Computer organization homework 4

3.9
in binary:
151 is 10010111
214 is 11010110

2’s complement:
151: 0110 1001
214: 0010 1010

0110 1001 + 0010 1010 = 10010011
overflow
since we using saturating arithmetic
the answer should be the largest positive number, which is 0111 1111
in decimal, answer is 127

3.10
in binary:
151 is 1001 0111
214 is 1101 0110

2’s complement:
151: 0110 1001
214: 0010 1010

0110 1001 – 0010 1010 = 0011 1111
in decimal, answer is 63

3.12

Iteration	Step	Multiplier	Multiplicand	Product
0	Initial values	1010	0000 0011 0010	0000 0000 0000
1	1: 0=>No operation	1010	0000 0011 0010	0000 0000 0000
	2:Shift left Multiplicand	1010	0000 0110 0100	0000 0000 0000
	3.Shift right Multiplier	0101	0000 0110 0100	0000 0000 0000
2	1: 1=>Prod = Prod+Mcand	0101	0000 0110 0100	0000 0110 0100
	2:Shift left Multiplicand	0101	0000 1100 1000	0000 0110 0100
	3.Shift right Multiplier	0010	0000 1100 1000	0000 0110 0100
3	1: 0=>No	0010	0000 1100 1000	0000 0110 0100

	operation			
	2:Shift left Multiplicand	0010	0001 1001 0000	0000 0110 0100
	3.Shift right Multiplier	0001	0001 1001 0000	0000 0110 0100
4	1: 0=>No operation	0001	0001 1001 0000	0001 1111 0100
	2:Shift left Multiplicand	0001	0011 0010 0000	0001 1111 0100
	3.Shift right Multiplier	0000	0011 0010 0000	0001 1111 0100

The product is 764 in octal, 500 in decimal, 0001 1111 0100 in binary

3.13

Iteration	Step	Multiplicand	Product
0	Initial values	0110 0010	0000 0000 0001 0010
1	1: 0=>No operation	0110 0010	0000 0000 0001 0010
	2.Shift right Product	0110 0010	0000 0000 0000 1001
2	1: 1=>Prod = Prod+Mcand	0110 0010	0110 0010 0000 1001
	3.Shift right Product	0110 0010	0011 0001 0000 0100
3	1: 0=>No operation	0110 0010	0011 0001 0000 0100
	2.Shift right Product	0110 0010	0001 1000 1000 0010
4	1: 0=>No operation	0110 0010	0001 1000 1000 0010
	2.Shift right Product	0110 0010	0000 1100 0100 0001
5	1: 1=>Prod = Prod+Mcand	0110 0010	0110 1110 0100 0001
	3.Shift right Product	0110 0010	0011 0111 0010 0000
6	1: 0=>No operation	0110 0010	0011 0111 0010 0000

	2.Shift right Product	0110 0010	0001 1011 1001 0000
7	1: 0=>No operation	0110 0010	0001 1011 1001 0000
	2.Shift right Product	0110 0010	0000 1101 1100 1000
8	1: 0=>No operation	0110 0010	0000 1101 1100 1000
	2.Shift right Product	0110 0010	0000 0110 1110 0100

Answer is 1762 in decimal, 6e4 in hex, 0000 0110 1110 0100 in binary