Design note

The class project is structured into four segments, and in the first project, we were asked to build a basic machine. The basic machine architecture consists of many registers such as MAR, MBR, MFR, PC and IR. A register package was set to store and load the values form/to the memory. After that, a memory control unit MCU was designed for loading from ROM and storing every value into memory with specific address. In case of overflowing, two memory sizes were used. To access the memory address and value, we set two inputs to bring the operand to the memory register. One method is storing in the ROM, and the other method is directly inputting in the user interface. In the user interface, we displayed the value of R0 to R3, X0 to X3, MAR, MBR, MSR, MFR, IR and PC. You can store the value in the blank, and the value will be displayed in binary. To achieve the instruction at local address, a Single Step button was used. We also opened a command window to show the operand we have made. In the load and store part, we identified the effective address according to IX and I. When we got the correct effective address, we set a switch to read Opcode to see which instruction we should execute. After the design and test, our project was achieved.