

Module 1 :: Number Systems and Codes

Practice Problems

1. Convert the decimal number 7532.6552 to hexadecimal (up to 3 hexadecimal digits after the decimal point).
2. Convert the hexadecimal number 2CF6.0D9E to octal.
3. Carry out the following operations in 8-bit 1's complement representation:
 - a) $87 - 36$
 - b) $44 - 118$
4. Carry out the following operations in 8-bit 2's complement representation
 - a) $87 - 36$
 - b) $44 - 118$
 - c) $-35 - 97$
5. Under what conditions can overflow occur when adding two n-bit numbers:
 - a) In an unsigned representation
 - b) In 2's complement signed representation
6. Draw the circuit diagram using exclusive-OR gates for:
 - a) Converting a 6-bit binary number to Gray code.
 - b) Converting a 6-bit Gray code number to binary.
7. Design a Hamming code for 5 data bits ($m = 5$). Explain how the check bits are generated while creating the codewords. Also, explain how the position of a bit error (if present) can be detected in a received codeword, assuming that only one bit can be erroneous at a given time.
8. Repeat (7) for 6 data bits ($m = 6$).