# Csc326 Homework 2

## Part I: array\_based list

1. The following declaration is for problem 1 and 2:

**const int MAX=10;**

**class AList{**

**public :**

**AList();**

**void PrintAll();**

**void Delete(int k, int &x, bool &success);**

\\ delete element at the position with index k and save it in x

**void Insert(int k, int x, bool &success);**

[\\ insert](file:///\\insert) element x at the position with index k

**…**

**private :**

**int list[MAX];**

**int size;**

**};**

**AList Chain;**

**bool flag;**

**int y;**

1. Assume you have a list of integers stored in a array-based list with the name of **Chain** declared as above and has the following integers:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 5 | 8 | 10 | 12 | 18 | 21 |  |  |  |

Show the contents of **Chain** and the value of **flag** after you execute each statement of the following program segment:

**Chain.Insert(2, 6, flag);**

**Chain.Insert(9, 25, flag);**

**Chain.Delete(0, y, flag);**

**Chain.Delete(8, y, flag);**

1. Assume you have a list of integers stored in an array-based list with the class name **AList** declared as above. Write the **PrintAll()** method for the **AList** class to prints out all values in the list that are greater than **10**.
2. With the following declaration, do problem 1&2:

const int MAX=10;

class AList{

public :

AList();

void Retrieve(int k, &x, int bool &success);

[\\retrieve](file:///\\retrieve) the kth element and save it in x

void Delete(int k, int &x, bool &success);

\\ delete element at the position with index k and save it in x

void Insert(int k, int x, bool &success);

[\\ insert](file:///\\insert) element x at the position with index k

…

private :

int list[MAX];

int size;

};

AList aList;

1. **With only the above methods, how do you implement the function swap (swap (aList, i, j) ) that interchanges the items currently in positions i and j of a list.**
2. **Revise the specifications of the above list to make insertion, deletion, retrieval operations are at the end of the list; and Implement these new methods.**

## Part II: linked list

1. Assume for the following linked list, each node is defined as the structure named Node

struct Node

{

int data;

Node \* next;

}

1. If the list is referenced by a variable **head** initially referring to the first node:

20 -> 10 -> 32 -> 27

Give the value for each of the following OR indicate if it is an error:

 \_\_\_\_\_\_\_\_\_\_\_What is head.data?

  \_\_\_\_\_\_\_\_\_\_\_What is head.next.data?

1. If the listed is pointed by a variable head initially pointing to the first node:

20 -> 10 -> 32 -> 27

How do you access 20?  \_\_\_\_\_\_\_\_\_\_\_

How do you access 32?  \_\_\_\_\_\_\_\_\_\_\_

1. **With the declaration of linked list and doubly linked list in the class, please do the following:**
2. **Write a method that will delete from a linked list of integers the node that contains the largest integer. Can you do this with a single traversal of the list?**
3. **Write the pseudocode for a method that inserts a new node at the end of a doubly linked list.**
4. **Write a method that inserts a new node at the start of a doubly linked list.**