LE10.1.1: Branch Offset

1/1 point (ungraded)

1. A BR instruction at location 0×1000 branches to 0×2000. If the literal field of that instruction is incremented by 0×10, where will the modified instruction transfer to?
   Branch target for modified BR (HEX): 0x
   2040 ✔
2. A BR instruction at location 0×1000 branches to 0×2000. If the binary representation for that BR were moved to location 0×1400 and executed there, where will the relocated instruction branch to?
   Branch target for relocated BR (in hex): 0x
   2400 ✔

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✔ Correct (1/1 point)

LE10.1.2: Beta Assembly

1/1 point (ungraded)

A line in an assembly-language program containing “ADDC(R1,2,R3)” is changed to “ADDC(R1,R2,R3)”. Will the modified program behave differently when executed?

- ○ Yes
- ◉ No
- ○ Can't Tell

✔

Explanation

The assembler will evalute the constant 2 and the symbol R2 to the same integer value 2 and use that to fill in the literal field. So both will result in the same instruction encoding.

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Answers are displayed within the problem

LE10.1.3: Symbol Table

1/1 point (ungraded)

When the assembler processes the program shown below, it builds a symbol table that gives the value of each symbol. Assume that the LD instruction in location 0 of main memory.

```
        LD(R31,N,R0)
if:     BNE(R0,else,R31)
then:   SUBC(R0,1,R0)
        BEQ(R31,end,R31)
else:   ADDC(R0,1,R0)
end:    ST(R0,M,R31)

N:      LONG(10)
M:      LONG(0)
```

Please give the values found in the symbol table after the assembler has finished assembling the program. Enter your answers as a sequence of hex digits.

Value for symbol "if": 0x 004 ✔ Answer: 4

Value for symbol "then": 0x 008 ✔ Answer: 8

Value for symbol "else": 0x 010 ✔ Answer: 10

Value for symbol "end": 0x 014 ✔ Answer: 14

Value for symbol "N": 0x 018 ✔ Answer: 18

Value for symbol "M": 0x 01C ✔ Answer: 1C

Value for symbol "R31": 0x 01F ✔ Answer: 1F

Explanation
In this problem, most of the symbols are labels whose value is address of the memory location holding the instruction that follows the label definition. Here's table showing the address of each instruction:

```
        INSTRUCTION                ADDRESS

          LD(R31,N,R0)              0x00
if:       BNE(R0,else,R31)          0x04
then:     SUBC(R0,1,R0)             0x08
          BEQ(R31,end,R31)          0x0C
else:     ADDC(R0,1,R0)             0x10
end:      ST(R0,M,R31)              0x14

N:        LONG(10)                  0x18
M:        LONG(0)                   0x1C
```

The symbol R31 has the value 31, which 0×1F.

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Answers are displayed within the problem

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- values of N,M and R31 — 4
  how do the values of "N","M" and "R31" come up to be 18,1C and 1F respectively? please explain th...
- Question LE10.1.1: BRANCH OFFSET A. — 3
  "The literal in the instruction represents the number of words away that the branch instruction wan...
- BRANCH OFFSET " B " — 6
  when the binary representation for that BR is moved to location 0×1400, a new offset will be calcul...

else at 0×10

why is else at 0×10?

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