


Question 4

0 out of 2 points

 The largest decimal value that can be represented using a 7-bit binary number in ones's complement notation is **11**.

Specified Answer for: 1  128

Correct Answers for: 1

Evaluation Method

Correct Answer

Case Sensitivity

 Exact Match

63

Question 5

8 out of 8 points

Consider the following additions of 4-bit binary numbers using two's complement arithmetic.
For each addition, provide the result as a 4-bit binary number and indicate whether an overflow occurs (Y) or whether no overflow occurs (N).

0101
+ 1111
Result: **1A** (4-bit binary number)
Overflow? (Y/N) **A**

1100
+ 1100
Result: **1B** (4-bit binary number)
Overflow? (Y/N) **B**

0110
+ 0101
Result: **1C** (4-bit binary number)
Overflow? (Y/N) **C**

0101
+ 0111
Result: **1D** (4-bit binary number)
Overflow? (Y/N) **D**

Specified Answer for 1A: **Y**
Specified Answer for A: **N**
Specified Answer for 1B: **Y**
Specified Answer for B: **N**
Specified Answer for 1C: **Y**
Specified Answer for C: **Y**
Specified Answer for 1D: **Y**
Specified Answer for D: **Y**

Correct Answers for 1A

Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	0100	
Exact Match	10100	

Forward Answers for A

Question 6

0 out of 5 points (Extra Credit)

Use Booth's algorithm to multiply the 4-bit binary values in two's complement representation given below. The product will then be an 8-bit value. Provide the correct value for each step of the algorithm, including all leading bits.

Also provide the final (binary) result of the multiplication.

You are required to express each possible subtraction by a corresponding addition according to the method presented in the lecture.


1011
+ 0101
Step 1:
+ [1] (must be a bit string of length 8)
Step 2:
+ [2] (must be a bit string of length 7)
Step 3:
+ [3] (must be a bit string of length 6)
Step 4:
+ [4] (must be a bit string of length 5)
Final Result:
[5] (must be a bit string of length 8)

Specified Answer for: 1 01010101
Specified Answer for: 2 1101101
Specified Answer for: 3 001111
Specified Answer for: 4 11001
Specified Answer for: 5 11001110


Correct Answers for: 1		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	00000101	
Correct Answers for: 2		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	1111011	
Correct Answers for: 3		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	000101	
Correct Answers for: 4		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	11011	
Correct Answers for: 5		
Evaluation Method	Correct Answer	Case Sensitivity

Specified Answer for: 5  11001110


Correct Answers for: 1

Evaluation Method	Correct Answer	Case Sensitivity
 Exact Match	00000101	


Correct Answers for: 2

Evaluation Method	Correct Answer	Case Sensitivity
 Exact Match	11111011	

Correct Answers for: 3

Evaluation Method	Correct Answer	Case Sensitivity
 Exact Match	000101	

Correct Answers for: 4

Evaluation Method	Correct Answer	Case Sensitivity
 Exact Match	11011	

Correct Answers for: 5

Evaluation Method	Correct Answer	Case Sensitivity
 Exact Match	11100111	

Question 7



Use Booth's algorithm to multiply the 4-bit binary values in two's complement.

Provide the correct value for each step of the algorithm, including all

Also provide the final (binary) result of the multiplication.

Question 7

0 out of 5 points

Use Booth's algorithm to multiply the 4-bit binary values in two's complement representation given below. The product will then be an 8-bit value. Provide the correct value for each step of the algorithm, including all leading bits.

Also provide the final (binary) result of the multiplication.

You are required to express each possible subtraction by a corresponding addition according to the method presented in the lecture.

0110
+ 1111
Step 1:
+ [1] (must be a bit string of length 8)
Step 2:
+ [2] (must be a bit string of length 7)
Step 3:
+ [3] (must be a bit string of length 6)
Step 4:
+ [4] (must be a bit string of length 5)
Final Result:
[5] (must be a bit string of length 8)

Specified Answer for: 1 1010111
Specified Answer for: 2 1101111
Specified Answer for: 3 111011
Specified Answer for: 4 11111
Specified Answer for: 5 00101111

Correct Answers for: 1		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	11111010	
Correct Answers for: 2		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	0000000	
Correct Answers for: 3		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	000000	
Correct Answers for: 4		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	00000	
Correct Answers for: 5		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	11111010	

Question 8

2 out of 6 points

Consider the biggest floating point number that can be represented in the textbook's floating point format consisting of a sign, a 5-bit exponent and an 8-bit significand.

- a. What is the exponent (in binary)? [A]
- b. Suppose the represented value is $m \cdot 2^e$. What is the value of m in binary? [B]
- c. Suppose the represented value is $m \cdot 2^e$. What is the value of e in decimal? [C]
- d. Provide the number in decimal (without using scientific notation). [D]
- e. Convert the number to (decimal) scientific notation of the form $M \cdot 10^E$. What is the value of M ? [E]
- f. Convert the number to (decimal) scientific notation of the form $M \cdot 10^E$. What is the value of E ? [F]

Specified Answer for: A 11111
Specified Answer for: B 1.11111111
Specified Answer for: C 16
Specified Answer for: D 130944
Specified Answer for: E 1.30944
Specified Answer for: F 5

Correct Answers for: A		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	11111	
Correct Answers for: B		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	0.11111111	
Correct Answers for: C		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	16	
Correct Answers for: D		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	65280	
Correct Answers for: E		
Evaluation Method	Correct Answer	Case Sensitivity
Contains	6.528	
Correct Answers for: F		
Evaluation Method	Correct Answer	Case Sensitivity
Exact Match	4	

Question 1

2 out of 2 points



Complete the following sentence:

A bus operating at **800** MHz has a cycle time of 1.25 nanoseconds.

Round your answer to a whole number without decimal places.

Specified Answer for A: **800**

Correct Answers for: A

Evaluation Method

Exact Match

Correct Answer

800

Case Sensitivity

Question 3

8 out of 8 points

Fill in the blanks such that the calculation correctly implements the conversion from decimal to base 7 via the division remainder method.

Divisor	Quotient resp. Dividend	Remainder
7	[A]	5
7	[B]	5
7	[C]	5
7	[D]	1
7	[E]	6
7	[F]	1
	0	

Hint: You should fill in the blanks from bottom to top.

- Specified Answer for A: 31841
Specified Answer for B: 4548
Specified Answer for C: 649
Specified Answer for D: 92
Specified Answer for E: 13
Specified Answer for F: 1

Correct Answers for: A		
Evaluation Method	Correct Answer	Case Sensitivity
Contains	31841	
Correct Answers for: B		
Evaluation Method	Correct Answer	Case Sensitivity
Contains	4548	
Correct Answers for: C		
Evaluation Method	Correct Answer	Case Sensitivity
Contains	649	
Correct Answers for: D		
Evaluation Method	Correct Answer	Case Sensitivity
Contains	92	
Correct Answers for: E		