

Student Name:

CS 2010 Fall 2024 Sample Midterm Exam

Instructions:

- Answer the questions completely.
- Write your name on each page.
- If no exam with your name on it is turned in then you get a zero.

1. Perform the following base conversions using a method of your choice. Indentify your method and show your work:

1a. Convert $(321)_4$ to binary.

2a. Convert $(201102)_3$ to base 7.

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2. Bits, bytes, and integers.

2a. Fill in the following table of common integer types:

Name	Bytes	Bits	Max Unsigned	Max Signed
byte	1		255	127
short		16		
int		32		
long	8		$2^{64}-1$	$2^{63}-1$

2b. Two's Complement. Fill in the rest of this table:

Integer value	Bit representation as 8 bit two's complement
4	0000 0100
-4	
25	
-25	
127	
-127	

3. Base Conversions. Fill in the rest of this table:

Decimal (Base 10)	Hexidecimal (Base 16)	Binary (Base 2)	Octal (Base 8)
25			
	25		
		10101	
			25
250			
	250		
	abc		

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4. Boolean Expressions

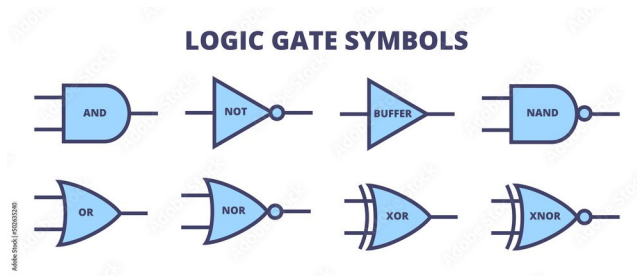
Given: $Q(A, B, C, D) = A'B + ACD' + A'CD + A'B'$

4a. Write the truth table.

4b. Write the K-Map.

4c. Write an equivalent, simplified expression.

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5. Circuit Diagrams

5a. Draw a circuit diagram for $Z = (A + B + C)(A' + B + C)$

5b. Draw a circuit diagram for $Z = AB + AC + B'C$