

## 22C:060: Computer Organization

### Homework 4

Total points = 50

Due Tuesday November 5, 2013, **5:00 AM (not PM)**

(Ideally you should finish the work on the previous night and submit it by midnight.

**Late submissions will not be accepted)**

1. **Do not consult others. You must solve the problems on your own.**
2. To submit your work, *zip* (or *tar*) them into a single file that has your last name as the prefix. Use ICON drop box to submit your assignment.

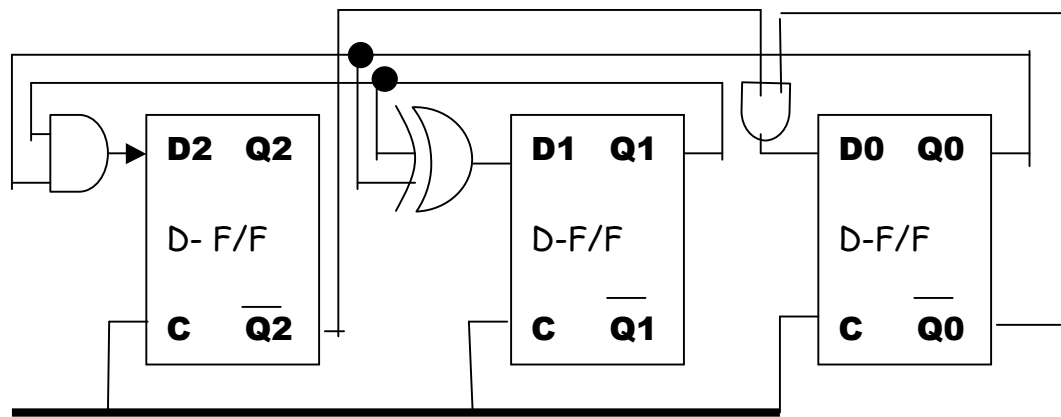
#### Question 1. (10+5+10 = 25 points)

The following two floating-point numbers have been represented using IEEE 754 single precision floating-point notation (that uses a biased exponent):

$$A = 0xC0A0\ 0000, \quad B = 0x3EB0\ 0000 \quad [\text{Representation in hex}]$$

- (a) Compute the decimal equivalents of these two numbers. Show the steps.
- (b) Compute their product  $P = A \times B$  using your calculator.
- (c) Represent  $P$  using IEEE floating point representation, and write it down in hex. Show the steps

**Question 2. (10 points)** In the following digital circuit, eight clock pulses have been applied at the input line. Show how the output  $Q_2\ Q_1\ Q_0$  will change after each clock pulse. You can assume that initially  $Q_2\ Q_1\ Q_0 = 000$ .



**Clock**

**Question 3. (15 points)** Given eight 256M x 1 bit RAM units and a decoder of your choice, connect them together to implement a 1G x 2 bit RAM. Provide a neat drawing of the circuit diagram. You should properly label the input and output ports of all the modules that you use.