

COMP262-01 LAB6, CH15
CONTROL UNIT STEPS (Micro Operations)

A certain CPU has the following relevant components:

a Control Unit(CU); an Arithmetical/Logical unit(ALU); a Program Counter(PC); an Instruction Register(IR); a Memory Address Register(MAR); a Memory Buffer Register(MBR); a Memory Control Register(MCR); three ALU registers: Two Input: R1, R2 and one Output: R3; an ALU operation register(ALUOP); a Status register(FLAGS); a Clock; and all the necessary interconnection paths(Local Bus).

Given the following program segment written in (a certain) Assembly language:

Loop: OR A, B, C	(logically 'OR's operands A and B and stores result in operand C)
BRC N, Loop	(branches on condition (Negative indicator on) to location Loop)
STOP	

Complete the provided 'LAB6-steps' EXCEL doc by filling out the rows of the table column labeled 'SYMBOLIC DESCRIPTION' with the necessary steps that the CU need to perform in order to 'execute' the machine instructions corresponding to the program segment. Use the symbolic notation described/used in CH15, sect. 15.1 Micro-Operations and the examples given for the different instruction cycles.

Realize that these steps (micro-ops) describe WHAT needs to be done by using a high level form of description indicating the **flow/movement** of data (both instructions and operands) through the components of the CPU. In fact, these steps are the 'algorithm' that the CU executes when properly coded with 'micro code'.

In CH16 we will see HOW these steps (micro-ops) are in fact coded, by using a lower level symbolic representation, the 'micro code', which in turn is a shortcut for the actual combinatorial circuit.

There is an analogy to be made here: Assembly language is a symbolic representation for Machine language and at a level below that, the CU Micro Code is a Symbolic representation for a Combinatorial circuit...

Please upload the filled out document when completed.