CSE 111

Fall 2010

October 4 – 8

ANNOUNCEMENTS

- No labs this week (except for B5)
- Lab 2 Part 2 due next week in lab
  - Week of October 11th

- Lab 3 will start week of October 11th
- Exam 2 – Friday, October 22nd in lecture

MACHINE INSTRUCTIONS

- CPU processes instructions and controls what the computer does.

- The instructions are referred to as machine instructions and are written in machine language.

TYPES OF MACHINE INSTRUCTIONS

- Data Transfer

copy data
move data

TYPES OF MACHINE INSTRUCTIONS

- Arithmetic/Logic

Add, subtract,

or, and, not

Shift & Rotate

TYPES OF MACHINE INSTRUCTIONS

- Control

Direct execution of programs

→Branch /Jump

ARCHITECTURE OF AN EXAMPLE MACHINE

- 16 general purpose registers
  - Addressed 0-15

- 256 main memory cells *—8 bits*
  - Addressed 0-255

In Base 16

DECODING INSTRUCTIONS

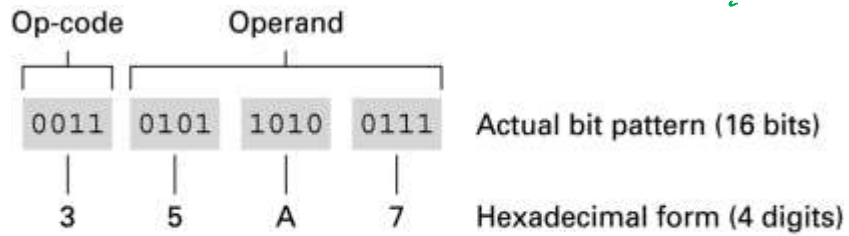- Instructions contain two parts:
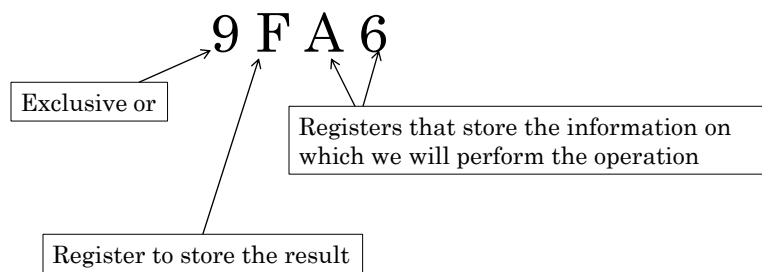 - Op-code (operation code)

  what to do /what operation

  - Operand

  Additional data to perform operation

EXAMPLE INSTRUCTION

DECODING INSTRUCTIONS

9 F A 6

Exclusive or

Registers that store the information on
which we will perform the operation

Register to store the result

EXAM 2 STUDY QUESTIONS
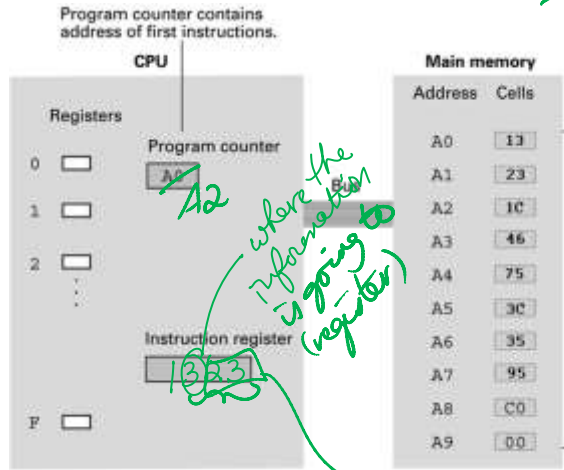
- Section 2.2 – page 91
  - 3
  - 5
  - 7

MACHINE CYCLE

- Fetch —Get the instruction stored at the address listed in the program counter. Increment program counter.

- Decode —Translate instruction

- Execute —Tell the various parts of the circuitry to perform the operation
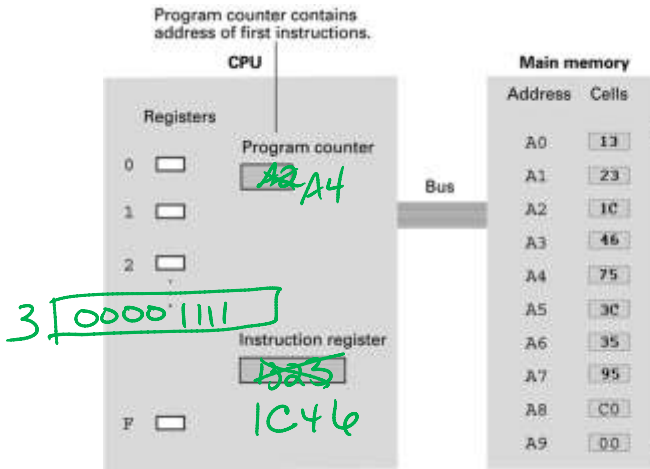
SAMPLE PROGRAM EXECUTION

1 = load

23 = where the information is coming from (main memory)

Program counter contains address of first instructions.

where the information is going to (register)

SAMPLE PROGRAM EXECUTION

1 = load
C = register we are storing to
46 = main memory address we are reading from

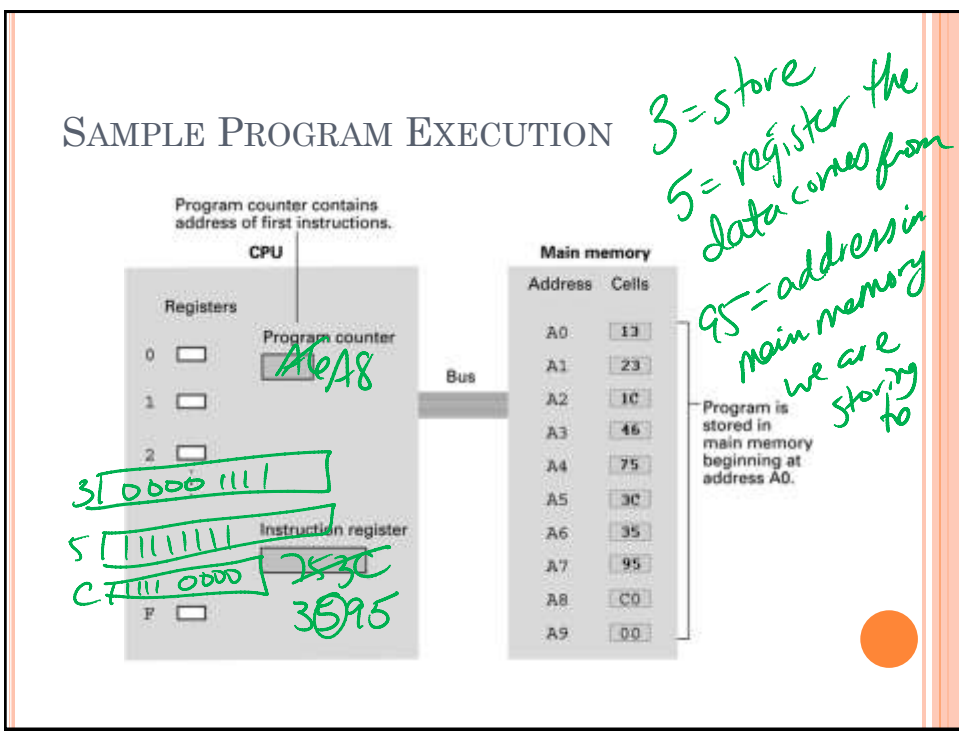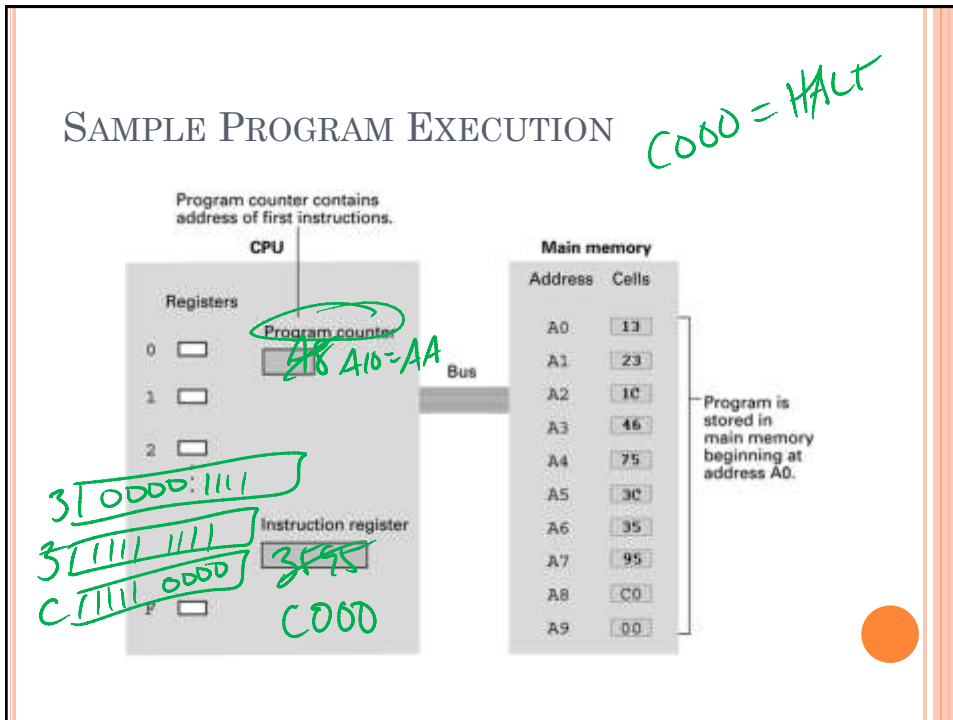Program counter contains address of first instructions.

SAMPLE PROGRAM EXECUTION

7 = "or"
5 = register we are storing answer into
3dC = registers we read for the data
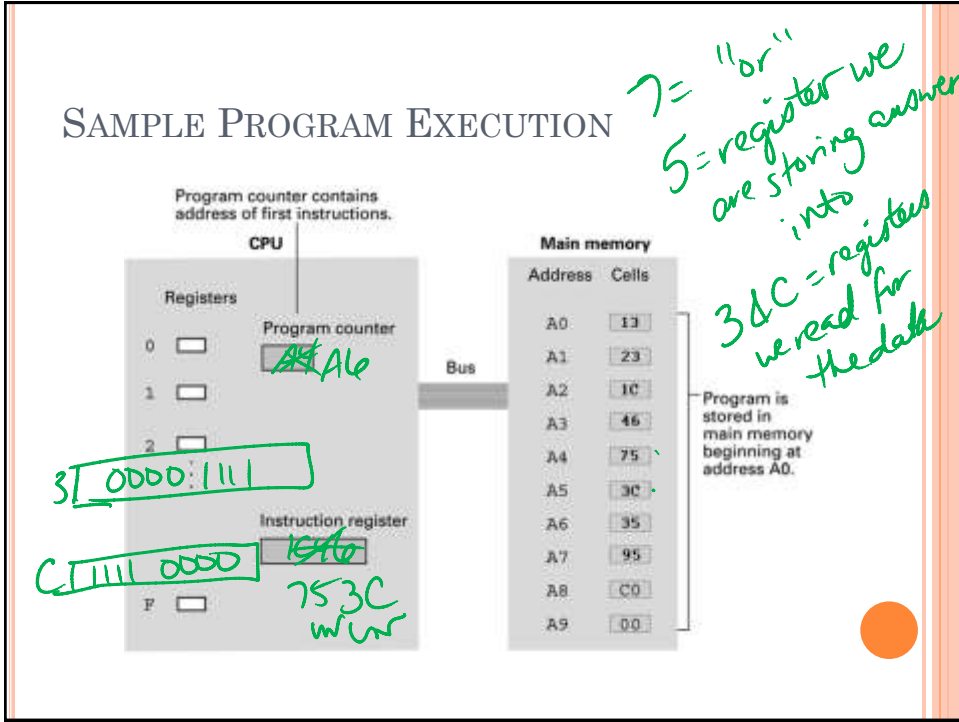
SAMPLE PROGRAM EXECUTION

3 = store
5 = register the data comes from
95 = address in main memory we are storing to

8

SAMPLE PROGRAM EXECUTION

C000 = HALT

Program counter contains
address of first instructions.

CPU

Registers

0

1

2

Program counter

518 A10=AA Bus

3 | 0000 : 1111

3 | 1111 1111

C | 1111 0000

Instruction register

3F95

C000

Main memory

Address	Cells
A0	13
A1	23
A2	1C
A3	46
A4	75
A5	3C
A6	35
A7	95
A8	C0
A9	00

Program is
stored in
main memory
beginning at
address A0.

EXAM 2 STUDY QUESTIONS

- Section 2.3 – page 98
  - 1
  - 2

OPERATING SYSTEMS

- Complex pieces of software that helps to control all of the activities of the computer.

JOB SCHEDULING

- Jobs are the programs/activities to be executed by the computer.

TYPES OF SOFTWARE

- Application Software'

  — Office, Photoshop, Games

- System Software

  — Networks (Wireless or Wired)

  — Compression

SHELL

— Users communicate to the computer through the shell.

KERNEL

- File manager

- Device drivers

- Memory manager

QUESTION

- What happens when you turn on the power to the computer?

BOOTING

- Initial instructions store in ROM.

PROCESS MANAGEMENT

- A process is the activity of executing a program.

- Each process is recorded in a process table with its process state.

SCHEDULING PROCESSES

- A process can be in two states:
  - Ready
  - Waiting

SCHEDULING PROCESSES

- Machine's processing time divided into short segments called time slices.

- During each time slice, a ready process runs.

- When the time slice is over, the process that is running is interrupted and then must wait for another turn from the scheduler.

EXAM 2 STUDY QUESTIONS

- Section 3.2 – page 134
  - 1
  - 2

- Section 3.3 – page 137
  - 1