CSCI-21 Quiz #1 Name Travis Liang

Please use pencil and erase mistakes. No calculators. Show your work. 10 points.

What are the two primary things that the base of a number system tells you? Illustrate (give an example of) each of these things for base 14. (4 points)

1. It tells you the cardinality of the set of digits in the system. $A = \{0,1,2,3,4,5,6,7,8,9,A,B,C,D\}$ $|A| = 14$

2. It tells you the place values of any base in the number system. Place value always an integer power of the base

2A1 has place values 14^2 14^1 14^0

Convert the following bit pattern to octal and hexadecimal (1 point each):

10110101_2 = 265 $_8$ = B5 $_{16}$

2 6 5

1011 0101

1011 0101

11

B 5

Using repeated subtraction, convert 68 decimal to 8-bit binary. (2 points)

128 0
64 1
32 0
16 0
8 0
4 1
2 0
1 0

68
−64
4
−4
0

0100 0100 = 68

Using repeated division, convert 77 decimal to 8-bit binary. (2 points)

38
2|77
6
17
16
4
19
2|38
2|9
9
2|19

77|1
38|0
19|1
9|1
4|0
2|0
1|1

0100 1101 = 77