Tutorial 5: Singly Linked Lists

Pointers

1. What are the two pointer operators? What is their relationship?
2. Explain pointer arithmetic.
3. Why do you use pointers as parameters to functions?
4. How do you declare a pointer to a function? How do you indicate the parameters to a function pointer?
5. What is the relationship between array notation and pointer arithmetic?
6. What is the relationship between pointers and strings?
7. How do you declare a pointer to a pointer?
8. What is a pointer to a pointer?
9. How do you declare an array of pointers?
10. How do you allocate memory in C?
11. What happens if you do not free memory allocated?

Singly Linked Lists

12. What is dynamic memory allocation?
13. When is dynamic memory allocation prefereable to static memory allocation.
14. How are arrays different for a collections of variables each of which is allocated dynamically?
15. Why do you need to know the address of every variable that is allocated dynamically?
16. What is a linked list?
17. Write a C struct for a linked list node.
18. Write a C function that will insert a node in a singly linked list.
19. Trace the addition of 3, 7, and 4 to an empty list.
20. Write a C function that will insert a node at the end of a linked list.
21. Write a C function that will traverse a linked list.

22. Trace the steps of traversing a list containing 3, 7, and 4.
23. Trace the insertion of 9 at the end of a list containing 3, 7, and 4.
24. Write a C function that will insert a new node at the beginning of a linked list.
25. Write a C function to insert a node at a particular location.
26. Write a C function that will delete the first node of a singly linked list.
27. Trace the deletion of the first item from a list containing 3, 7, and 4.
28. Write a C function that will delete the last node of a singly linked list.
29. Trace the deletion of the last item from a list containing 3, 7 and 4.
30. How are items accessed in a singly linked list? How are they accessed in an array?
31. What is the worst case complexity of accessing an item by position in a linked list? What is the worst case complexity in the case of an array.