컴퓨터 구조 7번째 과제

2019040164 정지오

<13.1>

a. 20 b. 40 c. 60 d. 30 e. 50 f. 70

<13.3>

Instruction

Opcode	Address: 14

a) 14 (The address field).

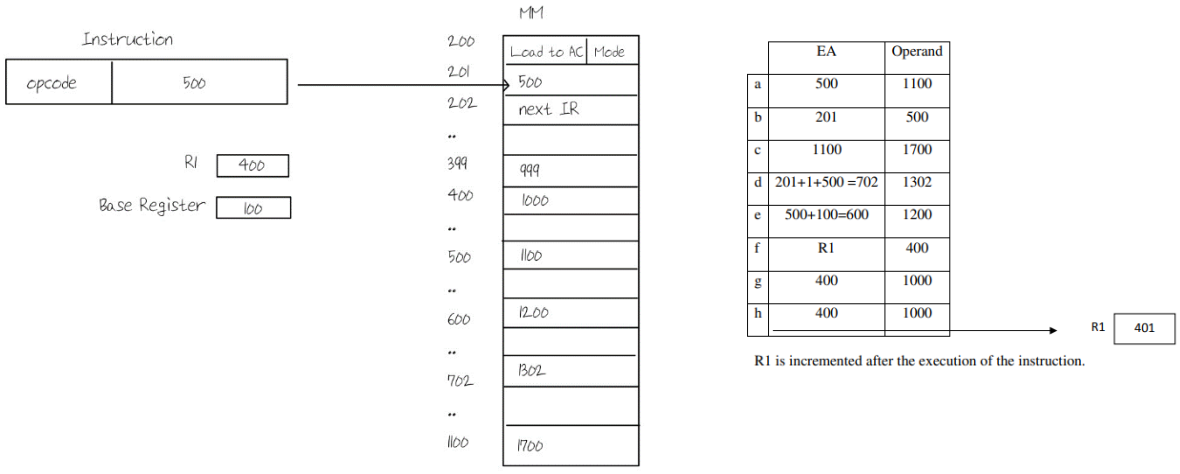
b) Memory location 14.

c) The memory location whose address is in memory location 14.

d) Register 14.

e) The memory location whose address is in register 14.

<13.4>



<14.1>

A.

00000010

00000011

_____

00000101

> Carry = 0(no carry is present);

> Zero = 0(The Zero flag is set to 1 when the result is zero;otherwse it is reset);

> Overflow = 0(set if the result is too large positive number, or is too small negative number to fit into destination operand:- This means that it cannot fit into the required bit-width, hence literally overflows out.

the flag is set for such situations);

> Sign = 0(indicates whether the result of an arithmetic operation is positive or negative);

> Even Parity = 1;

As,we know that,even parity indicate that the number of '1's in the result is even.

> Half-Carry= 0.(The half-carry flag is set when a carry takes place out of the lower-

order 4 bits i.e.half byte.)

b.

11111111

00000001

_____

1 00000000

> Carry = 1;

> Zero = 1;

> Overflow = 0;

> Sign = 0;

> Even Parity = 1;

> Half-Carry= 1.

<14.2>

11110000

 0010100

———————

11100100

<14.3>

Given that frequency is 5Ghz. We need to convert this to Cycles Per Second (cps). If 1 Hz is equal to 1 cps, then 5Ghz = 5,000,000,000Hz = 5000000000cps.

To get the duration of a clock cycle, you have to calculate the period which is simply 1/frequency or 1/cps.

→ 1/(5*10^9) seconds.

<14.7>

a.

10 x 1.0x10^-7= 1.0 x 10^-6= 0.1 x 10^-5

64(15 x 10x10^-7) = 9.6 x 10^-5

Add two → 9.7 x 10 ^-5

b. 9.7 x 10^-5 + acknowledge cycle time

c. 1.0 x 10^-6 + acknowledge cycle time

<14.8>

INSTRUCTIONS	1	2	3	4	5	6	7	8	9	10
I1	FI	DA	FO	EX						
I2		FI	DA	FO	EX					
I3			FI	DA	FO	EX				
I4				FI	DA	FO				
I5					FI	DA				
I6						FI				
I15							FI	DA	FO	EX

<14.9>

a.

No. of instructions (n) =1.5 million

1 Million=106

No. of stages in pipleline (k)=5

Instructions rate per clock cycle=1

Torque (τ)=1

Speed up=?

S= [nk] τ / [k+ (n-1)] τ

s= (1.5 x 106) (1) / 1+(1.5 x 106-1)

s= 1

b.

MIPS rate=?

No. of instructions=1.5 million

MIPS= Ic / T x 10 6

T= nk= (1.5)(5)

T =7.5

MIPS= 1.5 x 106/7.5 x 10 6

MIPS= 0.2

<14.11>

S(k) = nk / pqnk +k + (1− pq)n−1 .