

Problem 2

Consider a processor with the following specifications

- Instruction size is 8 bits
- 8 different instructions
- Register file of 4 registers of 8 bits
- 2 instructions have 3 explicit operands with direct addressing to a register
- 3 instructions have only one explicit operand with relative addressing (register explicit) with a displacement of maximum 7
- The other instructions have one explicit operand with direct addressing to memory

Design the instruction format and find an answer to the following questions.

1. Is an instruction format with only 8 bits possible?
2. If so, how many memory positions can the instructions with direct memory addressing reach?

Problem 3

Given a processor with one address and one accumulator register with the following instructions:

LOAD V: $AC \leftarrow V$ SUB V: $AC \leftarrow AC - V$

STORE V: $V \leftarrow AC$ MUL V: $AC \leftarrow AC * V$

ADD V : $AC \leftarrow AC + V$ DIV V: $AC \leftarrow AC / V$

Write a program with the instructions that determines the value of X in

$$X = (A + B - C) / (B * D)$$