Homework3 of Chapter 4,5

Ch4:

3

The program counter does not count on programs. Besides, the value stored in the program counter is the address of the next instruction. So the name 'Instruction Pointer' is better.

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(a) Location 3: 0000 0000 0000 0000

Location 6: 1111 1110 1101 0011

(b)

1) 2's Complement -

Location 0: 0001 1110 0100 0011 = 7747

Location 1: 1111 0000 0010 0101 = -4059

2) ASCII –

Location 4: 0000 0000 0110 0101 = 101 = 'e'

3) Floating Point -

Locations 6 and 7: 0000 0110 1101 1001 1111 1110 1101 0011 Number:

$1.10110011111111011010011 \times 2^{-114}$

4) Unsigned - Location 0: 0001 1110 0100 0011 = 7747 Location 1: 1111 0000 0010 0101 = 61477

(c) Instruction –

Location 0: 0001 1110 0100 0011 = Add R7 R1 R3

(d) Memory Address –

Location 5: 0000 0000 0000 0110 Refers to location 6.

Value in location 6 is 1111 1110 1101 0011

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(a) 8-bits

(b) 7-bits

(c) Maximum number of unused bits = 3-bits

9

Loading the address of the next instruction into the program counter.

Ch5:

2

The MDR is 64 bits. It did not tell anything about the MAR.

7

01111 (15 in decimal)

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1001 100 010 111111; NOT R4, R2

0001 100 100 000001; ADD R4, R4, #1 (get the opposite number of R2 ->R4)

0001 001 100 000 011; ADD R1, R4, (R3R1<- R4 AND R3)

0000 010 000000101; BRz DONE (if R1 = 0 means that they are equal then it ends)

0000 100 000000001; BRn R2 (if R1 is negative then R2 is bigger)

0000 001 000000010; BRp R3 (if R1 is positive then R3 is bigger)

0001 001 010 1 00000; ADD R1, R2, #0 (branch: deal with R2)

0000 111 000000001; BRnzp DONE

0001 001 011 1 00000; ADD R1, R3, #0 (branch: deal with R3)

1111 0000 00100101; HALT

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R5 has 3 bits in bit【7:0】is 0, 5 is 1.

40

It is that whether the instruction in IR is a taken branch instruction.