Name:

CSE 1400 Applied Discrete Mathematics

Fall 2012 Quiz Five

Score

1. (10 pts) Unicode is a standard for encoding text characters used in most of the world's writing systems. There are $109,976$ (printable) characters in Unicode (version 6.2).

   (a) How many different strings of length 4 can be written using the characters in Unicode?
   Answer: There are $109,976^4$ Unicode strings of length 4.

   (b) If you need to name n things using fixed length strings written in Unicode, how long would the strings need to be?
   Answer: The strings would need to be

   $$\lceil \log_{109,976} n \rceil$$

   characters long.

Score

2. (5 pts) Write 43 as an unsigned binary number.
   Answer:

Repeated Remaindering Mod T						
Quotients	43	21	10	5	2	1
Remainders	1	1	0	1	0	1

herefore $(43)_{10} = (101011)_2$.

Score

3. (5 pts) Write +43 as a signed binary number in two's complement notation.
   Answer: Since $(43)_{10} = (101011)_2$ as an unsigned binary, $(43)_{10} = (0101011)_{2c}$ as a two's complement number.

Score

4. (5 pts) Write −43 as a signed binary number in two's complement notation.
   Answer: Since $(+43)_{10} = (0101011)_2$ as a two's complement number, $(-43)_{10} = (1010101)_{2c}$.

Score

5. (5 pts) Write −43 as a decimal number in biased notation with bias $b = 64$.
   Answer: $(-43)_{10} = (-43 + 64)_{b=64} = (21)_{b=64}$.

Score

6. (5 pts) Use Horner's rule to convert the unsigned binary $(1100\ 1000)_2$ to decimal notation.
   Answer:

Horner's Rule							
1	1	0	0	1	0	0	0
0	2	6	12	24	50	100	200
1	3	6	12	25	50	100	$\boxed{200}$

Therefore $(1100\ 1000)_2 = (200)_{10}$.

Total Points: 35 Monday, November 19, 2012