

Problem Set 12

1. Write programs to create, insert, remove, search elements in a linked list.
2. Implement polynomials using arrays and lists. In case of arrays, $a[i]$ indicates the coefficient of x^i . Write a function to add two polynomials. Now implement it with lists, where a node stores both the coefficient and power (e.g., 3 and 5 in $3x^5$). Rewrite addition of polynomials using lists.
3. Find out if a list contains a cycle.
4. Print a list in reverse. Write iterative and recursive versions.
5. Concatenate two lists.
6. Merge two sorted lists.
7. Create a rudimentary memory allocator where you keep track of allocated and free memory using linked list. Support `mymalloc` and `myfree` functions.
8. Using the same set of nodes, maintain multiple lists (having pointers `nextname`, `nextrollno`, `nextroom`, etc.). Keep each list sorted based on the appropriate field.
9. Extend your singly list functions (Problem 1 above) to doubly linked list (using a previous pointer). Which of the operations get simplified and which get complicated?