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CS 200 Homework 4

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\*\*sub means with a base of x. I.E. 51360 with a base of 7=51360sub7

\*\* 4096,1024,512,256,128,64,32,8,4,2,1

1. 51360 sub 7 to base 10

=5\*(7^4)+1\*(7^3)+3\*(7^2)+6\*(7^1)+0\*(7^0)

=12005+343+147+42+0

=12537

1. 3157 sub 10 to base 16

= 3157/256=12 with a remainder of 85.

85/16= 5 with a remainder of 5.

=1255 sub 16= C55 sub 16

1. 173 sub 10 to base 2

173-128=45 1

Can’t use 64 because 45<64 0

45-32=13 1

Can’t use 16 because 13<16 0

13-8=5 1

5-4=1 1

Can’t use 2 because 1<2 0

1-1=0 1

So, final result= 10101101 sub 2

1. D1B079 sub 16 to base 2

D =1101

1=0001

B=1011

0=0000

7=0111

9=1001

Using these, final result= 11010001101100000111 sub 2

1. 101010111001 sub 2 unsigned to base 10

=1\*(2^11)+0\*(2^10)+1\*(2^9)+0\*(2^8)+1\*(2^7)+0\*(2^6)+1\*(2^5)+1\*(2^4)+1\*(2^3)+0\*(2^2)+0\*(2^1)+1\*(2^0)

=2048+0+512+0+128+0+32+16+8+0+0+1

=2745 sub 10

1. 101010111001 sub 2 is complement, to base 10

=010101000110 sub 2 since it is negative/first bit is 1

=0\*(2^11)+1\*(2^10)+0\*(2^9)+1\*(2^8)+0\*(2^7)+1\*(2^6)+0\*(2^5)+0\*(2^4)+0\*(2^3)+1\*(2^2)+1\*(2^1)+0\*(2^0)

=0+1024+0+256+0+64+0+0+0+4+2+0

=1350 sub 10 but since the original was negative

Final result = -1350 base 10

1. 101010111001 sub 2 2s complement, to base 10

= 010101000110 since it is negative/first bit is 1

=010101 000111 since the 2s complement, 1 needs to be added

=0\*(2^11)+1\*(2^10)+0\*(2^9)+1\*(2^8)+0\*(2^7)+1\*(2^6)+0\*(2^5)+0\*(2^4)+ 0\*(2^3)+1\*(2^2)+1\*(2^1)+ 1\*(2^0)

=0+1024+0+256+0+64+0+0+0+4+2+1

=1351 sub 10 but since the original was negative

Final result = -1351 base 10

1. 320147 sub 8 to base 16

3=011

2=010

0=000

1=001

4=100

7=111

=011010000001100111

=0001 1010 0000 0110 0111

0001=1

1010=A

0000=0

0110=6

0111=7

Final Result=1A067 sub 16

1. 5CF9 sub 16 to 10

C=12

F=15

=5\*(16^3)+12\*(16^2)+15\*(16^1)+9\*(16^0)

=20480+3072+240+9

=23801 sub 10

1. -730 sub 10 to 12-bit 2s complement

730-512= 218 1

218<256 0

218-128=90 1

90-64=26 1

26<32 0

26-16=10 1

10-8=2 1

2<4 0

2-2=0 1

0<1 0

=1011011010

=001011011010 Make the number 12 bit by adding 2 0 bits to the left side

=110100100101 Flip the bits since the original is negative

=110100100101+1 Need to add 1 to make the 2s complement

=110100100110 sub 2