

ECE 662

Machine Problem #1

In this machine problem, you will run the register transfers needed to do the fetch cycle, and execution cycles for the ADD AC,AC and HALT instructions. You will try this out on a simple test program. This program is a “Hello World” exercise to get you started on the simulator.

The simulator needs two input files, one for microinstructions and one for a test program. The first file is the specifications for the register transfers for a given machine. This quarter the simulator has been modified so that it can simulate the OSIAC 662, the machine to be designed in the machine problems.

Enter the following text into a file on your Red Hat Linux account and name it `micro1.dat`. Note `st`'s are not in column 1!

```
*****
*** ECE 662, Autumn 2007 ***
**** Machine Problem 1 ****
**** Your Name ****
*****

*** Start fetch cycle ***
st=0  rt='[pc] -> mar'      imar rac=1 rn=3
st=1  rt='[[mar]] -> mdr'   read
st=2  rt='[mdr] -> ir'     omdr iir
st=3  rt='[pc]+1 -> q'     rac=1 rn=3 ib p1 oadder
st=4  rt='[q] -> pc'       oq wac=1 wn=3
      cond='ir1512' value=0 nst=10
      cond='ir1512' value=1 nst=20

*** If any instructions are present except HALT or ADD, a halt will occur. ***
*** HALT execution cycle ***
st=10 halt

*** ADD AC,AC execution cycle ***
st=20 rt='[ac] -> t1'      rac=1 rn=0 it1
st=21 rt='[t1]+[ac] -> q'  oa rac=1 rn=0 ib oadder newc newv
st=22 rt='[q] -> ac'      oq wac=1 wn=0 newz newn
      nst=0
```

Now you need to type in a test program. For this machine, an `ADD AC,AC` is HEX 1000 and a `HALT` is 0000. Take the last digit of your Student ID. Your personalized test program will be that many `ADD AC,AC` instructions followed by a `HALT!` (If your last digit is 0, use 10.) Your test program should look like:

```
*****
start test1
E000 AC
0001 X
0010 SP
0000 PC
1010 CVZN
1000
1000
0000
end test1
*****
```

Except instead of having two lines of 1000, you should have as many lines as the value of the last digit of your Student ID. Call this file `test1`.

To run the simulator enter:

```
~orin/osiac/dosim4 -debug micro1.dat test1
```

Did it run okay? Look at the `details.1` and `summary.1` files.

After it runs okay, turn in a hardcopy of the file `details.1` by the due date.