EE/CSE371 QUIZ 4

Name: _____

Student ID
Number: _____

Please do not turn the page until 11:40.

Instructions

- This quiz contains 3 pages, including this cover page. You may use the backs of the pages for scratch work.

- The quiz is closed book and closed notes.

- Please silence and put away all cell phones and other mobile or noise-making devices.

- Remove all headphones and watches.

- You have 40 (+5) minutes to complete this quiz.

Advice

- Read questions carefully before starting. Read *all* questions first and start where you feel the most confident to maximize the use of your time.

- There may be partial credit for incomplete answers; please show your work.

- Relax.

Algorithm to ASMD [16 pts]

The pseudocode to the right is for an algorithm that computes (in place) the **moving average of size 2** for an array of length Len stored in a **simplified dual-port RAM** (*i.e.*, one that can read from one address and write to another addresses at the same time) with *unregistered* output.

```
L = Len
if (L < 2)  return
for k from 0 to L-2:
  A = RAM[k]
  RAM[k] = (A + RAM[k+1])/2
endfor
```

- Include inputs Len, Start, and Reset.
- Include outputs Ready and Done. Done should remain asserted until Start is de-asserted.

Create an ASMD chart for this algorithm. Please follow the names given in the algorithm, including using RAM[i] to indicate the data stored in the RAM at address i, and choose reasonable names for control signals.

Partial Datapath [10.5 pts]

For the same moving average algorithm, all of the main datapath components are given below. Draw out a partial datapath that includes these blocks and their connections.

- DO NOT show the **clock connections** but DO generate the **status signals**.

- For **control signals**, you can simply attach their names on the ends of wires and buses in as many places as needed.

- For **arithmetic operations**, you may draw squares with the operations written inside (*e.g.*, [-1], [÷2], [>]).