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“The course that gives CMU its Zip!”

Machine-Level Programming I: Introduction Sept. 10, 2007

Topics

- Assembly Programmer's Execution Model
- Accessing Information
 - Registers
 - Memory
- Arithmetic operations

IA32 Processors

Totally Dominate Computer Market

Evolutionary Design

- Starting in 1978 with 8086
- Added more features as time goes on
- Still support old features, although obsolete

Complex Instruction Set Computer (CISC)

- Many different instructions with many different formats
 - But, only small subset encountered with Linux programs
- Hard to match performance of Reduced Instruction Set Computers (RISC)
- But, Intel has done just that!

x86 Evolution: Programmer's View (Abbreviated)

Name	Date	Transistors
8086	1978	29K
<ul style="list-style-type: none">■ 16-bit processor. Basis for IBM PC & DOS■ Limited to 1MB address space. DOS only gives you 640K		
386	1985	275K
<ul style="list-style-type: none">■ Extended to 32 bits. Added “flat addressing”■ Capable of running Unix■ Referred to as “IA32”■ 32-bit Linux/gcc uses no instructions introduced in later models		