HOMEWORK 1. ISA (1/1 point)

Which of the following instructions overwrite the contents of one of the general-purpose registers? **[You must check all that apply to get credit]**

- [x] NOT ✔
- [x] ADD ✔
- [x] LEA ✔
- [x] LDI ✔
- [ ] STR
- [ ] ST

EXPLANATION

The NOT and ADD are operate intructions that write their result to a general-purpose register. The LEA instruction forms an address that is written to a general-purpose register. The LDI instruction reads a value from memory and places it into a general-purpose register.

The store instructions overwrite memory with a register value, rather than overwriting one of the general-purpose registers.

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HOMEWORK 2. ISA (1/1 point)

Which of the following operations can be performed using one or more LC-3 instructions? **[You must check all that apply to get credit]**

- [x] OR ✔
- [x] Subtraction ✔
- [x] Copy from one register to another register. ✔
- [x] Initialize a register to all 1's. ✔

EXPLANATION

From DeMorgan's Law, an OR can be accomplished by inverting the inputs and output of an AND operation. Thus, an OR can be performed using two NOT instructions, an AND instruction, and another NOT instruction.

Subtraction is performed by taking the two's complement of the second operand and adding to the first. The two's complement can be obtained through a NOT followed by an AND immediate using an immediate value of 1. The resulting value is then added to the first operand using an ADD instruction.

Copying from one register to another can be performed in two ways. The first method uses an ADD immediate instruction with an immediate value of 00000, the register to be copied specified as Src1, and the register to be written specified as Dst. In the second approach, an AND instruction is used with an immediate value of 11111.

To initialize a register to all 1's, we first clear the register using an AND immediate with an immediate value of 00000 and the Src1 and Dst fields specifying the register to be cleared. Then we use a NOT instruction to initialize the register to all 1's.

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