

Number systems

1. Convert the following binary numbers to decimal:

- (1) 1011
- (2) 1000
- (3) 1111
- (4) 1011001
- (5) 1000000
- (6) 10101.11
- (7) 11101.001

2. Convert the following decimal numbers to binary:

- (1) 10
- (2) 8
- (3) 16
- (4) 52
- (5) 12.625
- (6) 45.875
- (7) 10.33

3. Convert to hexadecimal and then to binary: (Round to 4 digits past the decimal point)

(a) 757.2510 (b) 123.1710 (c) 356.8910 (d) 1063.510

4. Convert to octal. Convert to hexadecimal. Then convert both of your answers to decimal.

(a) 111010110001.011₂ (b) 10110011101.11₂

5. Convert to base 6: $3BA.25_{14}$ (do all of the arithmetic in decimal, keep 3 digits after the point).

6. (a) Convert to hexadecimal: 1457.11_{10} . Round to two digits past the hexadecimal point.

(b) Convert your answer to binary, and then to octal.

(c) Convert to decimal: $DEC.A_{16}$

7. Convert the decimal numbers to hexadecimal and then to binary.

(a) 1305.375_{10} (b) 111.33_{10} (c) 301.12_{10} (d) 1644.875_{10}

8. Convert to octal. Convert to hexadecimal. Then convert both of your answers to

decimal, and verify that they are the same.

(a) 101111010100.101_2 (b) 100001101111.01_2

Binary arithmetic

9. Add, subtract, and multiply in binary:

(a) 1111 and 1010 (b) 110110 and 11101 (c) 100100 and 10110

10. Subtract in binary. Place a 1 over each column from which it was necessary to borrow.

(a) $11110100-1000111$ (b) $1110110-111101$ (c)
 $10110010-111101$

11. Add, subtract, and multiply in binary:

(a) 1111 and 1001 (b) 1101001 and 110110 (c) 110010 and 11101

12. Subtract in binary. Place a 1 over each column from which it was necessary to borrow.

(a) $10100100 - 01110011$ (b) $10010011 - 01011001$

(c) $11110011 - 10011110$

13. Divide in binary:

(a) $11101001 / 101$ (b) $110000001 / 1110$ (c) $1110010 / 1001$

Check your answers by multiplying out in binary and adding the remainder.

14. Divide in binary:

(a) $10001101 / 110$ (b) $110000011 / 1011$ (c) $1110100 / 1010$