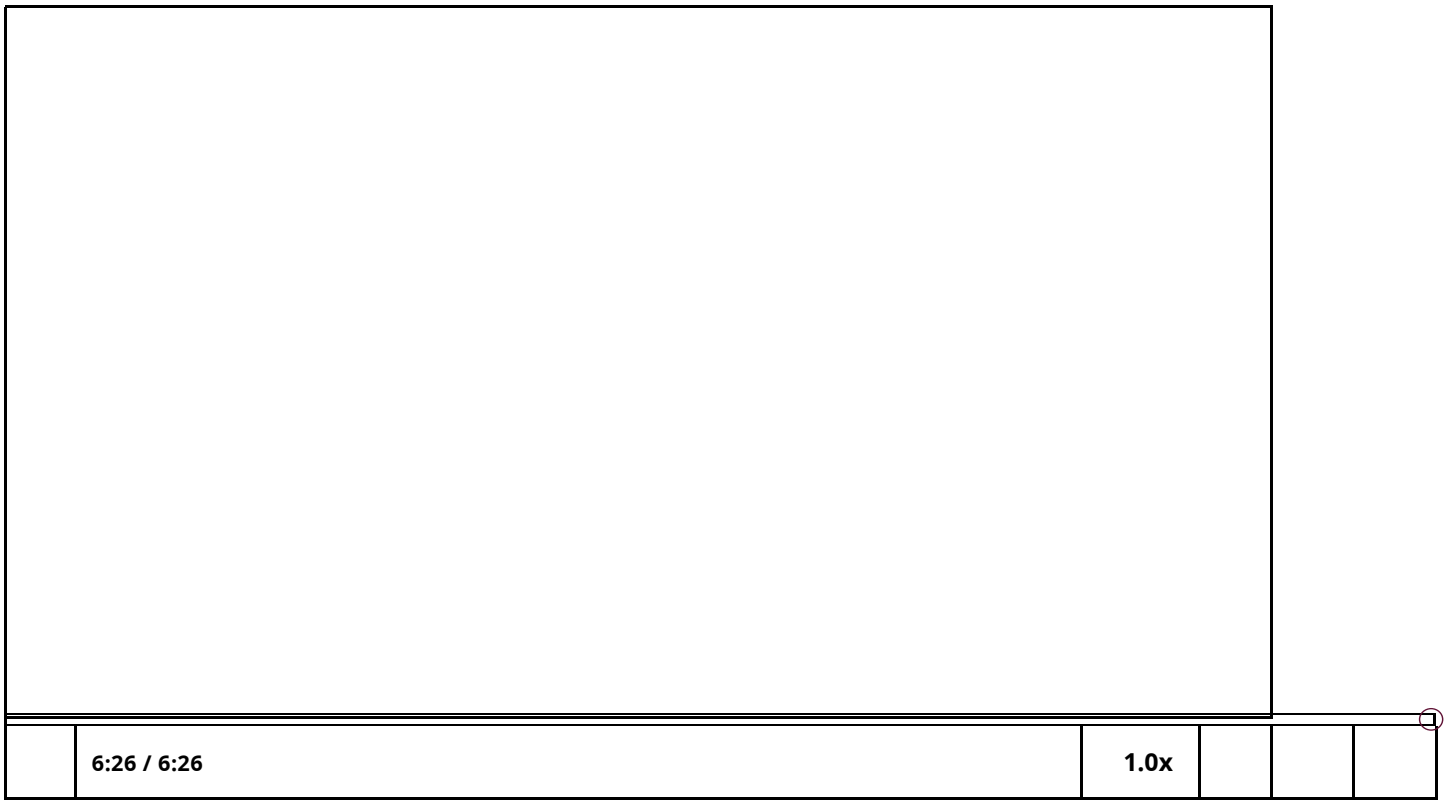
ASSEMBLY LANGUAGE



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1. CHECK YOUR UNDERSTANDING

For each of the following LC-3 assembly language instructions, pick the correct description of its operation. **You only get one attempt for each of the questions.**

1 A. CHECK YOUR UNDERSTANDING (1/1 point)

ADD R1, R2, R3

- Add the contents of R1, R2, and R3.
- Add the contents of R1 and R2 and put the result into R3.
- (•) Add the contents of R2 and R3 and put the result into R1. ✔

EXPLANATION

The first register (R1) is the destination register, while the second two (R2 and R3) are the source registers. We add the values from the source registers and put the result into the destination register.

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1 B. CHECK YOUR UNDERSTANDING (1/1 point)

ADD R1, R2, #11

- Add the contents of R1 and R2 and put the result into memory at address 11.
- Add the contents of R1 to the binary number 11 and put the result into R2.
- (•) Add the contents of R2 to the decimal number 11 and put the result into R1. ✔

EXPLANATION

The first register (R1) is the destination register, while the second (R2) is the source register. The constant "11" is in decimal form as indicated by the "#" symbol. We add this constant value to the value in R2 and place the result into the destination register R1.

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1 C. CHECK YOUR UNDERSTANDING (1/1 point)

LD R1, INT

- (•) Load the data at the memory location at label INT into R1. ✔
- Load the constant value INT into R1.
- Load the value in R1 into the memory location at label INT.

EXPLANATION

Since this is a load instruction, we are moving data from memory into a register. INT is a label that marks a memory location where data is stored. The data at that location is loaded into register R1.

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1 D. CHECK YOUR UNDERSTANDING (1/1 point)

BRnz DONE

- Branch to the instruction at label DONE if the result of the last instruction to write the register file is greater than zero.
- Branch to the instruction at label DONE if the result of the last instruction to write the register file is less than zero.
- Branch to the instruction at label DONE if the result of the last instruction to write the register file is less than or equal to zero. ✔

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EXPLANATION

One of N, Z, and P is set every time the register file is updated. Since “nz” is specified in the BR instruction, we will branch if the N bit is set (result was negative) or the Z bit is set (result was zero).

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