

CS 350 Activities for Lecture 8

Bitstring Operations

A. Why?

- Bitstring shifts correspond to multiplication and division by two.
- Bitwise operations with masks enable us to manipulate particular bits of a bitstring.

B. Outcomes

At the end of this activity you should:

- Be able to perform bitstring operations.

C. Questions

1. Fill in the table below, which shows the result of repeatedly shifting 00011011 one bit left with zero fill.

k	After left-shifting k bits (0 fill)	In Decimal
0	00011011	27
1		
2		
3		
4		
5		
6		
7		

2. Fill in the table below, which shows the result of repeatedly shifting 10011011 one bit right with sign-bit fill.

k	After right-shifting k bits (sign-bit fill)	In Decimal
0	10011011	-101
1		
2		
3		
4		

k	After right-shifting k bits (sign-bit fill)	In Decimal
5		
6		
7		

3. Fill in the table below, which shows the result of repeatedly circularly shifting 10011011 one bit left.

k	After circularly shifting k bits left	In Decimal
0	10011011	-101
1		
2		
3		
4		
5		
6		
7		

4. Let $X = 1011001$ and $Y = 0110110$. Performing all the operations bitwise, what is (a) $NOT X$? (b) $X AND Y$ (c) $X OR Y$ (d) $X XOR Y$.

5. Say X , N , and Z are bitstrings of equal length, with N having all bits = 0 and Z having all bits = 1. Performing operations bitwise, what is (a) $X AND N$? (b) $X OR N$? (c) $X XOR N$? (d) $X AND Z$? (e) $X OR Z$? (f) $X XOR Z$?

6. Say we'd like to see if bit k of bitstring X is 0 or 1. What mask, operation, and test would we use?