# Debugging Applications in VS Code

## Step 1: Install Necessary Extensions

1. Open VS Code and go to \*\*Extensions (`Ctrl+Shift+X`)\*\*.  
2. Install the appropriate debugger extension:  
 - Python: \*\*Python Extension\*\*  
 - JavaScript/Node.js: \*\*Debugger for Chrome\*\*  
 - Java: \*\*Java Extension Pack\*\*  
 - C/C++: \*\*C/C++ Extension\*\*

## Step 2: Start Debugging

1. Open your project folder in VS Code.  
2. Navigate to the \*\*Run and Debug Panel (`Ctrl+Shift+D`)\*\*.  
3. Click \*\*'Run and Debug'\*\* and select the appropriate environment.  
4. Configure `.vscode/launch.json` (if needed) for custom settings.

## Step 3: Use Breakpoints and Debug Console

1. Click in the \*\*gutter\*\* (left margin) next to a line of code to add a breakpoint.  
2. Start debugging (`F5`), and execution will pause at breakpoints.  
3. Use \*\*'Variables' panel\*\* to inspect variable values.  
4. Use \*\*Debug Console (`Ctrl+Shift+Y`)\*\* to execute commands and inspect runtime values.

## Step 4: Debugging Shortcuts

✅ \*\*Start Debugging:\*\* `F5`  
✅ \*\*Step Over:\*\* `F10`  
✅ \*\*Step Into:\*\* `F11`  
✅ \*\*Step Out:\*\* `Shift+F11`  
✅ \*\*Stop Debugging:\*\* `Shift+F5`  
✅ \*\*Restart Debugging:\*\* `Ctrl+Shift+F5`

## Step 5: Troubleshooting

1. If breakpoints are not hitting, check if you are in \*\*debug mode\*\*.  
2. Ensure the correct \*\*interpreter or runtime\*\* is selected (`Ctrl+Shift+P` → Select Interpreter).  
3. Check for \*\*port conflicts\*\* in `launch.json` (especially for web apps).  
4. Use \*\*Logpoints\*\* for debugging without stopping execution.