

# **SC1005 Digital Logic Tutorial 1**

## **Introductory concepts and number systems**

1. What is the largest decimal number that can be represented using 16 bits in
  - a) binary?
  - b) BCD?
2. How many bits are needed to represent a decimal integer value not exceeding  $350000_{10}$ ?
3. Give the BCD representation of these decimal numbers:
  - a) 285
  - b) 47.19
4. Give the decimal value for each of these representations:
  - a)  $0011\ 1000_2$
  - b) 0011 1000 (in ASCII)
5. Perform the following conversions:
  - a)  $101111.0111_2 = ?_{16} = ?_{10}$
  - b)  $15C.38_{16} = ?_8 = ?_{10}$
  - c)  $1435_{10} = ?_{16} = ?_2$
  - d)  $7436.11_8 = ?_{16} = ?_{10}$
6. Convert the decimal fraction 0.8254 into an 8-bit binary fraction of the form  $0.b_1b_2 \dots b_8$ .
7. Determine the parity bit to be generated for each of the following code words before transmission. Assuming even parity is used.
  - a) 0110011
  - b) 0x43 (0x is a common notation for hexadecimal)
  - c) 0100 0111 0011

## **Answers**

1.    a)    65535  
      b)    9999
2.    19
3.    a)    0010 1000 0101  
      b)    0100 0111. 0001 1001
4.    a)    56  
      b)    8
5.  
      a)  $101111.0111_2 = 2F.7_{16} = 47.4375_{10}$   
      b)  $15C.38_{16} = 534.16_8 = 348.21875_{10}$   
      c)  $1435_{10} = 59B_{16} = 10110011011_2$   
      d)  $7436.11_8 = F1E.24_{16} = 3870.140625_{10}$
6.     $0.11010011_2$
7.  
      a) 0  
      b) 1  
      c) 0