Name: Id#

COE 202, Term 201

Digital Logic Design

Quiz# 1 Solution

Date: Sunday, Sep. 13, 2020

**Question 1. Select the correct answer in each of the following questions: (10 points)**

1. Given that 1000 students are enrolled in a school. The school would like to assign an ID for each student. The number of binary bits needed to assign a unique ID code for each student and the number of remaining unused codes are:
2. 10 bits and 23 remaining unused codes
3. 10 bits and 24 remaining unused codes
4. 11 bits and 23 remaining unused codes
5. 11 bits and 24 remaining unused codes

210=1024. Thus, we need 10 bits. 1000 codes will be used. Thus, we will have 24 remaining unused codes.

1. The value of m that satisfies the equation  is:
2. m=4
3. m=6
4. m=8
5. m=10

Adding 3333+1 = 10000 which is equal to 44=28. Thus, 3333 = 28-1 and hence m = 8.

1. Given that (123)r = (83)10, then the base r is:
2. 4
3. 6
4. 8
5. 10

r2+ 2r + 3 = 83 ==> r2+ 2r - 80 = 0 ==> (r-8)(r+10)=0 => r=8

1. The number of bits required to represent the result of multiplying a 6-bit unsigned number by a 4-bit unsigned number is equal to:
2. 6 bits
3. 8 bits
4. 10 bits
5. 12 bits

63 by 15 = 945 >511 & < 1023 ==> 10 bits are needed.

1. Using a system with radix R=7, the operation 600-456 produces the following result:
2. 143
3. 144
4. 110
5. 111

B  11

    600

-  456

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   111﻿﻿﻿﻿﻿

1. In base R number system, given that (xC)R = (36)10, where x is a single digit in base R, then the proper values for x and R are:
2. x=1 and R=24
3. x=2 and R=12
4. x=3 and R=8
5. x=4 and R=6

 xR + 12 = 36; ==> xR  = 24  ==> x = 1 and R = 24; R has to be greater than 12.

1. The decimal number 58 is represented using excess-3 code as:
2. 1000 1000
3. 0101 1000
4. 0101 1011
5. 1000 1011

5+3=8 --> 1000    8+3=11 -->1011

1. Assuming a number system with radix R=4 with 2 fraction digits, the largest fraction error for representing fractions using this representation is: (Note that Error=Actual Value-Represented Value)
2. 2-3
3. 2-4
4. 2-5
5. 2-6

Largest fraction that can be represented is 0.33. Thus, the largest error is 0.0033…3, which are the digits that can’t be represented. 0.0033…3 ≅ 4-2= 2-4

1. Using a system with radix R=5, adding the numbers 111+444 produces the following result:
2. 1011
3. 1111
4. 1110
5. 1101

C 11

111

+ 444

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1110

1. Assume that an alphabetic character is transmitted and the 8-bit binary code 1110 0101 is received by the receiver. Assuming that no error has occurred during transmission, then the transmitted character and the parity used are: (Note that bit 7 is the parity bit and the ASCII code for 'a' =0x61)
2. Character is 'd' and even parity
3. Character is 'd' and odd parity
4. Character is 'e' and even parity
5. Character is 'e' and odd parity

Since the number of 1's is odd, then the used parity is odd.

The ASCII code of the transmitted character is 110 0101 =0x65='e'.