Computer Architecture. Microprogramming assignment II

I have made a slight change to the machine which you have been programming. You need to download version 2, where you will find that the ALU has the AND function removed and replaced with a “negator” or 2’s-complement generator. Nothing else has changed and the Excel sheet contains the correct columns.

So, for our second much more serious assignment, we will come up with a sequence which in effect implements a subtraction, using 2’s complement integers of 8 bits total, (bit 7 is the sign with a “1” indicating negative and “0” meaning positive. We are also going to implement the “auto-increment addressing mode.

Here’s what you should do:

1. Using the memory-to-bus field, load R0.
2. Hold the memory on the bus, select the “negator”, clock Z and return “-R0” to R1
3. Load a second 2’s complement positive value into R2
4. “Add” the values in R1 (negative) and R2 (positive) and place in R3
5. Assume that in the instruction the “R2” register had appeared with addressing mode (R2)+, auto increment, so our last task is to increment R2. Select the adder, clock R2 into Y, using the memory to bus field, hold a “1” steady and ADD R2 and one. Return the result – normally this would of course be to R2 – to R4; that way I can see all the values that you’ve computed in this sequence, even if the return to R4 is nonsense!!

Teaching points:

* Revision of two’s complement
* Horizontal micro-coding of a control unit
* Timing of enables and clocks
* Binary information presented in hexadecimal

As always, good luck. Submit the week of 11/14/2016, via e-mail to me. Submit the .CIRC file to me via e-mail. In the subject field of the e-mail, please type your <last name>\_<initial>\_<last 4 digits of your ID>, then in the body of the email type your full name, full ID, course and section. Finally attach the file for testing. Don’t change the file extension!

Copying and pasting code – this worked for me

1. Open Hex Editor on Logisim. Open notepad, or any other text editor.

2. Make your code on the notepad, every 8 digits in a group, separate each group by a new line or a space. I prefer a new line.

3. Select your code, copy.

4. Select the numbers on hex editor, **THE NUMBER OF HEX DIGITS SELECTED MUST BE EQUAL TO THOSE IN YOUR CODE**5. press CTRL+V.

SBA