Homework Assignment 2 Answered

Binary Addition Practice Problems

Unsigned Binary Addition (perform the addition)

Assume you have a byte (8 bits) of memory to work with. There's no need to track overflow.

1. 101 + 11

Carry Bits		1	1	1		
			1	0	1	
	+		0	1	1	
Sum		1	0	0	0	

2. 1101 + 101

Carry Bits		1	1	0	1	
			1	1	0	1
	+		0	1	0	1
Sum		1	0	0	1	0

3. 110 + 111

Carry Bits		1	1	0		
			1	1	0	
	+		1	1	1	
Sum		1	1	0	1	

4. 10011 + 110

Carry Bits		0	1	1	0	
		1	0	0	1	1
	+	0	0	1	1	0
Sum		1	1	0	0	1

5. 1110 + 10

Carry Bits		1	1	1	0
			1	1	1	0
	+		0	0	1	0
Sum		1	0	0	0	0

6. 101101 + 1001

Carry Bits		0	1	0	0	1	
		1	0	1	1	0	1
	+	0	0	1	0	0	1
Sum		1	1	0	1	1	0

7. 101 + 10101

Carry Bits		0	1	0	1	
		0	0	1	0	1
	+	1	0	1	0	1
Sum		1	1	0	1	0

8. 111111 + 1

Carry Bits		1	1	1	1	1	1	
			1	1	1	1	1	1
	+		0	0	0	0	0	1
Sum		1	0	0	0	0	0	0

9. 1000 + 111

Carry Bits		0	0	0	
		1	0	0	0
	+	0	1	1	1
Sum		1	1	1	1

10. 11001 + 1010

Carry Bits		1	1	0	0	0
			1	1	0	0	1
	+		0	1	0	1	0
Sum			1	0	0	0	1	1

Two's Complement on Signed Binary numbers

1. 0011

   One's Complement: 0011 => 1100

Carry Bits		0	0	0	
		1	1	0	0
	+	0	0	0	1
Sum		1	1	0	1

   Answer = 1101

2. 01101

   One's Complement: 01101 => 10010

Carry Bits		0	0	0	0	
		1	0	0	1	0
	+	0	0	0	0	1
Sum		1	0	0	1	1

   Answer = 10011

3. 1101

   One's Complement: 1101 => 0010

Carry Bits		0	0	0	
		0	0	1	0
	+	0	0	0	1
Sum		0	0	1	1

   Answer = 0011

4. 1110

   One's Complement: 1110 => 0001

Carry Bits		0	0	1	
		0	0	0	1
	+	0	0	0	1
Sum		0	0	1	0

   Answer = 0010

5. 1001

   One's Complement: 1001 => 0110

Carry Bits		0	0	0	
		0	1	1	0
	+	0	0	0	1
Sum		0	1	1	1

   Answer = 0111

6. 011111

   One's Complement: 011111 => 100000

Carry Bits		0	0	0	0	0	
		1	0	0	0	0	0
	+	0	0	0	0	0	1
Sum		1	0	0	0	0	1

   Answer = 100001

7. 1011

   One's Complement: 1011 => 0100

Carry Bits		0	0	0	
		0	1	0	0
	+	0	0	0	1
Sum		0	1	0	1

   Answer = 0101

8. 0100

   One's Complement: 0100 => 1011

Carry Bits		0	1	1	
		1	0	1	1
	+	0	0	0	1
Sum		1	1	0	0

   Answer = 1100

9. 111111

   One's Complement: 111111 => 000000

Carry Bits		0	0	0	0	0	
		0	0	0	0	0	0
	+	0	0	0	0	0	1
Sum		0	0	0	0	0	1

   Answer = 000001

10. 0001001

    One's Complement: 0001001 => 1110110

Carry Bits		0	0	0	0	0	0	
		1	1	1	0	1	1	0
	+	0	0	0	0	0	0	1
Sum		1	1	1	0	1	1	1