

Development Tools

Introduction to Developer Tools

Developer tools are essential software that help programmers write, test, and deploy code efficiently—like a toolbox for building software. Just as a carpenter needs more than a hammer, developers need specialized tools to streamline their work.

Key Topics

What is an IDE?

An **Integrated Development Environment (IDE)** combines a code editor, debugger, and build tools into one application to improve productivity, code quality, and debugging.

Coding Environments Compared

- **Offline (e.g., Notepad):**
Simple but lacks features like syntax highlighting or debugging.
- **Online (CLI/Terminal):**
Flexible and accessible, but not beginner-friendly or feature-rich.
- **IDE:**
Powerful, feature-packed, best for complex projects but can be resource-heavy.

What Are Development Tools?

Development tools are software applications that help programmers write, test, debug, and maintain code efficiently. They've evolved significantly over the decades:

Why Do We Need Development Tools?

Challenge	Solution
Manual Error Detection	Real-time syntax checking & IntelliSense
Time-consuming Compilation	One-click build & run
Difficult Debugging	Visual debuggers with breakpoints
File Management	Project explorers & search
Version Control	Integrated Git workflows
Code Quality	Automated formatting & linting

Code Editors & IDEs

Visual Studio

- Full IDE for .NET, C#, ASP.NET Core
- Features: IntelliSense, Debugger, GUI Designers, NuGet
- Use case: Windows desktop apps, enterprise systems

Visual Studio Code

- Lightweight, cross-platform code editor
- Rich extension ecosystem (Live Server, ESLint, GitLens)
- Built-in terminal, version control, debugger
- Ideal for web development and scripting

What is VS Code?

Introduction to Visual Studio Code

VS Code is a lightweight, cross-platform source code editor developed by Microsoft that has revolutionized modern development.

Key Features:

- **Free & Open Source**
- **Cross-platform** (Windows, macOS, Linux)
- **Extensive extension ecosystem** (100,000+ extensions)
- **Built-in Git integration**
- **Integrated terminal**
- **IntelliSense** (smart completions)

Why Choose VS Code?

Advantage	Benefit
Lightning Fast	Starts in 2-3 seconds
Highly Customizable	Themes, extensions, settings
Multi-language Support	JavaScript, Python, C#, Go, etc.
Active Community	Constant updates, support
Remote Development	SSH, containers, WSL

Essential Extensions

```
. Prettier - Code formatter
. Auto Rename Tag
. Live Server
. Thunder Client (API testing)
```

- . JavaScript (ES6) code snippets
- . Bracket Pair Colorizer 2
- . Material Icon Theme
- . One Dark Pro (theme)

Essential Shortcuts

Shortcut	Action
<code>Ctrl + P</code>	Quick file navigation
<code>Ctrl + Shift + P</code>	Open command palette
<code>Ctrl + ~</code>	Toggle terminal
<code>Alt + Click</code>	Multi-cursor editing
<code>Ctrl + /</code>	Comment/uncomment line
<code>Ctrl + B</code>	Toggle sidebar
<code>F8</code>	Jump to next error or warning
<code>Ctrl + Space</code>	Trigger IntelliSense suggestions
<code>Ctrl + Shift + E</code>	Explorer panel
<code>Ctrl + Shift + X</code>	Extensions panel
<code>Ctrl + Shift + F</code>	Search across files
<code>F5</code>	Run current script (with debugger)

VS Code Features

Multi-File Editing

```
Ctrl+D      # Select next occurrence
Ctrl+Shift+L # Select all occurrences
Alt+Shift+I  # Insert cursor at end of each line
Ctrl+Shift+K # Delete line
Alt+Up/Down  # Move line up/down
Shift+Alt+Up/Down # Copy line up/down
```

Search and Replace

```
Ctrl+F      # Find
Ctrl+H      # Replace
Ctrl+Shift+F # Find in files
Ctrl+Shift+H # Replace in files
```

Code Navigation

```
Ctrl+G      # Go to line
Ctrl+Shift+O # Go to symbol
F12         # Go to definition
Alt+F12     # Peek definition
Shift+F12   # Find all references
```

Example: HTML/CSS/JavaScript Project

Create Live Project

1. **Create new folder:** `mkdir vscode-demo && cd vscode-demo`
2. **Open in VS Code:** `code .`

File Creation Demo

```
<!-- index.html - Create this live -->
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>VS Code Demo</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>
  <div class="container">
    <h1 id="title">Hello VS Code!</h1>
    <button onclick="changeColor()">Change Color</button>
    <div class="card">
      <p>This is a demo card</p>
    </div>
  </div>
  <script src="script.js"></script>
</body>
</html>
```

Show These Features While Coding:

- **Emmet abbreviations:** `div.container>h1#title+button`
- **Auto-completion:** HTML tags, CSS properties
- **Multi-cursor editing:** `Alt+Click` or `Ctrl+Alt+Down`
- **Auto rename tags:** Change opening tag, closing changes automatically

CSS File Demo

```
/* style.css - Show CSS IntelliSense */
.container {
  max-width: 800px;
  margin: 0 auto;
  padding: 20px;
  font-family: Arial, sans-serif;
}

#title {
  color: #333;
  transition: color 0.3s ease;
}

.card {
  background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);
  padding: 20px;
  border-radius: 10px;
  margin: 20px 0;
  color: white;
  box-shadow: 0 4px 6px rgba(0,0,0,0.1);
}

button {
  background: #007acc;
  color: white;
  border: none;
  padding: 10px 20px;
  border-radius: 5px;
  cursor: pointer;
}
```

JavaScript Demo

```
// script.js -
const colors = ['#ff6b6b', '#4ecdc4', '#45b7d1', '#96ceb4', '#feca57'];
let currentIndex = 0;

function changeColor() {
  const title = document.getElementById('title');
  currentIndex = (currentIndex + 1) % colors.length;
  title.style.color = colors[currentIndex];
}

console.log('Page loaded');
```

What is Visual Studio?

Introduction to Visual Studio

Visual Studio is a comprehensive Integrated Development Environment (IDE) from Microsoft, designed for enterprise-level development.

Key Features:

- **Full-featured IDE** for .NET ecosystem
- **Advanced debugging tools**
- **Database integration** (SQL Server)
- **Team collaboration tools**
- **Enterprise-grade IntelliSense**

Why Choose Visual Studio?

Advantage	Benefit
Comprehensive Toolset	Everything needed for .NET development
Superior Debugging	Advanced breakpoints, memory analysis
Database Integration	Visual database designers
Project Templates	Quick start for enterprise apps
Team Features	Built-in collaboration tools

Visual Studio Interface & Project Creation

Opening Visual Studio

- **Start Page:** Recent projects, clone repository, create project
- **Create New Project** walkthrough

Create Console Application Live

1. **File** → **New** → **Project**
2. **Console App (.NET 8)**
3. **Project name:** VisualStudioDemo
4. **Solution name:** DemoSolution

Interface Tour

- **Solution Explorer:** Project structure
- **Code Editor:** IntelliSense, error squiggles
- **Error List:** Compile-time errors
- **Output Window:** Build results
- **Package Manager Console:** NuGet packages

Essential Shortcuts

```
Ctrl+Shift+B      # Build Solution
F5                # Start Debugging
Ctrl+F5           # Start Without Debugging
F9                # Toggle Breakpoint
F10               # Step Over
F11               # Step Into
Ctrl+K+C          # Comment Selection
Ctrl+K+U          # Uncomment Selection
Ctrl+M+M          # Toggle Method Collapse
Ctrl+,            # Quick Launch
```

Features to Demonstrate:

- **IntelliSense:** Real-time suggestions
- **Debugging:** Breakpoints, watch windows
- **Error detection:** Red squiggles
- **Quick actions:** Ctrl+.
- **Code snippets:** for + Tab

VS Code vs Visual Studio Comparison

Head-to-Head Comparison

Aspect	VS Code	Visual Studio
Startup Time	2-3 seconds	10-15 seconds
Memory Usage	200MB	1GB+
Best For	Web dev, scripts	.NET, enterprise
Extensions	100,000+	Limited but integrated
Price	Free	Community free, Pro paid
Platform	Cross-platform	Windows focused
Learning Curve	Gentle	Steep

When to Use Each Tool

Use VS Code For:

- **Web Development** (React, Vue, Angular)
- **Multi-language projects**
- **Quick file editing**
- **Remote development**
- **Scripting** (Python, JavaScript)
- **Open source projects**

Use Visual Studio For:

- **.NET applications** (C#, F#)
- **Enterprise development**
- **Windows desktop apps**
- **Database-heavy applications**
- **Team collaboration** in Microsoft ecosystem

Sample Tasks to Try

In Visual Studio

- Create a new C# Console App
- Add a method, debug it using breakpoints
- Use NuGet to install Newtonsoft.Json

In VS Code

- Open a folder with an `index.html`
- Install Live Server extension → right click → "Open with Live Server"
- Try formatting code using Prettier (`Alt + Shift + F`)

Quick Reference Links

Download Links:

- **VS Code:** code.visualstudio.com
- **Visual Studio:** visualstudio.microsoft.com

Cheat Sheets:

- **VS Code Shortcuts:** code.visualstudio.com/shortcuts
- **Visual Studio Shortcuts:** Available in Help menu