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Ques-1

```
#include <bits/stdc++.h>
using namespace std;

struct node
{
    int data;
    int col;
    int row;
    node *next;
};
```

```
void insert(node *p, int d, int r, int c)
{
    while (p->next)
    {
        p = p->next;
    }
    node *t = new node;
    p->next = t;
    t->data = d;
    t->col = c;
    t->row = r;
    t->next = NULL;
}
```

```
void display(node *p)
{
    while (p)
    {
        cout << p->data << " " << p->row << " " << p->col
<< endl;
        p = p->next;
    }
}
```

```

}
void transpose(node *p)
{
    while(p)
    {
        swap(p->row,p->col);
        p=p->next;
    }
}

```

```

void displaymat(node *p, int rr, int cc)
{
    cout<<endl;
    int m[rr][cc];
    for (int i = 0; i < rr; i++)
    {
        for (int j = 0; j < cc; j++)
        {
            m[i][j] = 0;
        }
    }
}

```

```

while (p)
{
    m[p->row - 1][p->col - 1] = p->data;
    p = p->next;
}

```

```

for (int i = 0; i < rr; i++)
{
    for (int j = 0; j < cc; j++)
    {
        cout << m[i][j] << " ";
    }
    cout << "\n";
}
}

```

```

int main()
{

```

```

    node *mat = new node;
    mat->next = NULL;
    int n;
    cout << "Enter the number of rows and columns in a
matrix\n";
    int rr, cc;
    cin >> rr >> cc;
    cout << "Enter the number of non-zero elements\n";
    cin >> n;
    for (int i = 0; i < n; i++)
    {
        int d, r, c;
        cout << "Enter element, row, and column\n";
        cin >> d >> r >> c;
        insert(mat, d, r, c);
    }
    mat = mat->next;
    displaymat(mat, rr, cc);
    transpose(mat);
    displaymat(mat, rr, cc);

```

```

    return 0;
}

PS D:\Secondyear> cd "d:\Secondyear\" ; if ($?) { g++ sparse.cpp -o sparse } ; if ($?) { .\sparse }
Enter the number of rows and columns in a matrix
3
4
Enter the number of non-zero elements
5
Enter element, row, and column
2 2 2
Enter element, row, and column
4 1 2
Enter element, row, and column
3 1 3
Enter element, row, and column
2 3 1
Enter element, row, and column
1 1 1

1 4 3 0
0 2 0 0
2 0 0 0

```

Ques-2

```

#include<bits/stdc++.h>
using namespace std;
struct node
{

```

```

    int data;
    node *next;
};

node * create(node *p,int n)
{
    node *t;
    p->data=n%10;
    p->next=NULL;
    n=n/10;
    while(n)
    {
        t=new node;
        t->next=p;
        t->data=n%10;
        p=t;
        n=n/10;
    }
    return p;
}

node* reverse(node *p)
{
    node* q = NULL;
    node* r = NULL;
    while (p != NULL)
    {
        r = q;
        q = p;
        p = p->next;
        q->next = r;
    }
    return q;
}

void display(node *p)
{
    while(p)
    {
        cout<<p->data<<" ";
        p=p->next;
    }
}

```

```

    }
    cout<<endl;
}
void add(node *p, node *q) {

    node *ba=NULL;
    int carry=0;
    int sum=0;
    while(p || q || carry)
    {

        sum=0;
        if(p)
            sum+=p->data;
        if(q)
            sum+=q->data;
        if(carry)
            sum+=carry;
        node *t=new node;
        t->data=sum%10;
        carry=sum/10;
        if(!ba)
        {
            ba=t;
            t->next=NULL;
            if(p)
                p=p->next;
            if(q)
                q=q->next;
            continue;
        }

        t->next=ba;
        ba=t;
        if(p)
            p=p->next;
        if(q)
            q=q->next;
    }
}

```

```

    }

    display(ba);
}

```

```

int main()
{
    node *first=new node;
    node *second=new node;
    int n;
    cout<<"enter the first number\n";
    cin>>n;
    int n2;
    cout<<"enter the second number\n";
    cin>>n2;
    second=create(second,n2);
    first=create(first,n);

    node *rev=reverse(first);
    node *rev2=reverse(second);
    add(rev,rev2);

return 0;
}

```

PS D:\Secondyear> cd "d:\Secondyear\" ; if (\$?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if (\$?) { .\tempCodeRunnerFile }  
 enter the first number  
 87987  
 enter the second number  
 246547  
 3 3 4 5 3 4  
 PS D:\Secondyear>