

CS 354

Machine Organization and Programming

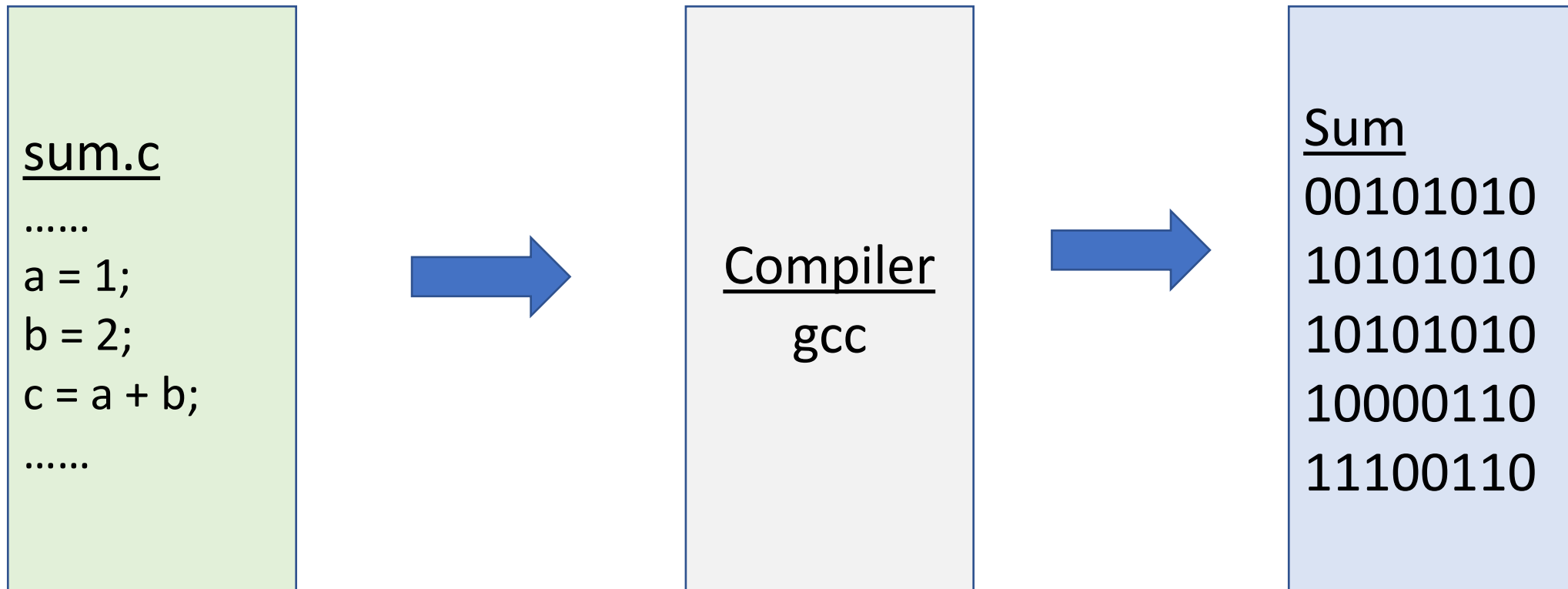
Week 8e

Michael Doescher
Spring 2021

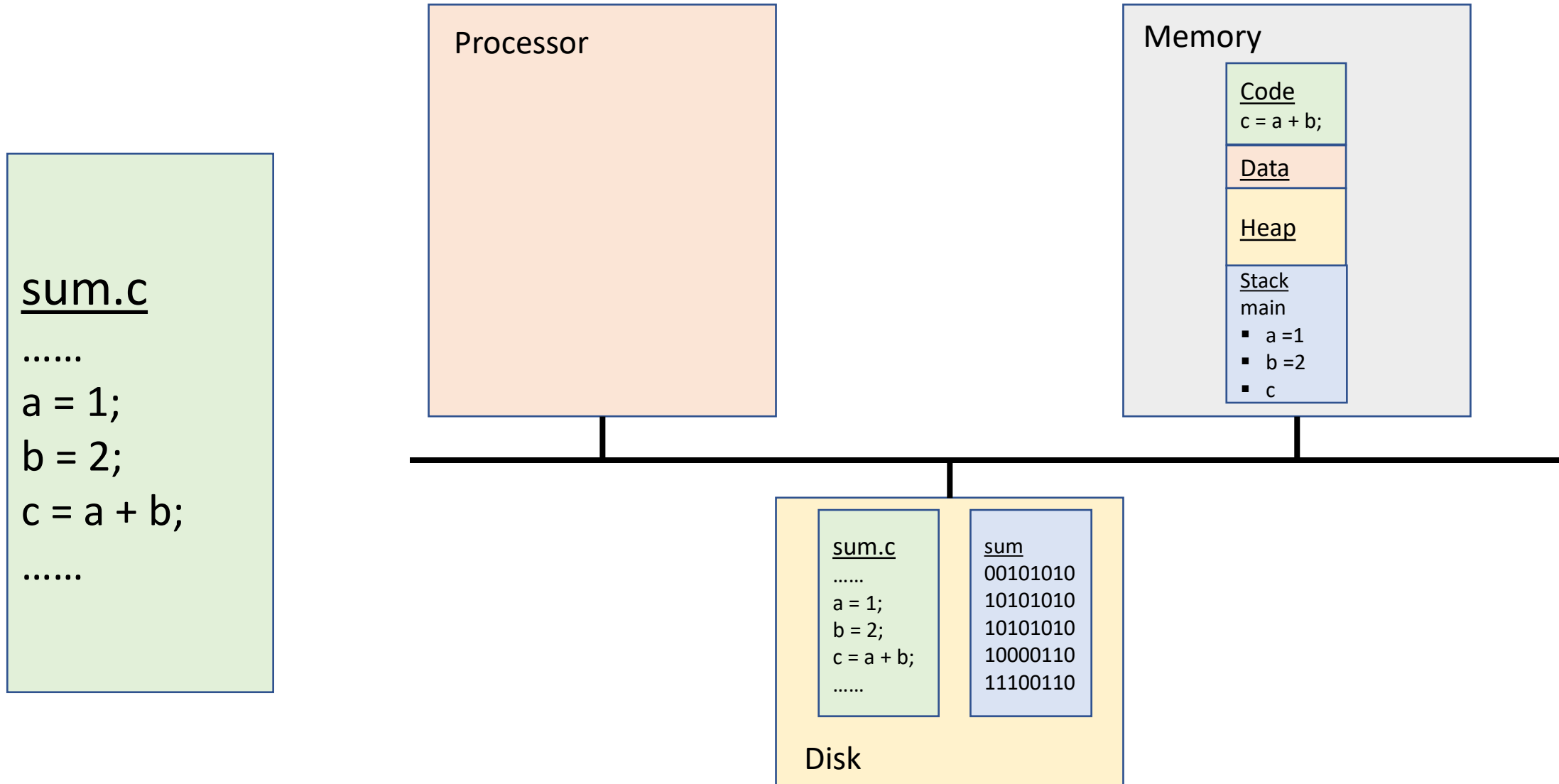
Casting Review and Endianness
Bitwise Operations
Binary Arithmetic
File Input/Output
Introduction to Assembly

What happens when we run a program?

Compiling



What happens when we run a program?



What does the CPU do?

sum.c

.....

a = 1;

b = 2;

c = a + b;

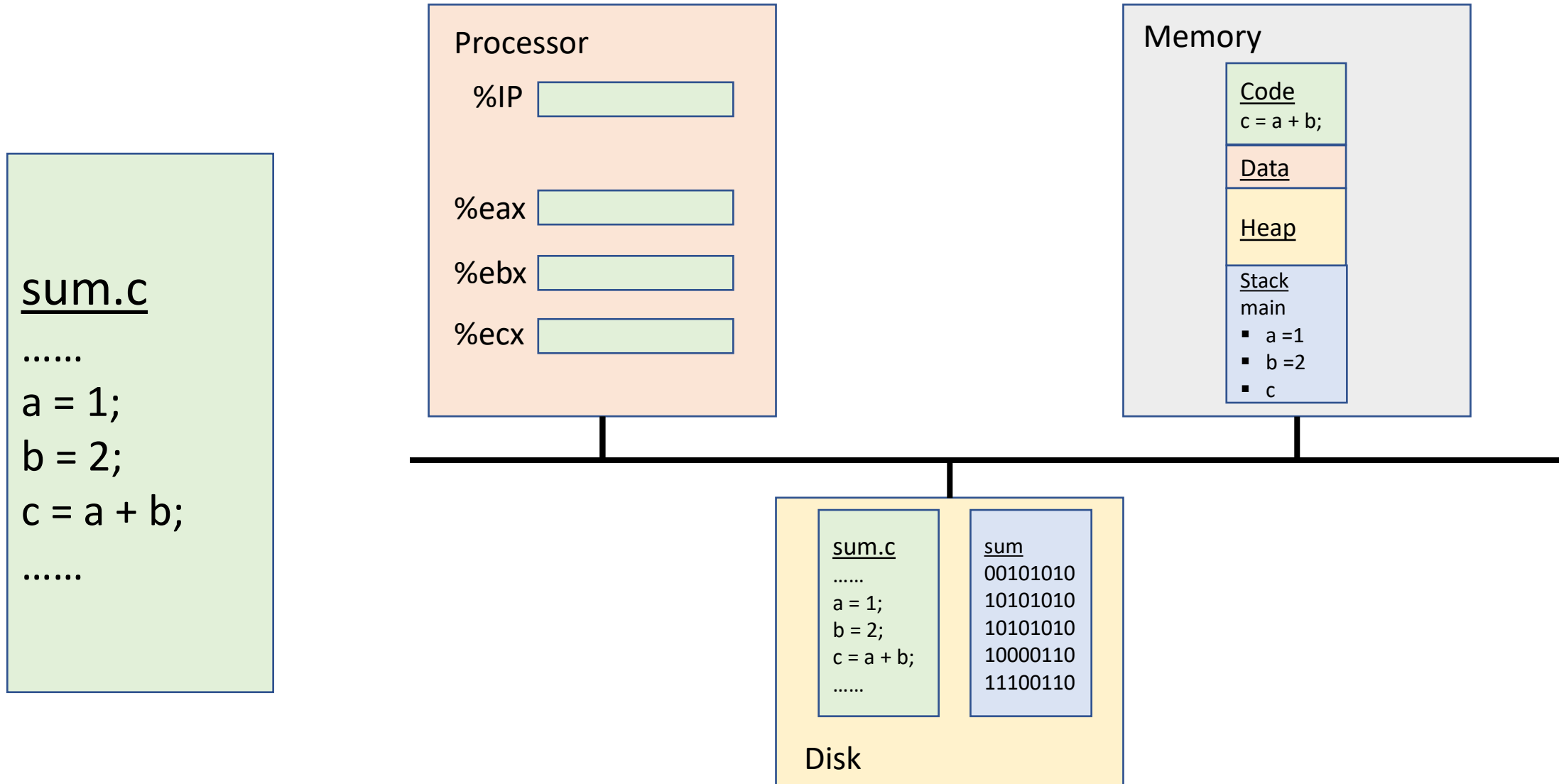
.....

fetch

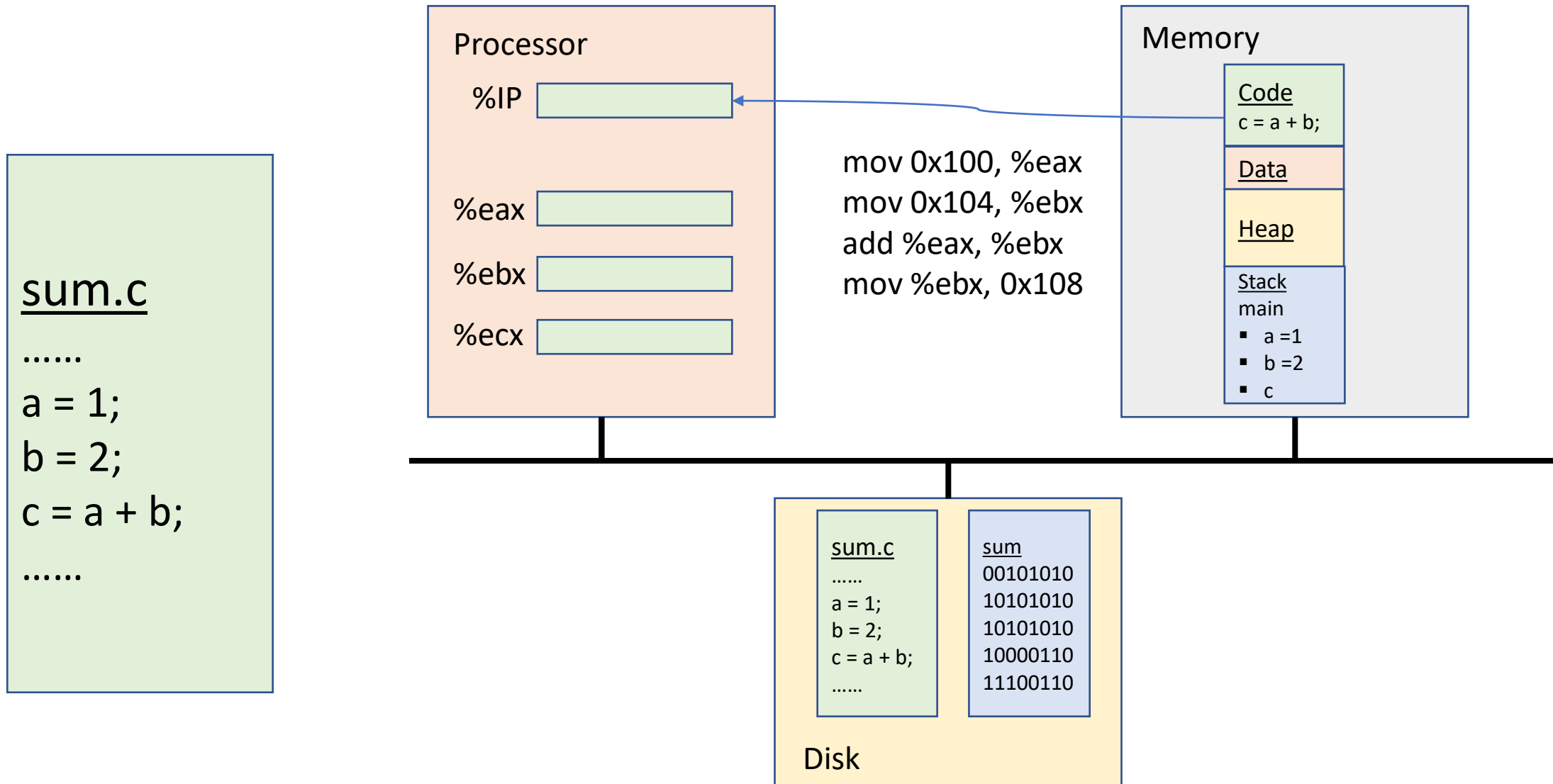
decode

execute

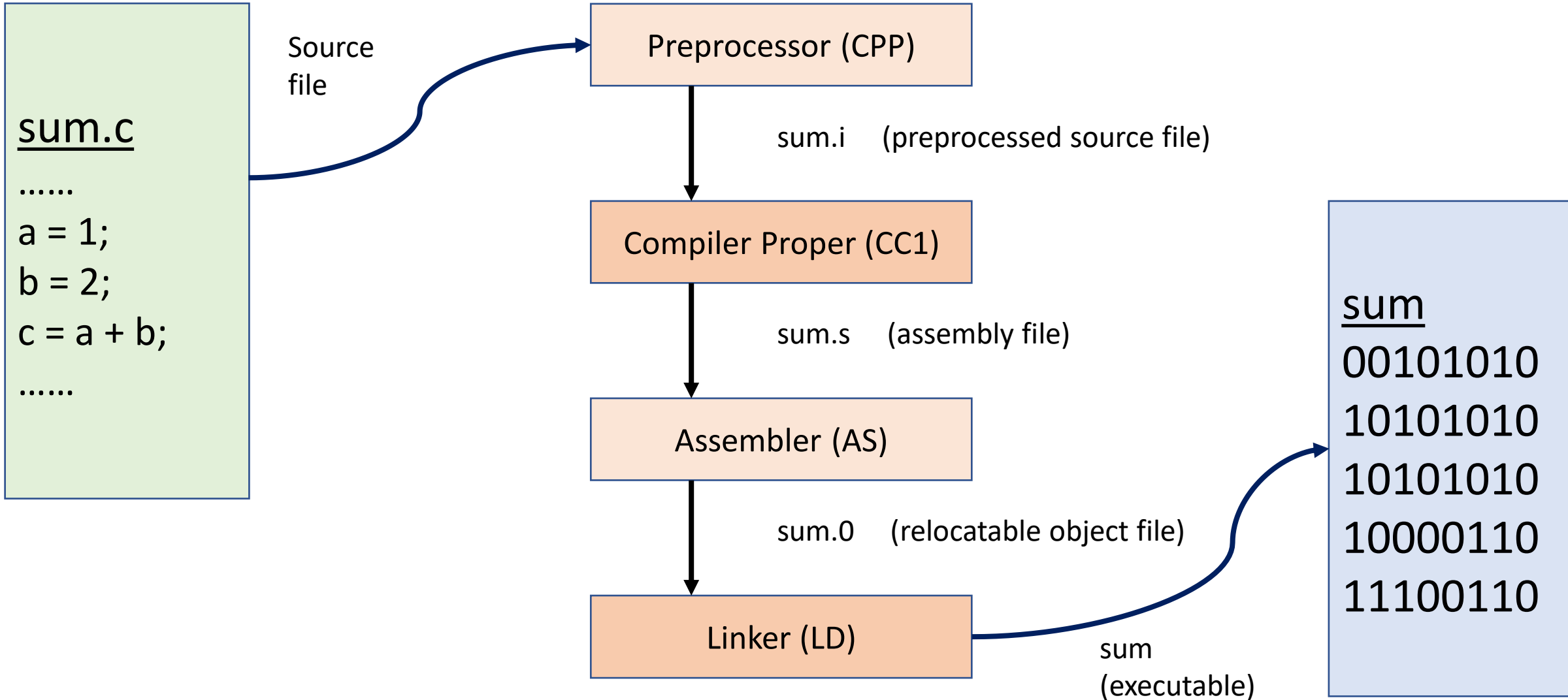
What happens when we run a program?



What happens when we run a program?



Build Process



Assembly

Intel X86

ARM

SPARC

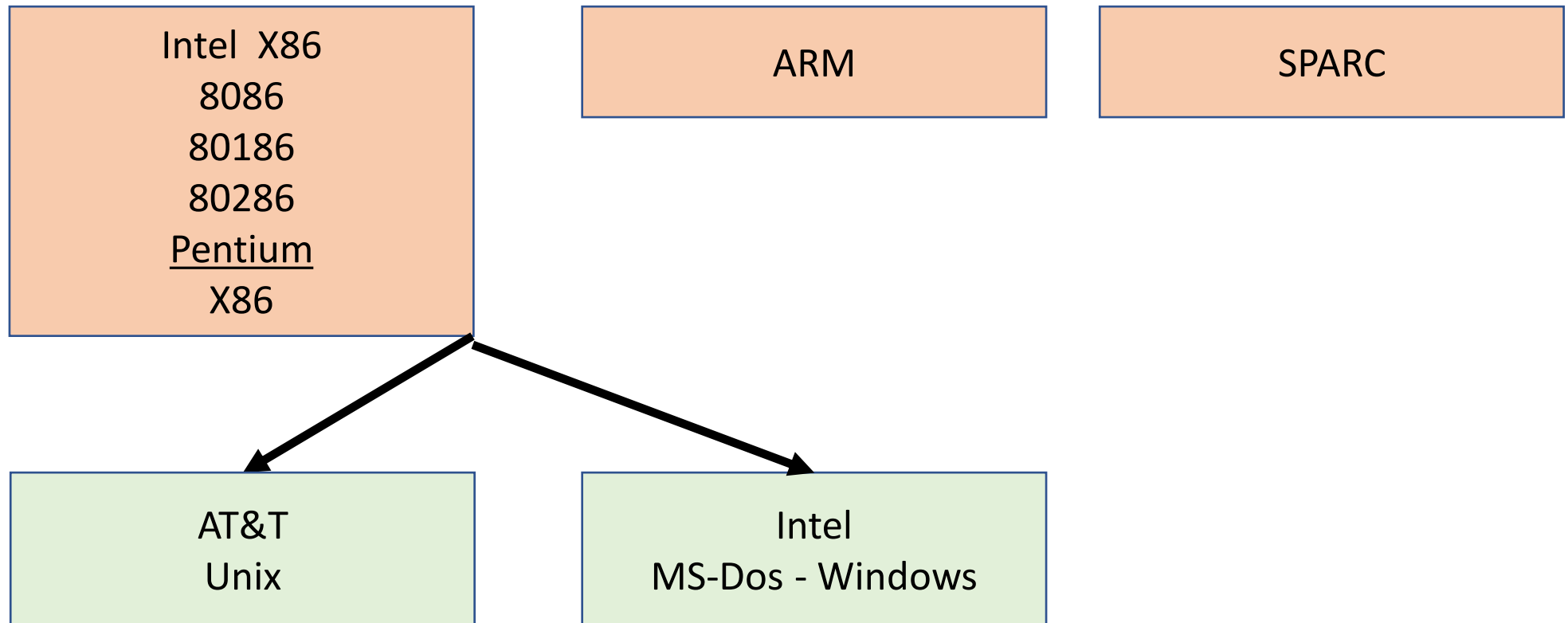
Assembly

Intel X86
8086
80186
80286
Pentium
X86

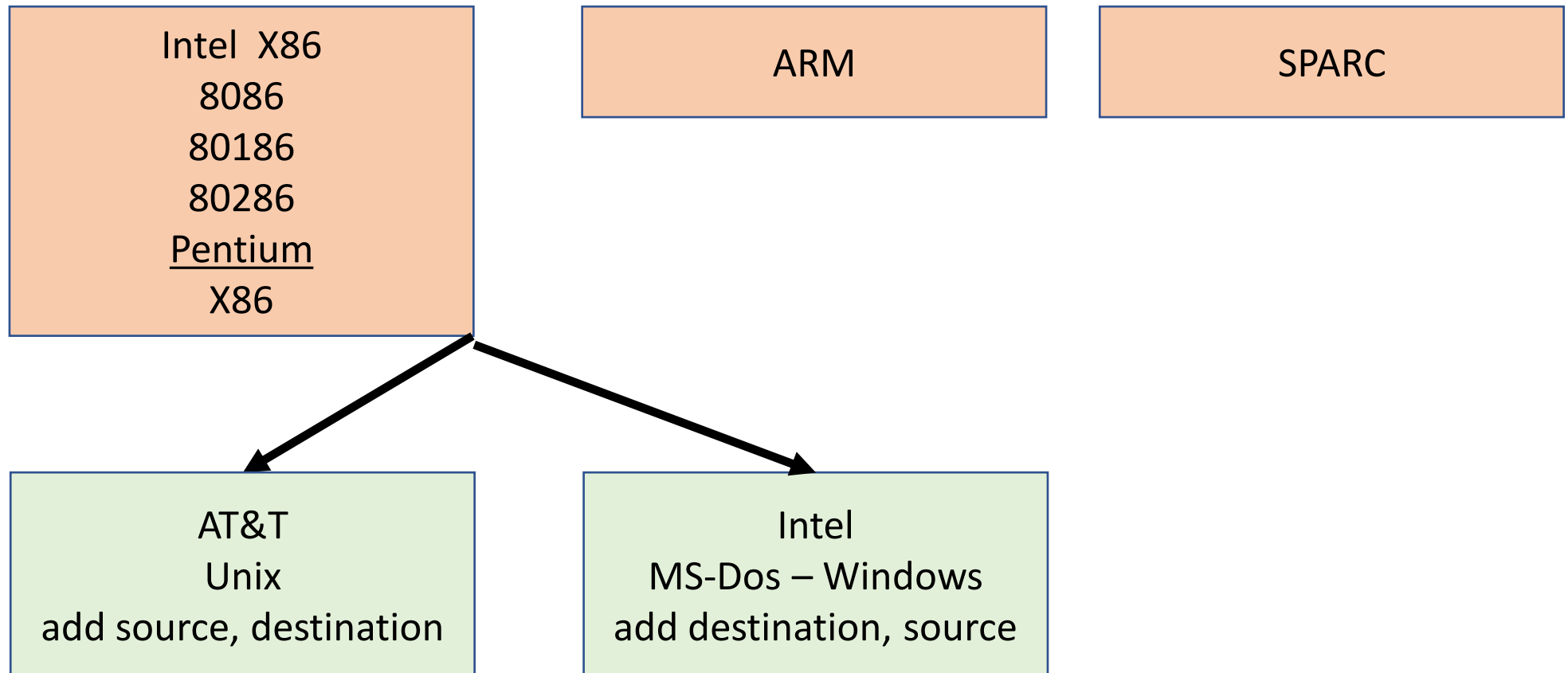
ARM

SPARC

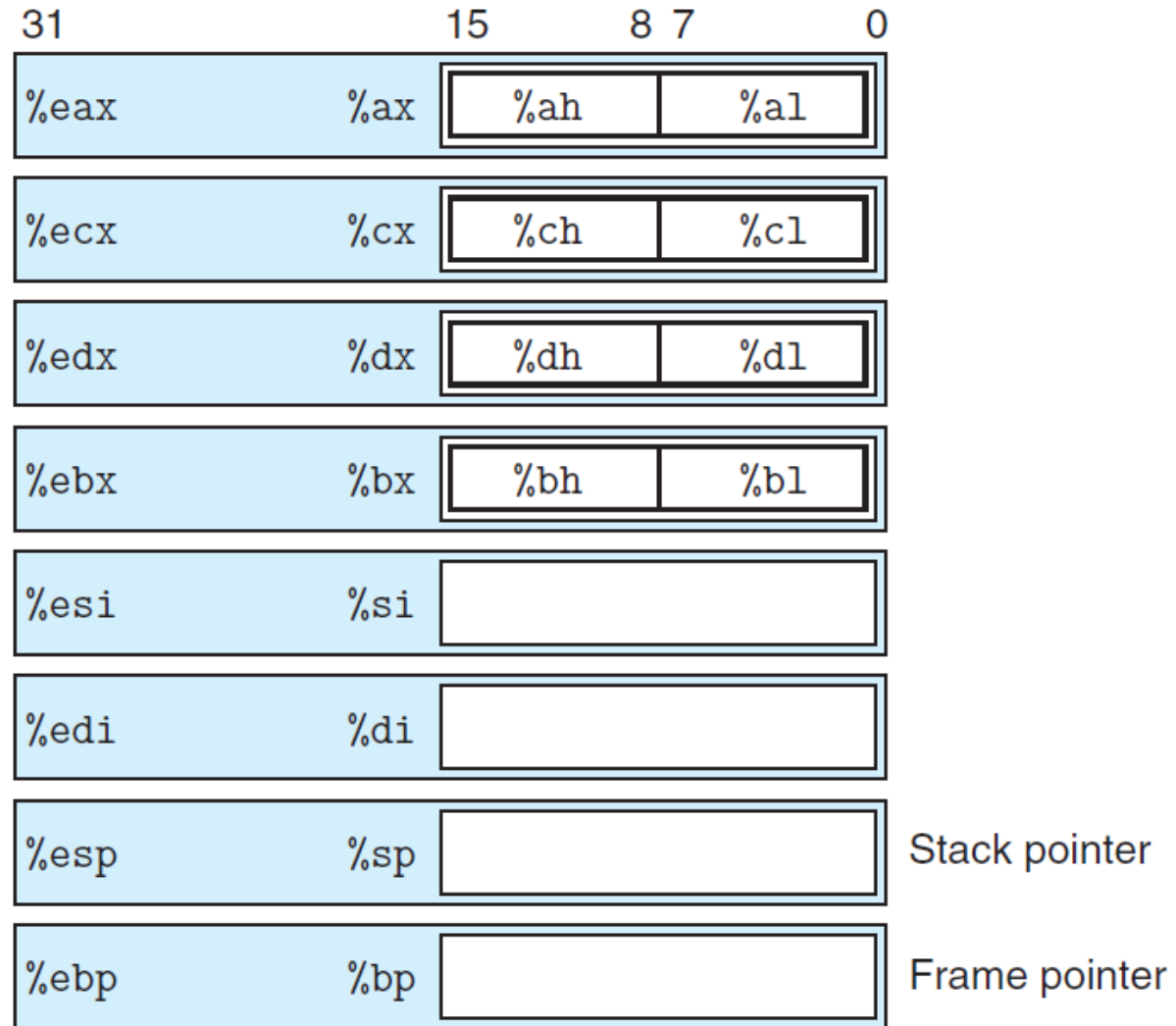
Assembly



Assembly



Registers



Registers

1. Data Transfer
2. Arithmetic Operators (add, sub, mult, div)
3. Memory
4. Bitwise Operations at the assembly level