15-213 Recitation 3 - 2/5/01

Outline

- Code to Executables
- Machine Model
- Assembly Programming
  - Structure
  - Addressing Modes
  - Miscellaneous Stuff
- H1a / L3 Practice

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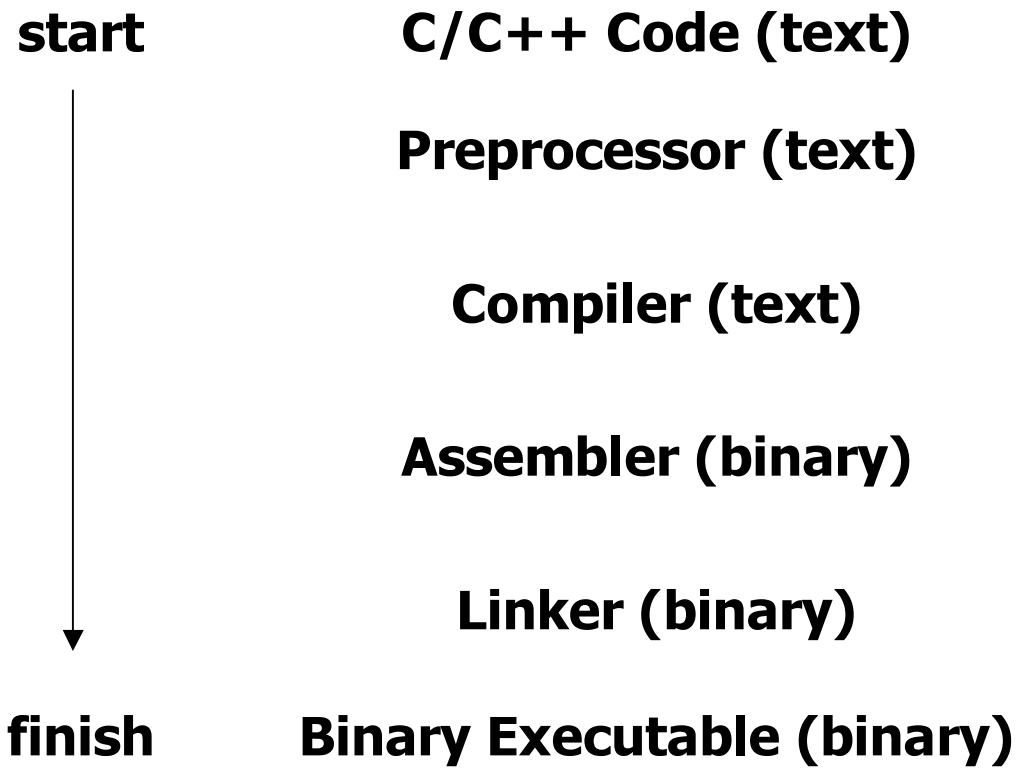
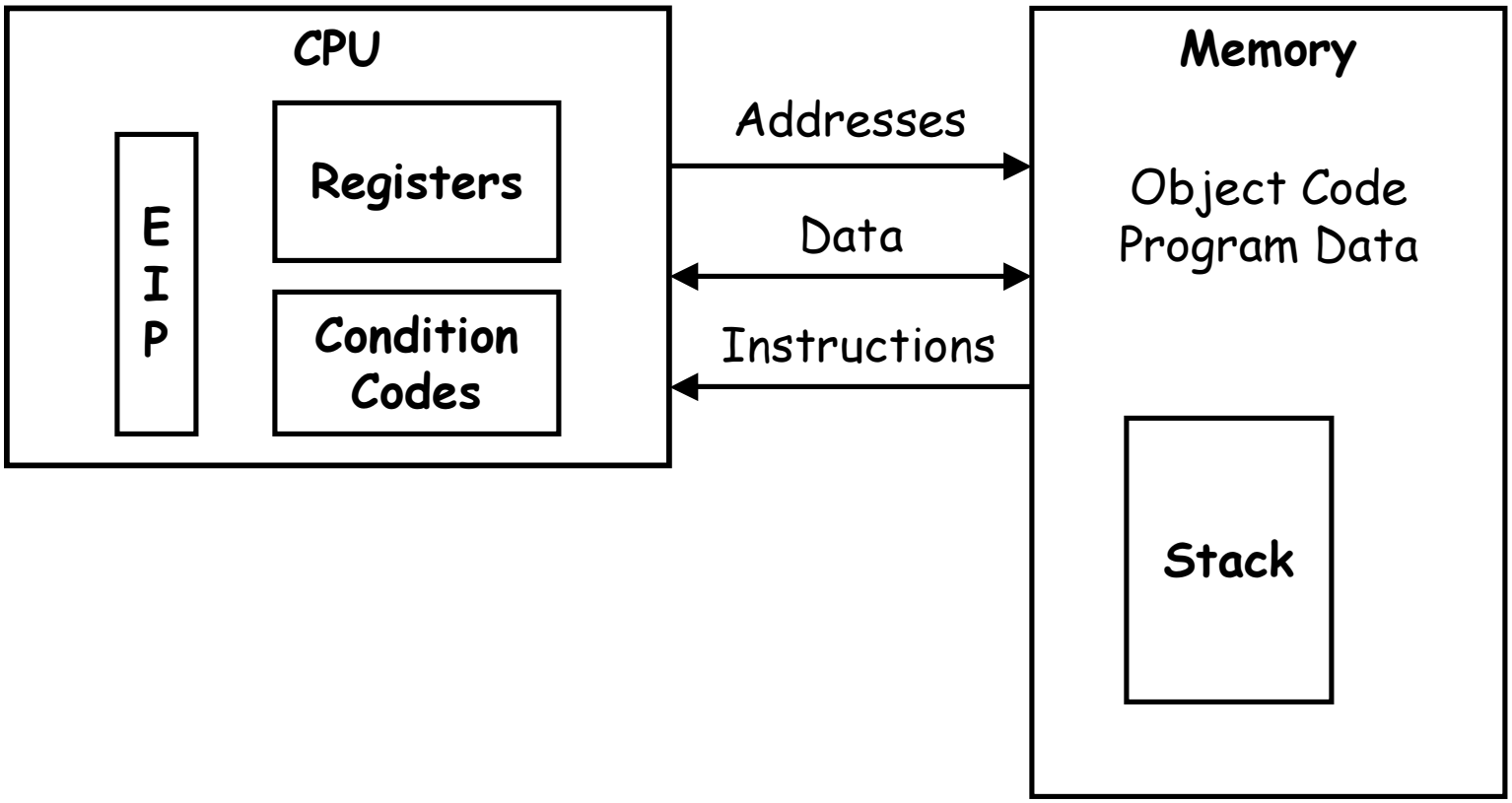
Code to Executables



Machine Model



Special Registers

- `%eax` Return Value
- %eip Instruction Pointer
- %ebp Base (Stack Frame) Pointer
- %esp Stack Pointer

Assembly Programming: Structure

Function Setup

- Save Old Base Pointer (`pushl %ebp`)
- Set up own base pointer (`movl %esp, %ebp`)
  - Note that this saves the old stack pointer
- Save any registers that could be clobbered
  - Where?

Function Body

- Operations on data, loops, function calls

Assembly Programming: Structure

Function Cleanup

- Return value placed in `%eax`
  - What about returning larger values? (structs, doubles, etc.)
- Restore Caller's Stack Pointer (`movl %ebp, %esp`)
- Restore Old Base Pointer (`popl %ebp`)
- Return
  - Where does it return to?

Assembly Programming: Simple Addressing Modes

Examples

- (R) Mem[R]
- $10(R) Mem[R + 10]
- $0x10(R) Mem[R + 16]

Assembly Programming: Indexed Addressing Modes

Generic Form

D(Rb, Ri, S) Mem[Reg[Rb]+S*Reg[Ri]+ D]

Examples

- (Rb,Ri) Mem[Reg[Rb]+Reg[Ri]]
- D(Rb,Ri) Mem[Reg[Rb]+Reg[Ri]+D]
- (Rb,Ri,S) Mem[Reg[Rb]+S*Reg[Ri]]