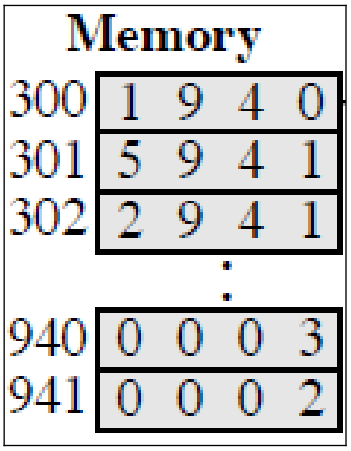
Quiz 1

20/2/2020

In the Hypothetical Machine the contents of memory was as shown. And PC contents is 300. Show the contents of memory and PC , AC , IR after execute three instructions (three fetch cycle and there execute cycle)



Frist instruction:

Fetching:

AC: 0000 IR: 1940 PC: 300

0002 :941 0003 :940

EXECUTION:

AC: 0003 IR : 5940 PC: 300

0002 :941 0003 :940

Second instruction:

Fetching:

AC: 0005 IR: 2941 PC: 302

0005 :941 0003 : 940

Execution:

AC: 0000 IR: 2941 PC: 302

0002 : 941 0003 :940

Third instruction:

Fetching:

AC: 0005 IR: 2941 PC: 302

0002 :941 0003 :940

EXECUTION:

AC: 0000 IR : 2941 PC: 302

0005 :941 0003 :940

Show the contents of PC , AC and IR and memory after the execution of each instruction of the following program on the Hypothetical Machine:

300 LOAD 550
301 ADD 551
302 STORE 600

.Where the contents of memory at 550 is 3 and at 551 is 4

Frist instruction:

Fetching:

AC: 0000 IR: 1550 PC: 300

550: 0003 551: 0004 600: 0000

EXECUTION:

AC: 0003 IR : 1550 PC: 301

550: 0003 551: 0002 600 : 0000

Second instruction:

Fetching:

AC: 0003 IR: 5551 PC: 301

550 : 0003 551: 0004 600: 0000

Execution:

AC: 0007 IR: 5551 PC: 301

550: 0003 551 : 0004 6000: 0000

Third instruction:

Fetching:

AC: 0007 IR: 2600 PC: 302

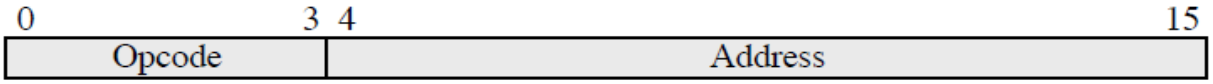
550: 0003 551: 0004 600: 0007

EXECUTION:

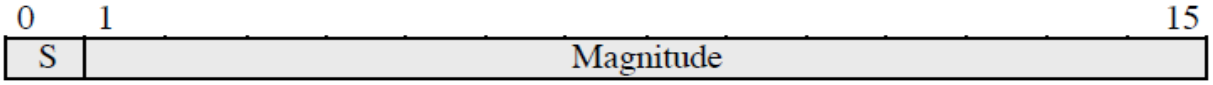
AC: 0000 IR : 2600 PC: 302

550: 0003 551: 0004 600: 0007

The following figure provide the main characteristics of .Hypothetical Machine



(a) Instruction format



(b) Integer format

Program Counter (PC) = Address of instruction
Instruction Register (IR) = Instruction being executed
Accumulator (AC) = Temporary storage

(c) Internal CPU registers

0001 = Load AC from Memory
0010 = Store AC to Memory
0101 = Add to AC from Memory

(d) Partial list of opcodes

The hypothetical machine also has two I/O instructions:

0011 = load AC from I/O

0111 =store AC to I/O

In these case, the 12-bi address identifies a particular I/O device. Show the program execution for the following program:

1. Load AC from device 5.
2. Add contents of memory location 940.
3. Store AC to device 6.

Assume that the next value retrieved from device 5 is 3 and that location 940 contains a value of 2.

Answer:

300 → 3005
301 → 5940
302 → 7006
940 → 2

After three instructions:

Device 5: 0003

940: 2

Device 6: 0005

Ibrahim Mohamed Elezmazy

Section : 1