



4.1.1 Execute Stage with LMC

This topic requires knowledge of the Little Man Computer instruction set (Topic 1.2.4)

- 1 A program contains the following LMC instruction.

LDA num1

The label num1 refers to memory location **101**.

Explain how the processor executes the instructions which reference to how the registers and buses are used.

[5 marks]

- The value **101** is stored in the MAR.
 - The address **101** is sent along the address bus.
 - A read signal is sent along the control bus.
 - The data stored at memory location **101** is transferred along the data bus and stored in the MDR.
 - The contents of the MDR are copied to the ACC.
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- 2 A program contains the following LMC instruction.

SUB num1

The label num1 refers to memory location **101**.

Explain how the processor executes the instructions which reference to how the registers and buses are used.

[5 marks]

- value **101** is stored in the MAR.
 - The address **101** is sent along the address bus.
 - A read signal is sent along the control bus.
 - The data stored at memory location **101** is transferred along the data bus and stored in the MDR.
 - The data in the MDR and the value in the ACC are passed to the ALU.
 - The ALU performs the subtraction and the result is stored in the ACC.
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3 A program contains the following LMC instruction.

BRZ loop

The label loop refers to memory location **101**.

Explain how the processor executes the instructions which reference to how the registers and buses are used.

[3 marks]

- value in the ACC is checked to see if it is zero.
 - If the value in the ACC is zero, the PC is changed to the address of the loop label.
 - If the value in the ACC is not zero, the PC is not changed by the BRP instruction and the next instruction in sequence is fetched.
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