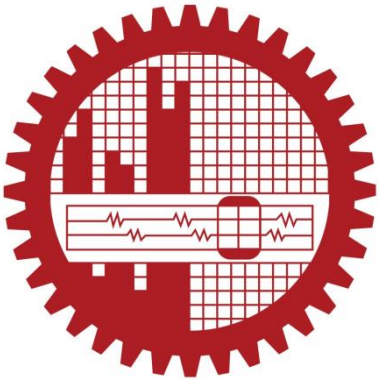
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY



ASSIGNMENT

On *Modified Simple As Possible Computer* (MSAP-2015)

INSTRUCTION MANUAL

Course: **EEE 315**
Microprocessor and Interfacing

Submitted to:

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Instructions for ASSEMBLER:

- Write the code for the assembler and save it as *.txt or *.asm IN THE SAME DIRECTORY AS THE ASSEMBLER. The assembler supports the following directives:

  ORG [address]

  DB byte

  THE ASSEMBLER DOES NOT SUPPORT VARIABLE NAMES OR LABELS. SO THE USER MUST GIVE SPECIFIC ADDRESS.
- Open the assembler.m file in matlab and run it. It will ask the user to input the name of the code file. Type in the name of the file WITH EXTENSION and press enter.
- The assembler will create a *.bin file with the same name as the code file in the current folder.

Instructions for LOADING THE PROGRAM:

- Open Final.dsn
- Go to the CHILD SHEET of the PROGRAMMER in the CPU BLOCK.
- Goto the properties sheet of the ROM and select the *.bin file created by the assembler.

Instructions for AUTOPROGRAMMING FROM ROM:

- Simulate the design.
- In the RUN/PROGRAM_START block, select PROGRAM.
- Turn on AUTOPROGRAM_FROM_ROM IN THE PROGRAMMER_CONTROLS BLOCK.
- PRESS CLEAR/START.
- Make sure SINGLE_STEP MODE AND SINGLE INSTRUCTION MODE IS TURNED OFF.
- The program will be loaded from ROM.
- Turn OFF AUTOPROGRAM_FROM_ROM.

Instructions for CONTINUOUS RUN MODE:

- Simulate the design.
- Load the program.
- In the RUN/PROGRAM_START block, select RUN.
- PRESS CLEAR/START.
- Make sure SINGLE_STEP MODE AND SINGLE INSTRUCTION MODE IS TURNED OFF.

Instructions for SINGLE STEP RUN MODE:

- Simulate the design.
- Load the program.
- In the RUN/PROGRAM_START block, select RUN.
- Make sure SINGLE_STEP_MODE IS TURNED ON.
- PRESS CLEAR/START.
- PRESS SINGLE_STEP PUSH BUTTON to step forward by one T state.

Instructions for SINGLE INSTRUCTION RUN MODE:

- Simulate the design.
- Load the program.
- In the RUN/PROGRAM_START block, select RUN.
- Make sure SINGLE_INSTRUCTION_MODE IS TURNED ON.
- PRESS CLEAR/START.
- PRESS SINGLE_INSTRUCTION PUSH BUTTON to step forward by one INSTRUCTION.

Instructions for USER INPUT FROM KEYBOARD (IN instruction):

- If the computer encounter IN instruction it will wait for user input. It will not proceed forward until it gets a ready signal.
- Press the keys in the KEYBOARD for hex number input. The keyboard holds 2 bytes which will be shown in its display. As the input is one byte in size, the LOWER BYTE OF THE WORD WILL BE SENT as input.
- After keying in the desired input press SEND_INPUT/READY_SIGNAL. The computer will take the input and proceed forward.

Instructions for MANUAL PROGRAMMING FROM KEYBOARD:

- Simulate the design.
- In the RUN/PROGRAM_START block, select PROGRAM.
- Turn OFF AUTOPROGRAM_FROM_ROM in the PROGRAMMER_CONTROLS BLOCK.
- In the keyboard block TURN ON CONNECT_TO_W_BUS.
- Key in the ADDRESS from the KEYBOARD AND PRESS SEND_ADDRESS IN THE PROGRAMMER_CONTROLS_BLOCK.
- Key in the corresponding DATA from the KEYBOARD AND PRESS SEND_DATA IN THE PROGRAMMER_CONTROLS_BLOCK.
- After sending all data to corresponding addresses, in the keyboard block TURN OFF CONNECT_TO_W_BUS.

DEBUGGING:

- For debugging, in the DEBUGGER BLOG SET THE TURN_ON_DEBUGGER LOGIC STATE HIGH.
- CLOCK SOURCES CAN BE SELECTED BY THE CLOCK_SELECT.
- Different signals in the CON_WORD can be set or reset manually.