



7. There are three different data clean up algorithms. Perform the Shuffle-Left, Copy Over, and the Converging Pointers method on the following set of numbers:  
0 3 1 7 0 2 4 11 0
8. Given the list: 3 6 7 9 12 14 18 21 22 31 43 use binary search algorithm to decide whether 35 is in the list. Show steps.
9. Construct a binary search tree using the following numbers:  
2 3 7 9 10 13 15 18 19 21 28 30 32 36 39 41
10. Express the following numbers in base 10:  
a)  $[1011010111001]_2$   
  
b)  $[237]_8$   
  
c)  $[A17D]_{16}$
11. Convert the following:  
a)  $[101100101]_2$  to base 8  
  
b)  $[101100101]_2$  to base 16

12. An instruction register for some processor has 4 bits for the op-code and 12 bits for a single address field. What is the maximum possible number of operations which can be performed by this processor? What is the maximum possible number of cells in memory (measured in KB)? Assuming that maximum memory size, what are the smallest and largest cell addresses?
13. What is the range of numbers which can be represented in sign/magnitude notation if 8 bits are available?
14. Perform the selection sort algorithm on the following set of number: 6 8 5 0 4 3
15. Suppose 10 bits are used to store signed integers in sign/magnitude representation. What bit string would be used to represent the number  $-27$ ?
16. Assume that 16 bits are available for floating point representation of rational numbers with 10 bits for the signed mantissa and 6 bits for the signed exponent.
- a) What bit string would be used to represent 12.75?
- b)  $-20.25$ ?

