

Assignment 2

COSC 2334.001

1.
 - What is the definition of position number systems? Describe the formula **D**.
 - What are the corresponding binary, octal, and hexadecimal numbers of **61453**₁₀ ? What are the corresponding octal, binary, and decimal numbers of **EABC**₁₆?
2. Each of the following arithmetic operations is correct in at least one number system. Determine possible radices of the numbers in each operation.
 - $1234 + 5432 = 6666$
 - $41/3 = 13$
 - $33/3 = 11$
3.
 - What is the negative number representation in signed-magnitude and two's complement systems? If a system only deals with 8 bits, does -128 exist in signed-magnitude or two's complement system? Why and why not?
 - Write the 8-bit signed-magnitude and two's complement representations for each of these decimal numbers:
 - +18, +115, -49, -3, -100
4.
 - State overflow for addition and subtraction rules for unsigned, signed-magnitude, and two's complement systems.
 - Indicate whether or not overflow occurs when adding the following 8-bit two's complement numbers:
 - $11010100 + 10101011$
 - $10111001 + 11010110$
 - $01011101 + 00100001$
 - $00100110 + 01011010$
5.
 - How many digital logic values there are? describing them.
 - Describe combinational circuits and sequential circuits. What is the difference between them?
 - What are the seven basic logic gates?
 - Construct a combinational circuit based on the functions

$$F_1 = ((X \oplus Y) \oplus Z)'$$

$$F_2 = (X' \cdot Y) + ((X \oplus Y)' \cdot Z)$$

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6. Design a 4-2 priority encoder based on the following truth table by AND, OR, and NOT gates.

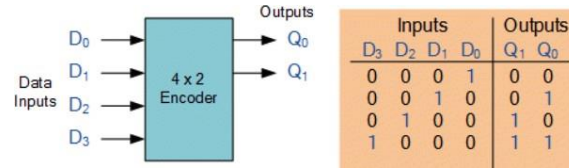


Fig. 1. The logic and block of 4:2 encoder