

University of Delaware

CISC260 Homework 3 Solution

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March 20, 2018

1 Question 1.

Answer:

First, we need to transfer hex into binary and then decode according to the instructions.

0x00: 07FF:

00 0001 1 111 111 111

SUB R7, R7,R7: $R7 = 0$

0x02: 0608:

00 0001 1 000 001 000

SUB R0, R0, R1: $R0 = R0-R1$

0x04: 2808:

00 1010 0 000 001 000

BLEZ R0 GOTO address 001000/0x08: if $R0 \leq 0$, go to 0x08

0x06: 3802:

00 1110 0 000 000 010

Jump to address 000010: 0x02

0x08: 0247:

00 0000 1 001 000 111

ADD R7, R1, R0

0x0A: 3C00:

00 1111 0 000 000 000

HALT

2 Question 2.

Answer

Initial values are:

R0: 0001 1101: 29

R1: 0000 0111: 7

R2: 0000 0000: 0

R3: 0000 0000: 0

R4: 0000 0000: 0

R5: 0000 0000: 0

R6: 0000 0000: 0

R7: 0001 0000: 12

Here I just the program's running only when value changed.

$R7 = 0$

$R0 = R0 - R1 = 29 - 7 = 22$

$R0 = R0 - R1 = 22 - 7 = 15$

$R0 = R0 - R1 = 15 - 7 = 8$

$R0 = R0 - R1 = 8 - 7 = 1$

$R0 = R0 - R1 = 1 - 7 = -6$

$R7 = R0 + R1 = -1 + 7 = 1$

Then, the final solution is:

R0: -6

R1: 7

R2: 0

R3: 0

R4: 0

R5: 0

R6: 0

R7: 1

3 Question 3.

Answer

0x00: SUB R7, R7, R7

@R7 = 0

0x02: SUB R2, R1, R0

@R2 = R1 - R0 = b-a

0x04: BRZ R2, Branch to 0x10

@ if R2 == 0 / a==b then, go to address 0x10

0x06: BLES R2, Branch to 0x0C

@ if R2 <= 0 / a>=b then, go to address 0x1C

0x08: SUB R1, R1, R0

@ R1 = R1 - R0 : b = b-a

0x0A: Jump to 0x02

@ go to address 0x02

0x0C: SUB R0, R0, R1

@ R0 = R0 - R1 : a = a-b

0x0E: Jump to 0x02

@ go to address 0x02

0x10: ADD R7, R7, R0

@ R7 = R7 + R0: R7 = a

0x12: HALT

@ Stop the program.