UNIVERSITI MALAYSIA PERLIS

NMJ31804 – PRINCIPLES OF COMPUTER ARCHITECTURE

Mini Project: Design a simple CPU

Design a 8-bit or 16-bit CPU that consist of Datapath unit and Control unit. Your design must have ROM to store instruction set or Opcode and RAM to store the data. Your CPU must have the following characteristics:

i. The instruction set must cover all of these operations
   - Data transfer
   - Arithmetic
   - Logical
   - Branching
   - Input and output

ii. Your design must have the following Addressing Mode
   - Register Addressing
     - MOV A, B (move the contents of register B to register A)
     - ADD B (add contents of registers A and B and store the result in register A)
   - Immediate Addressing
     - MVI B, 45 (move the data 45H immediately to register B)
   - Direct Addressing
     - LDA 2050 (load the contents of memory location into accumulator A)
     - IN 35 (read the data from port whose address is 35H)
   - Indirect Addressing
     - MOV A, M (move the contents of the memory location pointed by the H-L pair to the accumulator)
     - LDAX B (move contains of B-C register to the accumulator)

iii. Your design need to have sub-module for each part and will combine to become a complete CPU. All of these parts need to synthesis and simulate separately.

Notes:

- You need to submit report by week 14 with simple presentation and viva.
- Each group consist of three to five students. Sleeping partner will be penalized.

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