Tutorial 4 – ALU and CU Design

1. Review FF, Multiplexer and Adder design and functionality

2. Design an ALU with 3-bit commands and operations:

   0: NOP
   1: Accu = −Accu
   2: Accu = Accu + data
   3: Accu = Accu − data
   4: Accu = Accu * data
   5: Accu = data
   6: don’t care
   7: don’t care

3. Build a CU which advances the program counter by 2 in very step.

4. Build a CU which allows:

   • Increment PC by 1
   • Jump to ad address from the Address register
   • Store PC contents for a subroutine call
   • Return to (stored address + 1) for return from subroutine

5. Review Functionality of CPU4.

   • Write a machine program to multiply two numbers by repeated addition.
   • The two operands are in memory cells 0xFD and 0xFE
   • Store the result in memory cell 0xFF