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ADS Lab 2 Write-up

```
//skip list declaration
class
struct node {
    int data;
    node **forw;
    node (int level, int &data) {
        forw = new node * [level+1];
        memset (forw, 0, sizeof (node*) * (level+1));
        this -> data = data;
    }
    ~node ( ) {
    delete[] forw;
    }
};
class skiplist {
struct
    node *head;
    int data; int MAX_LEVEL;
    int level; float p
    skiplist ( ) {
        head = new node (MAX_LEVEL, data);
        level = 0;
    }
    ~skiplist ( ) {
        delete head;
    }
    void displaylist ( );
    bool searchlist (int &);
    void insertlist (int &);
    void deletelist (int &);
};
```

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```
// Insertion of element
void skiplist :: insertlist( int &data ) {
    node *x = head;
    node *update [MAX_LEVEL + 1];
    memset ( update, 0, sizeof( node * ) * ( MAX_LEVEL+1));
    for (int i = level ; i >= 0 ; i -- ) {
    {    while (x -> forw [i] != NULL &&
                        x -> forw[i] -> data < data ){

            x = x -> forw[i];
        }
        update [i] = x;
    }
    x = x -> forw [0];
    if (x == NULL || x -> data != data )
    {
        int lvl = randomlevel();
        if (lvl > level ) {
            for (int i = level + 1; i <= lvl ; i++) {
                update [i] = head;
            }
            level = lvl;
    } }
        x = new node (lvl, data);
        for (int i = 0 ; i <= lvl ; i++ ) {
            x -> forw[i] = update [i] -> forw [i];
            update [i] -> forw [i] = x;
        }
    }
}
```

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```
// Deletion of element
void skiplist :: deletelist (int &data) {
    node *x = head
    node *update [MAX-LEVEL+1];
    memset (update, 0, sizeof (node *), * (MAX_LEVEL+1));
    for (int i= level; i>=0; i--) {
    {   while (x-> forw[i] != NULL && x-> forw[i] -> data < data) {
            x = x-> forw[i];
        }
        update [i] = x;
    }
    x = x-> forw[0];
    if (x-> data == data) {
    {
        for (int i=0; i<= level ; i++) {
            if (update [i] -> forw[i] != x)
                break;
            update [i] -> forw[i] = x-> forw[i];
        }
        delete x;
        while( level > 0 && head -> forw [level] == NULL)
            level--;
        }
    }
}
// Searching an element
bool skiplist :: searchlist(int &data) {
    node *x = head;
```

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```
for(int i=level; i>=0; i--){
    while(x->forw[i] != NULL &&
                    x->forw[i]->value < value){
        x = x->forw[i];
    }
}
x = x->forw[0];
return x!=NULL && x->value == value;
}
```