COMP 122/L
Summer 2023

Number Representation and Conversion

1.) What is 42 (decimal) in binary?

42 % 2 = 0
42 / 2 = 21
21 % 2 = 1
21 / 2 = 10
10 % 2 = 0
10 / 2 = 5
5 % 2 = 1
5 / 2 = 2
2 % 2 = 0
2 / 2 = 1
1 % 2 = 1
1 / 2 = 0

101010

2.) What is 282 (decimal) in binary?

282 % 2 = 0
282 / 2 = 141
141 % 2 = 1
141 / 2 = 70
70 % 2 = 0
70 / 2 = 35
35 % 2 = 1
35 / 2 = 17
17 % 2 = 1
17 / 2 = 8
8 % 2 = 0
8 / 2 = 4
4 % 2 = 0
4 / 2 = 2
2 % 2 = 0
2 / 2 = 1
1 % 2 = 1
1 / 2 = 0

100011010

3.) What is 1001 1101 (binary) in decimal? (the space in the middle is just to make this easier to read; this is equivalent to 10011101)

$1 * 2^7 + 0 * 2^6 + 0 * 2^5 + 1 * 2^4 + 1 * 2^3 + 1 * 2^2 + 0 * 2^1 + 1 * 2^0$

$128 + 0 + 0 + 16 + 8 + 4 + 0 + 1 = 157$

Note: the question assumes this number is NOT in two's complement. More on two's complement later.

4.) What is 1100 1000 0010 1111 0110 1001 0101 1010 in hexadecimal? (Hint: use a lookup table)

1100 = C
1000 = 8
0010 = 2
1111 = F
0110 = 6
1001 = 9
0101 = 5
1010 = A

0xC82F695A