MCQ

0. ◦ trick to remember precedence table :

- PUMA S REBL TACO

1. find duplicate element of array

2. find maximum element of array

3. which sort doesnt use divide and conquer

- linear doesnt use Divide and Conquer,
- rest uses -->binary,quick,merge

4. Graph , and question on it

- or discrition of graph, and based on it, we need to find , terminalogies of node
- may not mentaion directed or undirected, here ,
- if for E {(),... } used then undirected ,
- if for E {< >,...} used directed

5. Complete graph

- Each vertex of a graph is adjacent to every other vertex.
- Un-directed graph: Number of edges = n (n-1) / 2
- Directed graph: Number of edges = n (n-1)

6. DAG (Directed acyclic graph) used for task scheduling in OS or big data system

7. What is true about spanning tree, or false about spanning tree?

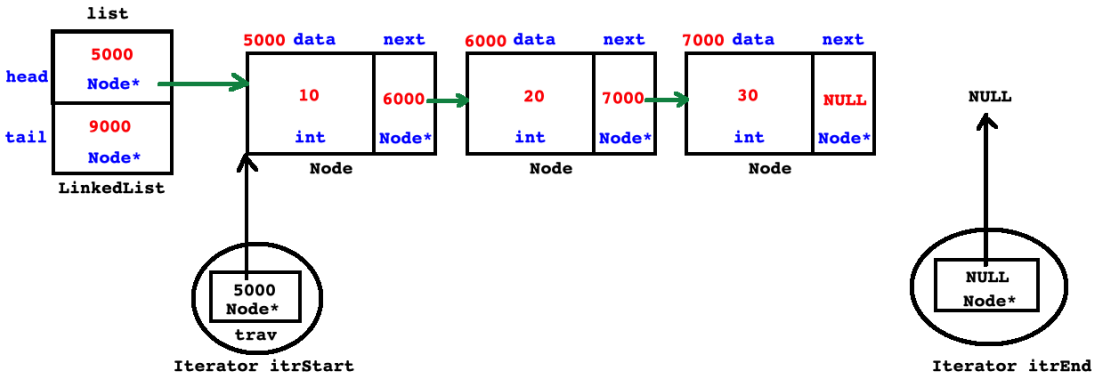
8. For un-directed graph, adjacency matrix is always symmetric across the diagonal.

9.

Interview Question

3. How to traverse Linked List in outside of class or non member function ?

- create iterator class



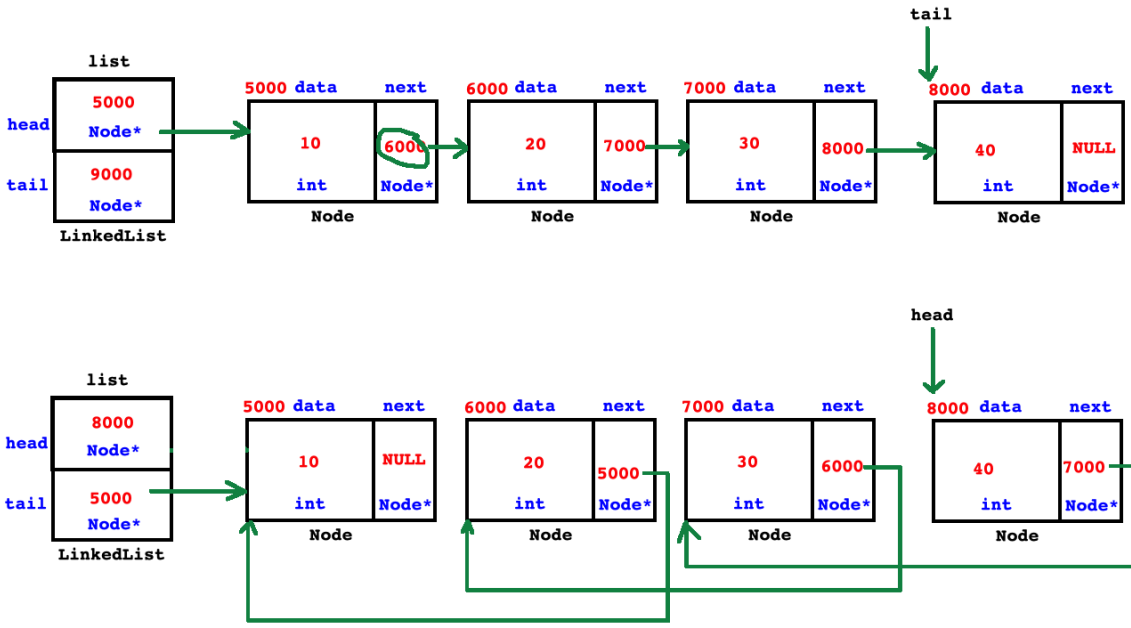

```
#include<iostream>
#include<string>
using namespace std;

namespace collection
{
    class Exception
    {
    private:
        string message;
    public:
        Exception( string message = " " ) throw( ) : message( message )
        {   }
        string getMessage( void )const throw( )
        {
            return this->message;
        }
    };
    class Iterator;     //Forward declration
    class LinkedList;   //Forward declration
    class Node
    {
    private:
        int data;
        Node *next;
    public:
        Node( int data = 0 ) throw( ) : data( data ), next( NULL )
        {   }
        friend class Iterator;
```

```
        friend class LinkedList;
    };

    class Iterator{

    private:
     Node *trav;

     public:
       Iterator(Node *trav)
       {
           this->trav = trav;

       }

       bool operator!=(Iterator &other)
       {
         return  this->trav != other.trav;
       }

       void operator++(void)
       {
           this->trav = this->trav->next;
       }

       int operator*(void)
       {
           return this->trav->data;
       }

    };

     class LinkedList
     {
     private:
         Node *head;
         Node *tail;
     public:
         LinkedList( void )throw( ) : head( NULL ), tail( NULL )
         {   }
         bool empty( void )const throw( )
         {
             return this->head == NULL;
         }
         void addLast( int data )throw( bad_alloc )
         {
             Node *newNode  = new Node( data );
             if( this->empty( ) )
                 this->head = newNode;
             else
                 this->tail->next = newNode;
             this->tail = newNode;
         }
         void removeFirst( void )throw( Exception )
```

```
        {
            if( this->empty( ) )
                throw Exception( "LinkedList is empty" );
            else if( this->head == this->tail )
            {
                delete this->head;
                this->head = this->tail = NULL;
            }
            else
            {
                Node *ptrNode = this->head;
                //this->head = ptrNode->next;   //or
                this->head = this->head->next;
                delete ptrNode;
            }
        }

        Iterator begin(void)
        {
            Iterator itr(this->head);

            return itr;
        }
        Iterator end(void)
        {
            Iterator itr(NULL);

           return itr;
        }

    };
}
int main( void )
{
    // iterate list in non member function
  using namespace collection;
  LinkedList list;
  list.addLast(10);
  list.addLast(20);
  list.addLast(30);

 Iterator itrStart  = list.begin();
    Iterator itrEnd = list.end();

    while(itrStart != itrEnd) // itrStart.operator!= (itrEnd)
    {
        cout<< ( *itrStart ) <<endl; // itrStart.operator*()
        ++ itrStart; //itrStart.operator++()
    }

    cout<<endl;
    return 0;
}
```

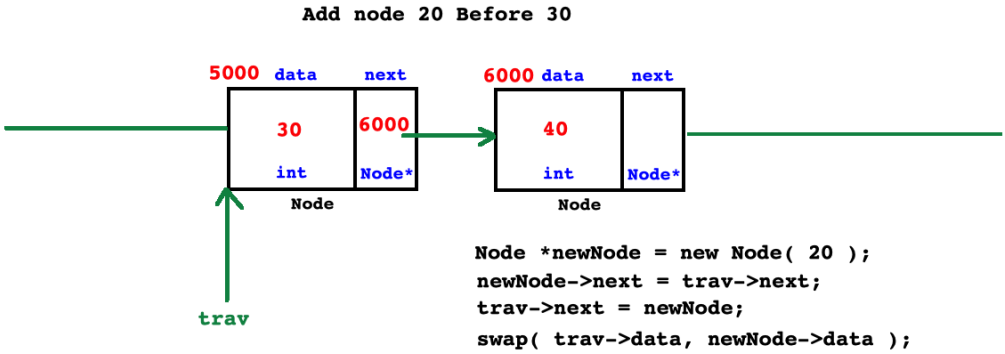
4. How to reverse a linked list?

- using recursion
- using 3 pointers



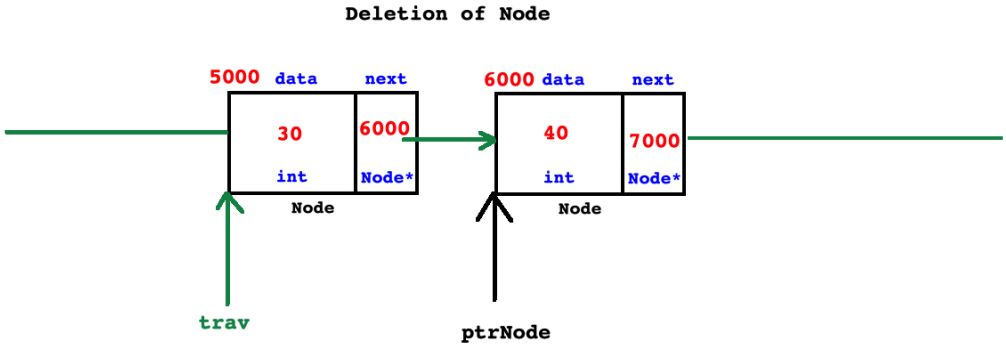

```
void reverse(void) throw(Exception)
       {
           if(this->empty())
           throw Exception("LinkedList is empty");

          Node *trav = this->head;

          Node* current;
          Node* previous = NULL;
          while(trav != NULL)
          {  current = trav;
              trav = trav->next;
               current->next = previous;
                previous = current;

          }

          this->tail = this->head;
          this->head = previous;

       }
```

5. Add node before



- Create a new node with value 20 and add it after node 30.
- Swap value 20 and 30.

6. Delete,node whose address is given, with a node after it



7. How to create Heterogeneous Linked List

- upcasting , dynamic cast, inheritence

8. Application of stack

- For parenthesis balancing .

- to implement undo and redo function

9. Evaluate infix to prefix and postfix, so number of time push and pop takes place

10. integer conversion to binery equivalent

11. how to balance parantesis

- 1. String of parenthesis is given for example "(((()) " or ({}) etc. and we need to find out if they are balanced. Means, if there are matching pairs or not.
- 2. for example, ({}) is balanced parentheses and ((((()) is not a balanced parenthesis.
- 3. Algorithm:

- 1. Traverse the expression string
- 2. If the current character is a opening bracket or parenthesis e.g. '(' or '{' or '[' then push in the stack.
- 3. If the current character is a closing bracket e.g ')' or '}' or ']' then pop a character from the stack and check if it is a corresponding parenthesis, if matched then pop it from stack.
- 4. Once, string traversal is complete then check if stack is empty or not. If the stack is empty parenthesis are balanced.

- 4. Time Complexity: O(n) – traverse string of n length.
- 5. Space complexity O(n) – Due to Stack

12. string reverse logic

```
void strrev(char str[])
{
   int frontIndex = 0;
   int backIndex = strlen(str) - 1;

while(frontIndex < backIndex)
   swap(str[frontIndex++],str[backIndex--]);
}
```

13. program from decimal to binary

```
#include<iostream>
using namespace std;
int main ()
{
    int num, bin;
    cout << "Enter the number : ";
    cin >> num;
    cout << "The binary equivalent of " << num << " is ";
    while (num > 0)
    {
        bin = num % 2;
        cout << bin;
```

```
            num /= 2;
        }
        return 0;
    }
```

14. DS intrview, write non recersice preorder,postorder,inorder