CDA 3103 Worksheet-4: Bit Manipulation

Example 2.11: Patt & Patel, page 37

Suppose we have eight machines that we want to monitor with respect to their availability. We can keep track of them with an eight-bit BUSYNESS bit-vector, where a bit is 1 if the unit is free and 0 if the unit is busy. The bits are labeled, from right to left, from 0 to 7.

The BUSYNESS bit-vector 11000010 corresponds to the situation where only the units 7, 6 and 1 are free, and therefore available for work assignment.

7	*6*	*5*	*4*	*3*	*2*	*1*	*0*
1	**1**	**0**	**0**	**0**	**0**	**1**	**0**

Problem 2.36: Patt & Patel, page 46

What mask value and what operation would one use to indicate that

a) machine 2 is busy *Operation*_____ *Mask (hex)* _____

b) machines 2 and 6 are no longer busy *Operation*_____ *Mask (hex)*_____

c) all machines are busy *Operation*_____ *Mask (hex)*_____

d) all machines are idle *Operation*_____ *Mask (hex)* _____

e) Develop a procedure to isolate the status bit of machine 2 as the sign bit. For example, if the BUSYNESS pattern is 01011100, then the output of this procedure is 10000000. If the BUSYNESS pattern is 01110011, then the output is 00000000. In general, if the BUSYNESS pattern is:

b7	**b6**	**b5**	**b4**	**b3**	**b2**	**b1**	**b0**

The output is:

b2	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Hint: What happens when you ADD a bit pattern to itself?