



Macro Programming

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**Experiential Learning — Debugging
VBA Code + Using Copilot to
Automate Excel Tasks**

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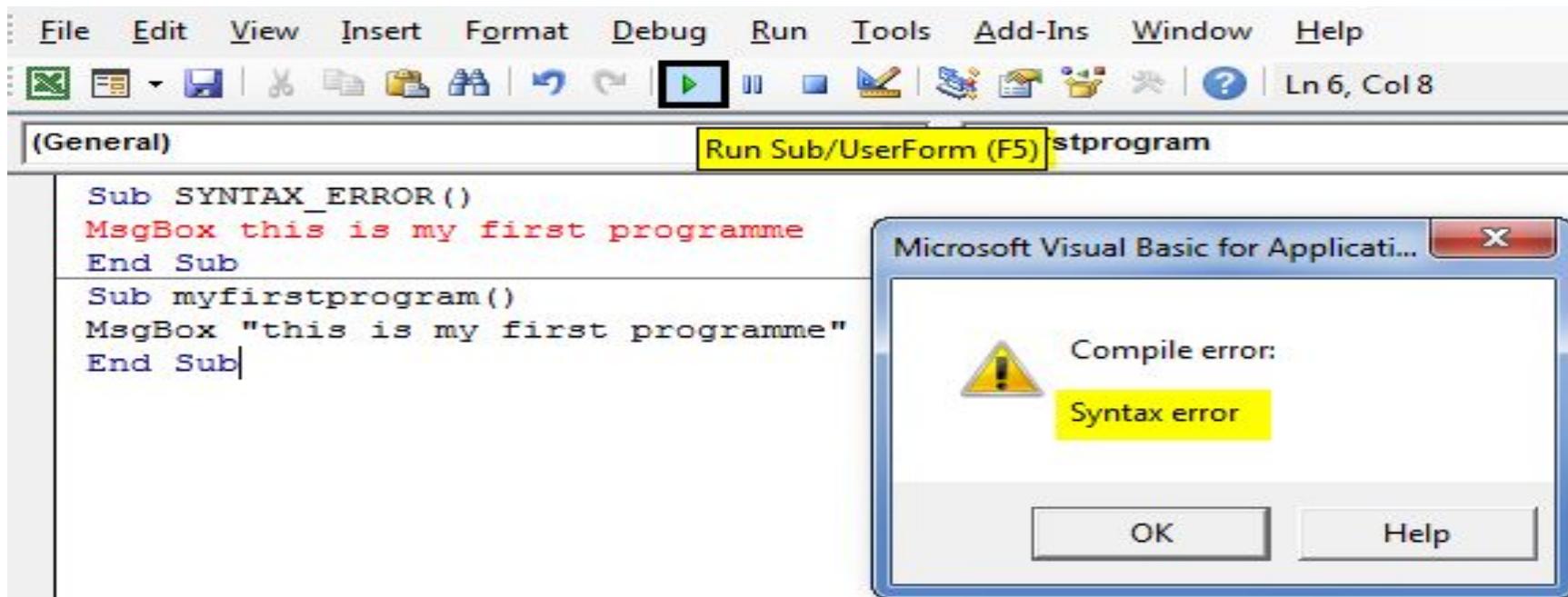


Types of VBA Errors

Error Type	Description	Example
Syntax Error	Breaks coding rules	If x = 10 Then MsgBox "Hi" (missing End If)
Runtime Error	Occurs while code runs	Dividing by zero, missing sheet
Logic Error	Code runs but gives wrong results	Incorrect formula or condition



Types of VBA Errors



The screenshot shows the Microsoft Visual Basic for Applications (VBA) editor interface. The menu bar includes File, Edit, View, Insert, Format, Debug, Run, Tools, Add-Ins, Window, and Help. The toolbar contains various icons for file operations and debugging. The status bar at the bottom right shows "Ln 6, Col 8". The code window displays two sub-procedures:

```
Sub SYNTAX_ERROR()
    MsgBox this is my first programme
End Sub

Sub myfirstprogram()
    MsgBox "this is my first programme"
End Sub
```

The second procedure contains a syntax error. A yellow callout box highlights the word "this" in the line "MsgBox this is my first programme". A yellow border surrounds the text "Run Sub/UserForm (F5)" in the toolbar. A "Run Sub/UserForm (F5)" button is also highlighted with a yellow box. A "stprogram" tab is visible in the background.

A "Microsoft Visual Basic for Applications" dialog box is displayed, showing a warning icon and the text "Compile error: Syntax error". The dialog has "OK" and "Help" buttons at the bottom.



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Experiential Task: Finding Syntax Errors

```
Sub SalesTotal()
    Dim total as Double
    For i = 1 To 10
        total = total + Cells(i, 2).Value
    MsgBox "Total Sales: " & total
End Sub
```

Expected Fix: Add Next i



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Runtime Errors in VBA

Common runtime errors:

- Division by zero.
- Referring to an invalid worksheet or cell.
- Opening a missing file.



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Runtime Errors in VBA



Example:

```
Sub ExampleRuntime()
    Dim result As Double
    result = 100 / 0
End Sub
```



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Experiential Task: Handling Runtime Errors



Add structured error handling:

```
On Error GoTo ErrHandler
Dim result As Double
result = 100 / 0
Exit Sub
ErrorHandler:
    MsgBox "An error occurred: " & Err.Description
```



Debugging Logic Errors

Logic errors are the hardest to find because VBA runs successfully but results are wrong.

```
Sub LogicErrorExample()
    Dim x As Integer, y As Integer
    x = 10
    y = 0
    Do Until x = 0
        y = y + x
        x = x - 2
    Loop
    MsgBox "Result: " & y
End Sub
```



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Debugging Workflow

Debug systematically:

1. Reproduce the error.
2. Add breakpoints (**F9**).
3. Step through (**F8**).
4. Inspect variables (Immediate / Watch Window).
5. Fix and re-test.



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Using Immediate Window

Use `?` to test variable values during runtime.

```
? x  
? Cells(1, 1).Value
```

Use `Debug.Print` to log information.

```
Debug.Print "Loop count: " & i
```



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Using Watch Window

Steps:

1. Right-click variable → “Add Watch.”
2. Choose “Watch Expression.”
3. Observe value changes in Watch Window.



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Breakpoints & Step Execution

Press **F9** to set breakpoint.

Run code → execution pauses.

Press **F8** to go line by line.

Observe variable changes in Locals Window.



Breakpoints & Step Execution

(General)

```
Sub BreakPOint()

    Dim k As Long

    Worksheets("Example1").Select

    ● Range("A1").Select

        Range("A1:A10").Value = "Hi threre!"

    End Sub
```



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Introducing Microsoft Copilot





Introducing Microsoft Copilot

Copilot is Microsoft's AI assistant that can help you:

- Generate VBA code snippets.
- Explain existing VBA logic.
- Suggest fixes for syntax or logic errors.
- Automate repetitive Excel tasks quickly.



Example: Using Copilot for VBA Help

Prompt Example:

“Write a VBA macro to highlight all cells with values greater than 500 in yellow.”



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