CSC231-Assembly

Week #1
Fall 2018

Dominique Thiébaut
dthiebaut@smith.edu
This Week...

- **Last name: A-N**  —> **Lab Monday**, Off Wednesday

- **Last name: M-Z**  —> Off Monday, **Lab Wednesday**
Plan

• Form teams of 3 people
• Move all the chairs to the side
• Get a PC (not dead, but soon to be)
• Fill out sign-up sheet
• Take apart the PC
• Recognize important components, take photos
Plan (Cont'd)

- Remove processor from mother-board
- Remove motherboard from computer
- Remove disk drive from computer
- Take apart disk drive (if you have time)
- Keep any of the components you like
- Put everything back in the case for EXTRA CREDITS
Plan (Cont'd)

• You need to document:
  
  • The open computer case
  • The motherboard
  • The power supply
  • The processor. You need to indicate the name of the manufacturer, and the name of the processor, as written on it.
  • The memory (RAM). Try to figure out what the manufacturer of the RAM is. How much RAM (in Gigabytes) was in the computer?
  • The hard disk. Indicate its capacity, in Gigabytes.
  • One of the crystals that generate the high frequency signal to the computer. Can you read the frequency written on its case?
  • The optical drive, or DVD drive (if there's one)
  • The connectors in the back of the computer (including USB connectors)
  • Some of the cables connecting the motherboard to various peripherals.

• You are ready for Homework #1!
We stopped here last time...

A Microprocessor Simulator
(Friday's Lecture)
Smithies in CS x coinbase

CRYPTOCURRENCY AND BLOCKCHAIN WITH COINBASE

Have you ever heard of cryptocurrency, bitcoin, and blockchain? They are hot words in the FinTech industry. Don’t really know what they are but want to learn more? Come to our cryptocurrency & blockchain session hosted by Coinbase! Want to learn about more opportunities at Coinbase? Come to the event! A Coinbase recruiter will hold an info session after the crypto workshop for internship and full time opportunities!

TIME:
September 19th, 2018 4:30-6:30pm

LOCATION:
Campus Center 204

HOST BY:
Coinbase

Pizza will be served!
The Processor

http://www.scind.org/content_images/full/1445359752New_Processor.jpg


http://www.scanind.org/content_images/full/1445359752New_Processor.jpg

https://i.stack.imgur.com/uxIPv.jpg
Let's Play a Game
Rules #1

00 Really?
01 Hello
02 How are you?
03 Did you enjoy breakfast?
04 Was it good?
05 Have you stared on the homework?
06 Do you like apples?
07 Do you like bananas?
08 Goodbye!

00 No
01 Yes
02 Good
03 Bad
04 A tiny bit
05 A lot
06 Sometimes
07 Hello!
08 Sad
09 Goodbye!
Enhancement #1

00 Really?
01 Hello
02 How are you?
10 Did you enjoy ...?
04 Was it good?
05 Have you stared on the homework?
11 Do you like ...
08 Goodbye!
12 Apples
13 Bananas
  14 Breakfast

00 No
01 Yes
02 Good
03 Bad
04 A tiny bit
05 A lot
06 Sometimes
07 Hello!
08 Sad
09 Goodbye!
How could we setup a conversation for the whole class?
Hello! Was it good? Have you stared on the homework?
Did you enjoy ...? Did you enjoy ...? How are you?
Really? How are you? Was it good?
00 No
01 Yes
02 Good
03 Bad
04 A tiny bit
05 A lot
06 Sometimes
07 Hello!
08 Sad
09 Goodbye!
10 Apples
11 Do you like ...?
12 Apples
13 Bananas
14 Breakfast

Hello!
Really? How are you?
Did you enjoy ...? How are you?
Really? How are you? Was it good?
00 Really? How are you?
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02 How are you?
10 Did you enjoy ...?
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Hello!
Really? How are you?
Did you enjoy ...? How are you?
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00 Really? How are you?
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05 Have you stared on the homework?
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12 Apples
13 Bananas
14 Breakfast
On Infinite Verbal Loops...
Important Concepts

• Codes, codes, codes

• Numbers can represent questions, as well as answers

• The same number can have different meanings, depending on context

• With the right choice of questions and answers, coded as numbers, one could have a rich conversation!
Important Concepts Relating to Computers

- Only numbers can be stored in memory
- The memory is made of bits
- Bits represent binary digits
- The memory contains only binary numbers
- Using codes, the numbers can be used to represent characters (a, b, A, B, 0, 1, #, &…)
- Using codes, the numbers can be used to represent actions to be executed by the processor
- Using codes, the binary numbers can be used to represent decimal numbers, integer, or real (1, -2, 10, 3.14159…)

D. Thiebaut, Computer Science, Smith College
# The ASCII Table

**American Standard Code for Information Interchange**

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<th>ASCII value</th>
<th>Character</th>
<th>Control character</th>
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Hand Calculator Example
Assembly Language
With a Simulator
The Key Players

Processor

<table>
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<th>AC</th>
<th>+</th>
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Memory
Types of Operation Supported

- LOAD
- STORE
- ADD

Memory

Processor
- AC
- PC
- +
LOAD instruction

Example
Example

STORE instruction
ADD instruction

Processor

AC + PC

Example

11 ??
10 ...
9 103
8 ??
7 ??
6 ??
5 ??
4 ??
3 ??
2 ??
1 ??
0 ??
Write an assembly language program that takes the number stored at Address 9, adds 1 to it, and stores the result back at Address 9.
JUMP instruction

Example

Processor

AC

PC

+
HALT instruction

Example

Processor

AC
PC

+  

11
10
9
8
7
6
5
4
3
2
1
0

11
10
9
8
7
6
5
4
3
2
1
0

Halt
Store [9]
Add 1
Load [9]
Computer Simulator


http://www.science.smith.edu/dftwiki/media/simulator/
Resources

- Link to the simulator
- Link to the documentation
Exercise

Write an assembly language program that uses 4 variables in memory, containing 3, 4, 10, and 0, respectively. The program will compute the sum of the first 3 and store the result in the 4th variable. Run your program on the simulator.