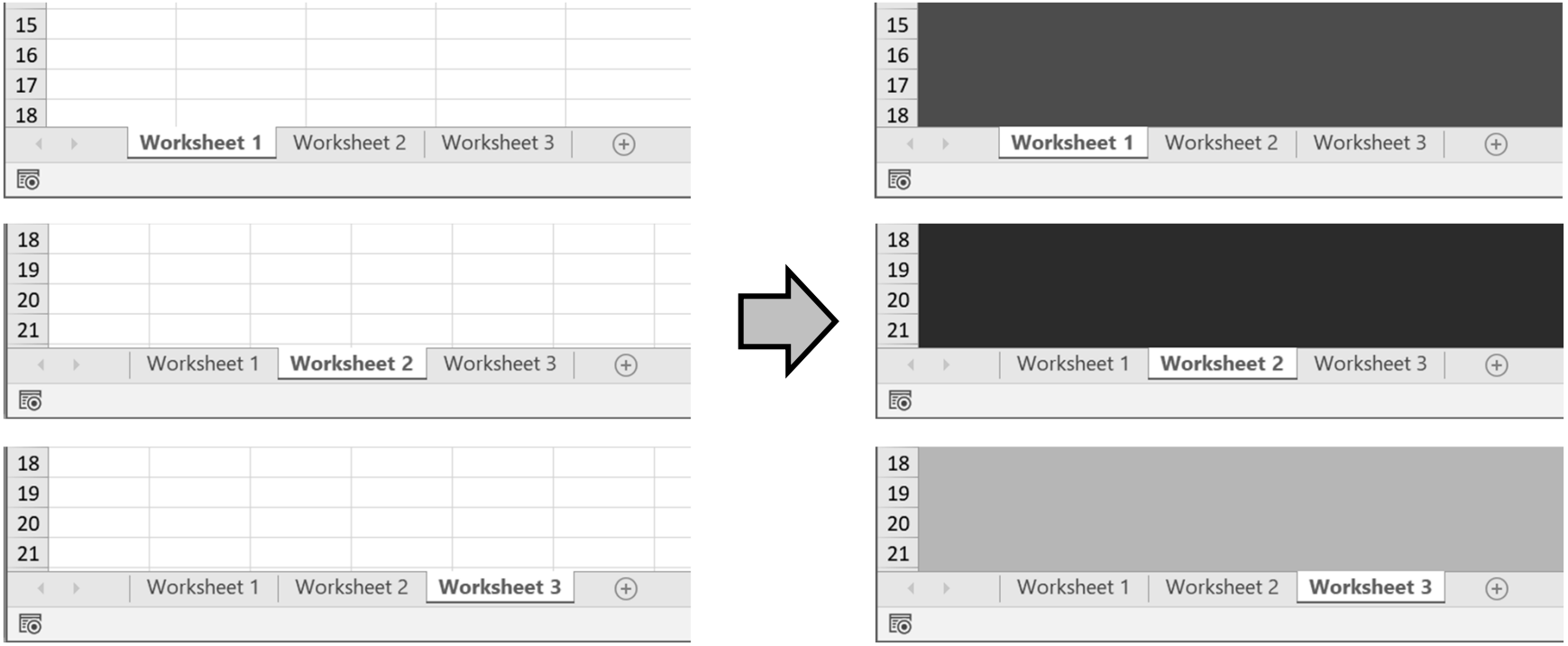
- All worksheets are stored together in a collection
- You can access all of them using `Worksheets`
- The following loop runs through each worksheet:

```
Dim ThisWorksheet As Worksheet

For Each ThisWorksheet In Worksheets
    ...
Next ThisWorksheet
```

One at a time, each worksheet is stored in this variable

Changing Worksheet Colours

- In the following example, the macro changes the colour of the three worksheets randomly



The Loop with Worksheets

- The For Each loop simply goes through all worksheets and changes their colours to a random colour index from 1 to 56

```
For Each ThisWorksheet In Worksheets
  ThisWorksheet.Cells.Interior.ColorIndex =
                                  Int(Rnd * 56) + 1
Next ThisWorksheet
```

Change every cell inside the worksheet

Put a number from 1 to 56 to the ColorIndex property of the worksheet cells