

BC03 How Programming Works: From Machine Code to Full Stack

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Byteclassroom

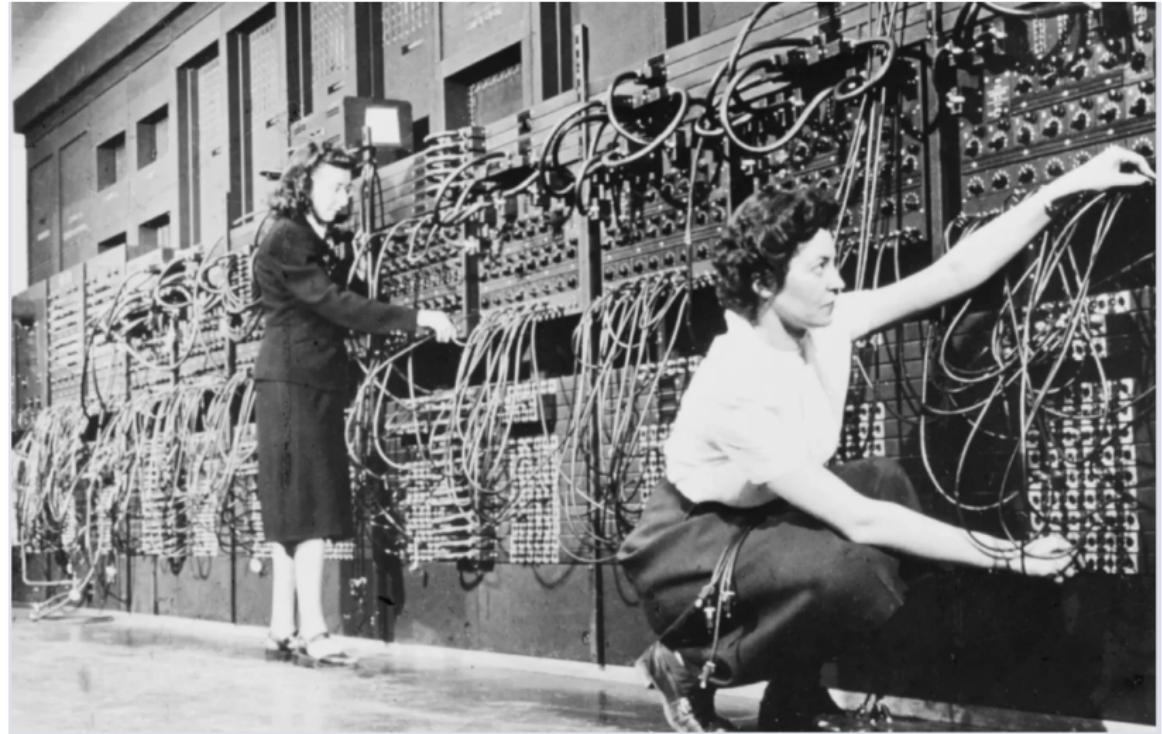
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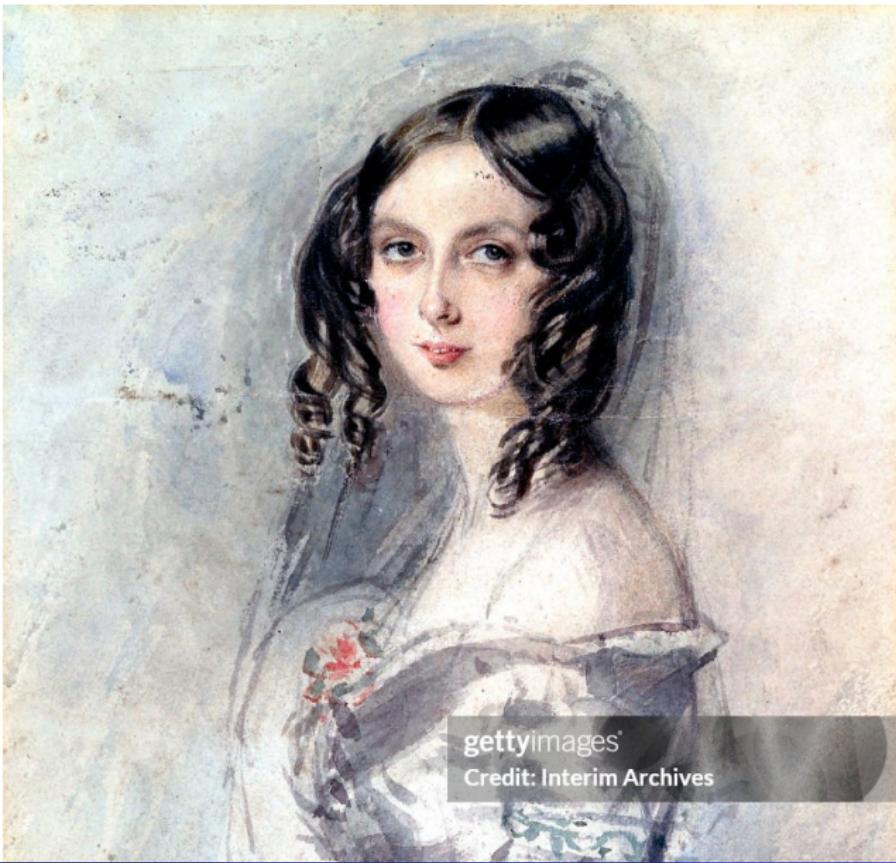
Previously on ByteClassroom...

- Why learn programming
- How to think like a programmer

Machine Language: The Birth of Programming



Meet Ada Lovelace - Fun fact 1



Binary - Fun fact 2

- Binary – Numbers, Images, and letters
- HELLO – Binary format?

Assembly Language: A Better Version of 0s and 1s

- Replaced 0s/1s with symbolic codes (MOV, ADD, etc.)
- Still low-level but easier
- Required Assembler to convert to machine code

Assembly Language: A Better Binary

Assembly program code to add two numbers

```
#include<stdio.h>
void main() {
    int a = 10, b = 20, c;

    asm {
        mov ax,a
        mov bx,b
        add ax,bx
        mov c,ax
    }

    printf("c= %d",c);
}
```

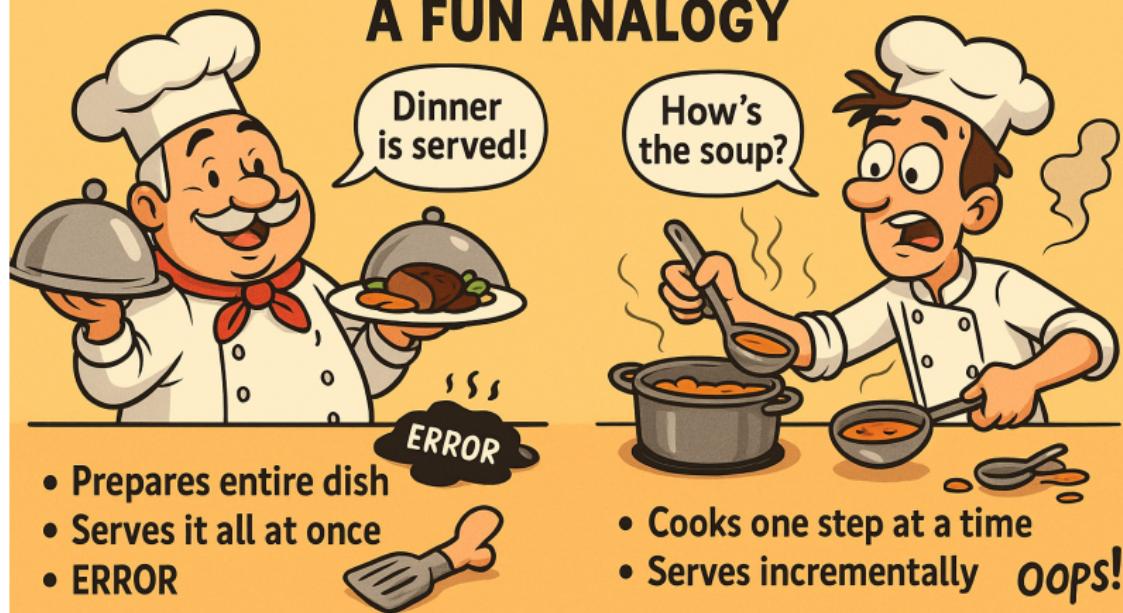
From Hardware to Human-Friendly Code

- Examples: C, Java, Python
- Closer to English
- $x = 1$ vs `MOV AX, 1`
- Easier to read, write, and maintain

Machine Vs Assembly Vs High-Level Language: NUTSHELL

Level	Instruction	Example
Machine Language	Binary	10111000 00000101
Assembly	Mnemonic code	MOV AX, 5
High-Level	English-like syntax	x = 5

COMPILER vs INTERPRETER A FUN ANALOGY



How COMPILERS work?

- Lexical Analysis
- Syntax Analysis (Parsing)
- Semantic Analysis
- Intermediate Code Generation
- Optimization
- Code Generation
- Linking and Assembly

How does INTERPRETER work?

- Lexical Analysis
- Parsing (Abstract Syntax Tree (AST))
- Interpret and Execute Line-by-Line

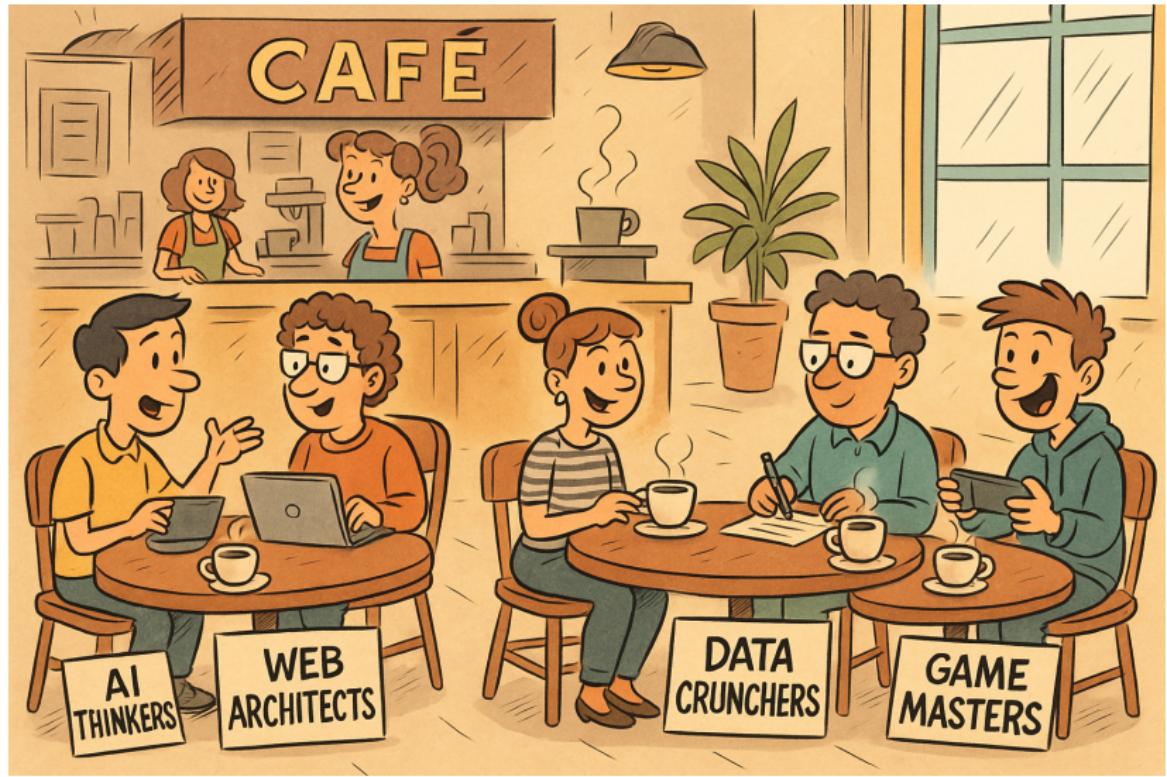
Python Java



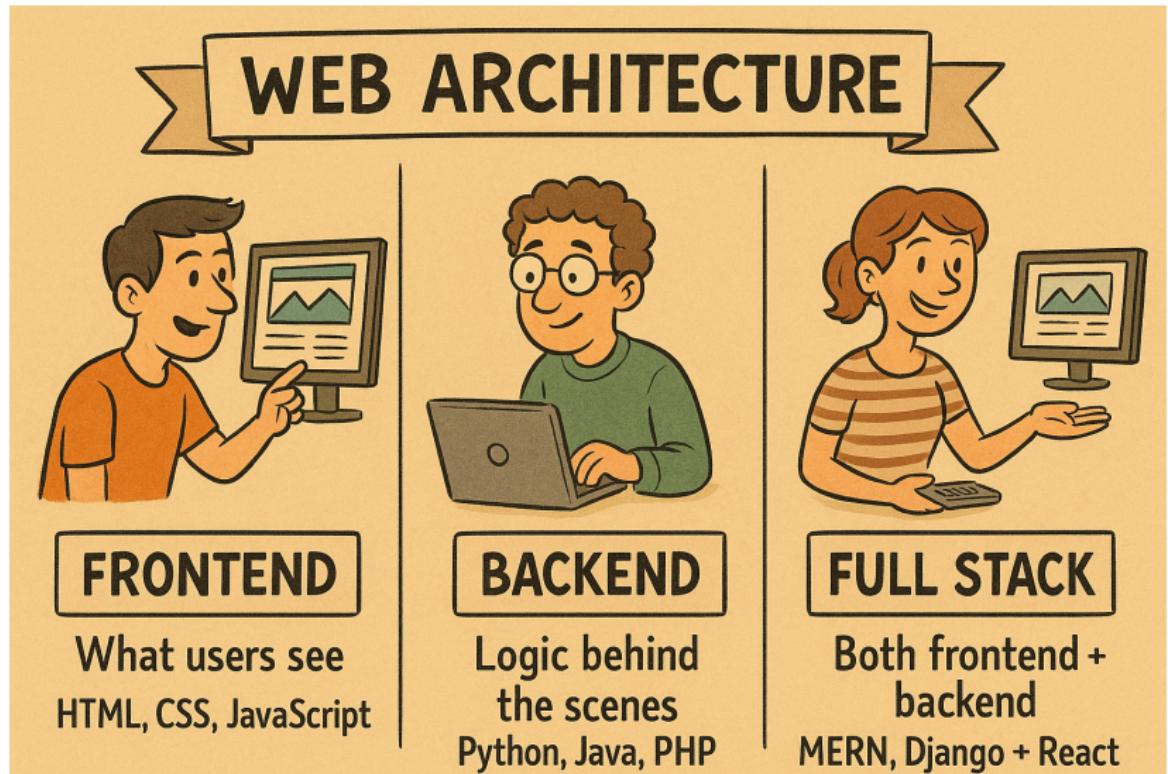
How does ASSEMBLER work?

- Lexical Analysis
- Opcode Translation
- Symbol Resolution
- Generate Machine Code
- (Optional) Linking

Languages for Every Domain



Building Blocks of Web Development



Understanding the Roots of Programming



Coming Up: From Problem to Pseudocode

- Next video: Solving any problem step-by-step
- Before code: Learn Problem Solving Strategies
- Stay tuned!

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Don't just be a coder — be a creator who understands the 'why' behind every line!