

EE1001 Part 2 - Tutorial 2 -Answer

1. Find the 9's, 10's, binary, 1's (8-bit) and 2's (8-bit) complement of decimal numbers: 19 and 57.

Ans.

	9's	10's	Binary	1's	2's
19	80	81	0001 0011	1110 1100	1110 1101
57	42	43	0011 1001	1100 0110	1100 0111

2. Find the decimal value of the following 8-bit numbers if they are in (i) unsigned, and (ii) 2's complement representation.

(a) 10110010, (b) 01010011, (c) 11101011, (d) 01101011

Ans. (i): (a) 178 (b) 83 (c) 235 (d) 107

(ii): (a) -78 (b) 83 (c) -21 (d) 107

3. Express the following decimal numbers in 7-bit 2's complement representation:

(a) -23, (b) 19, (c) -91, (d) -60, (e) 35

Ans. (a) 110 1001 (b) 001 0011 (c) out range (d) 100 0100 (e) 010 0011

4. Convert decimal numbers 111 and 69 to 8-bit unsigned binary number and find the sum and check for its correctness.

Ans. $111_{10} = 0110\ 1111_2$, $69_{10} = 0100\ 0101_2$

Sum = 1011 0100 (No carry – correct)

5. Convert decimal numbers -55 and -89 to 8-bit 2's complement number and find the sum and check for its correctness.

Ans. $-55_{10} = 1100\ 1001_{2's}$, $-89_{10} = 1010\ 0111_{2's}$

sum = 0111 0000 (Overflow – sign bit change)

6. Represent the following decimal numbers in 8-bit 2's complement numbers and use **addition** to perform the following arithmetic operation, and check for the correctness of the answers:

(a) 59+23, (b) 195+67, (c) -47+73, (d) -63-42, (e) -82-79

Ans. (a) 0101 0010 (b) overflow (sign change) (c) 0001 1010 (d) 1001 0111 (e) 0101 1111

7. Express two BCD numbers 759 and 863 in binary format and perform binary addition. Find the sum and express the result in BCD format.

Ans. $1622_{BCD} = 0001\ 0110\ 0010\ 0010$ (add 0110 to digits with sum greater than 9)

8. Express two decimal numbers 13 and 9 in 4-bit unsigned binary number and perform binary multiplication to find the product.

Ans. $1101 \times 1001 = 0111\ 0101$

9. Find the quotient and remainder for $100101110 \div 1011$.

Ans. Quotient = 11011, remainder = 101

10. Find the result of $111011011 \div 1011$ with 6 fractional digits.

Ans. = 101011.000011