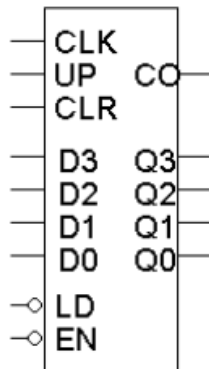## CSC 220: Computer Organization

Tutorial 9: Counter-RAM

Q1: Construct an asynchronous MOD-39 counter.

Q2: Configure the counter below to performs the following cycles

a. 0, 1, 2, 3, **4, 10**, 11, 12, 13, 14, 15…..

b. 0, 1, 2, 3, **4, 10,** 11, 12, 13, 0, 1…..

Q3: Design a 4 × 2 RAM Using a 4 × 2 RAM Cell Array

Q4: Choose the correct answer:
i. How many 128 x 8 RAM chips are needed to provide a memory capacity of 2048 bytes?
    (A) 8   (B) 16   (C) 24   (D) 32

ii. How many different addresses are required by the memory that contain 16K words?
    (A)16,380   (B) 16,382   (C)16,384   (D) 16,386

iv. which is a read instruction from memory:
     [A]   R1 <--- MAR
     [B]   R1 <--- MDR
     [C]   R1 <--- M[MAR]
     [D]   M[R1]   <--- R1

v. which is a Write instruction into memory:

[A]   R1 <--- M[MAR]
[B]   R1 <--- M[MDR]
[C]   R1 <--- M[R2]
[D]   M[MAR] <--- R1

Home Works

Text book problems: 7-1, 7-2, 7-4 (a), 7-8 (a, b)

Additional Problems

1. Design a counter that performs the following cycles: 0, 1, 2, 3, 4, **5,   9**, 10, 11, 12, 0, 1, 2,…..

2. A 20-bit address bus allows access to a memory of capacity (assuming 1 Byte /word)
   (a) 1 MB (b) 2 MB (c)32MB (d) 64 MB

3. A 32-bit address bus allows access to a memory of capacity (assuming 1 Byte /word)
   (a) 64 MB (b) 16 MB (c) 1GB (d) 4 GB

4. A byte corresponds to
   (a) 4 bits (b) 8 bits (c) 16 bits (d) 32 bits

5. A gigabyte represents
    (a) 1 billion bytes (b) 1000 kilobytes (c) 2

6. A megabyte represents
   (a) 1 million bytes (b) 1000 kilobytes (c) 2 bytes (d) 1024 bytes

7. A Kb corresponds to
    (a) 1024 bits (b) 1000 bytes (c) 2 bytes (d) 2 bits