CSULB

CECS225

Lab1

Either type your lab in a word document and upload as a **pdf**

Or **write neatly**, scan the file and upload as a **pdf**.

**Show your work, no work no credit even if the answer is correct**

When you are done, **click on quizzes and convert your answers to the quiz**.

Make sure to follow the instructions on how to enter the answer (for grading purposes)

1- Find the decimal values of the following numbers using the digit position and the base

of the system.

1. 36510
   1. 365, already in base decimal
2. 112
   1. 1 \* 21 + 1 \* 20 = 310
3. 117
   1. 1 \* 71 + 1 \* 70 = 810
4. 10012
   1. 1 \* 23 + 0 \* 22 + 0 \* 21 + 1 \* 20 = 910
5. 10101012
   1. 1\*26 + 0\*25 + 1\*24 + 0\*23 + 1\*22 + 0\*21 + 1\*20 = 8510
6. 213
   1. 2\*31 + 1\*30 = 710
7. 1223
   1. 1\*32 + 2\*31 + 2\*30 = 1710

2- Convert the following unsigned binary numbers to decimal, Hexadecimal, and Octal.

Show your work.

1. 11102­ ­
   1. Decimal
      1. 1\*23 + 1\*22 + 1\*21 + 0\*20 = 1410­
   2. Hexadecimal
      1. Using decimal 1310, 10 = A, 14 = E
   3. Octal
      1. Using decimal 1410 
         1. 14 / 8 = 1, R = 6
         2. 1 / 8 = 0, R = 1
         3. 168
2. 1001002
   1. Decimal
      1. 1\*25 + 0\*24 + 0\*23 + 1\*22 + 0\*21 + 0\*20 = 3610
   2. Hexadecimal
      1. Using decimal 3610,
         1. 36 / 16 = 2, R = 4
         2. 2 / 16 = 0, R = 2
         3. 2416
   3. Octal
      1. Using decimal 3610
         1. 36 / 8 = 4, R = 4
         2. 4 / 8 = 0, R = 4
         3. 448
3. 110101112
   1. Decimal
      1. 1\*20 + 1\*21 + 1\*22 + 0\*23 + 1\*24 + 0\*25 + 1\*26 + 1\*27 = 21510
   2. Hexadecimal
      1. Using decimal 21510
         1. 215 / 16 = 13, R = 7
         2. 13 / 16 = 0, R = 13 = D
         3. D716
   3. Octal
      1. Using decimal 21510
         1. 215 / 8 = 26, R = 7
         2. 26 / 8 = 3, R = 2
         3. 3 / 8 = 0, R = 3
         4. 3278
4. 0111010101001002
   1. Decimal
      1. 0\*20 + 0\*21 + 1\*22 + 0\*23 + 0\*24 + 1\*25 + 0\*26 + 1\*27 + 0\*28 + 1\*29 + 0\*210 + 1\*211 + 1\*212 + 1\*213 + 0\*214 = 1501210
   2. Hexadecimal
      1. Using decimal 1501210
         1. 15012 / 16 = 938, R = 4
         2. 938 / 16 = 58, R = 10
         3. 58 / 16 = 3, R = 10
         4. 3 / 16 = 0, R = 3
         5. 3AA416
   3. Octal
      1. Using decimal 1501210
         1. 15012 / 8 = 1876, R = 4
         2. 1876 / 8 = 234, R = 4
         3. 234 / 8 = 29, R = 2
         4. 29 / 8 = 3, R = 5
         5. 3 / 8 = 0, R = 3
         6. 352448

3- Convert the following hexadecimal numbers to decimal, to unsigned Binary Show your

work.

1. 4E16
   1. Decimal
      1. E = 14 \* 160 + 4 \* 161 = 14 + 64 = 7810
   2. Unsigned Binary
      1. Using 7810
         1. 78 / 2 = 39, R = 0
         2. 39 / 2 = 19, R = 1
         3. 19 / 2 = 9, R = 1
         4. 9 / 2 = 4, R = 1
         5. 4 / 2 = 2, R = 0
         6. 2 / 2 = 1, R = 0
         7. 1 / 2 = 0, R = 1
         8. 010011102
2. 7C16
   1. Decimal
      1. C = 12 \* 160 + 7\*161 = 12 + 112 = 12410
   2. Unsigned Binary
      1. Using 12410
         1. 124 / 2 = 62, R = 0
         2. 62 / 2 = 31, R = 0
         3. 31 / 2 = 15, R = 1
         4. 15 / 2 = 7, R = 1
         5. 7 / 2 = 3, R = 1
         6. 3 / 2 = 1, R = 1
         7. 1 / 2 = 0, R = 1
         8. 011111002
3. ED3A16
   1. Decimal
      1. A = 10\*160 + 3\*161 + 13\*162 + 14\*163 = 6073010
   2. Unsigned Binary
      1. Using 6073010
         1. 60730 / 2 = 30365, R = 0
         2. 30365 / 2 = 15182, R = 1
         3. 15182 / 2 = 7591, R = 0
         4. 7591 / 2 = 3795, R = 1
         5. 3795 / 2= 1897, R = 1
         6. 1897 / 2 = 948, R = 1
         7. 948 / 2 = 474, R = 0
         8. 474 / 2 = 237, R = 0
         9. 237 / 2 = 118, R = 1
         10. 118 / 2 = 59, R = 0
         11. 59 / 2 = 29, R = 1
         12. 29 / 2 = 14, R = 1
         13. 14 / 2 = 7, R = 0
         14. 7 / 2 = 3, R = 1
         15. 3 / 2 = 1, R = 1
         16. 1 / 2 = 0, R = 1
         17. 1110 1101 0011 10102
4. 403FB00116
   1. Decimal
      1. 1\*160 + 0\*161 + 0\*162 + 11\*163 + 15\*164 + 3\*165 + 0\*166 + 4\*167 = 107791564910
   2. Unsigned Binary
      1. 107791564910
         1. 1077915649 / 2 = 538957824, R = 1
         2. 538957824 / 2 = 269478912, R = 0
         3. 269478912 / 2 = 134739456, R = 0
         4. 134739456 / 2 = 67369728, R = 0
         5. 67369728 / 2 = 33684864, R =0
         6. 33684864 / 2 = 16842432, R = 0
         7. 16842432 / 2 = 8421216, R = 0
         8. 8421216 / 2 = 4210608, R = 0
         9. 4210608 / 2 = 2105304, R = 0
         10. 2105304 / 2 = 1052652, R = 0
         11. 1052652 / 2 = 526326, R = 0
         12. 526326 / 2 = 263163, R = 0
         13. 263163 / 2 = 131581, R = 1
         14. 131581 /2 = 65790, R = 1
         15. 65790 / 2 = 32895, R = 0
         16. 32895 / 2 = 16447, R = 1
         17. 16447 / 2 = 8223, R = 1
         18. 8223 / 2 = 4111, R = 1
         19. 4111 / 2 = 2055, R = 1
         20. 2055 / 2 = 1027, R= 1
         21. 1027 / 2 = 513, R = 1
         22. 513 / 2 = 256, R = 1
         23. 256 / 2 = 128, R = 0
         24. 128 / 2 = 64, R = 0
         25. 64 / 2 = 32, R = 0
         26. 32 / 2 = 16, R = 0
         27. 16 / 2 = 8, R= 0
         28. 8 / 2 = 4, R = 0
         29. 4 / 2 = 2, R = 0
         30. 2 / 2 = 1, R = 0
         31. 1 / 2 = 0, R = 1
         32. 01000000001111111011000000000001­2

4- How many different numbers can be represented with 23 bits?

Unsigned: 0 to 2k – 1; Signed: -2k-1 to 2k-1 – 1