DSA Assignment 1:

Answer 1:

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

void display(int a[], int len){
    cout<<"Array is --> ";
    for(int i=0;i<len;i++){
        cout<<a[i]<<' ';
    }
}

void del(int a[], int len){
    int num,i;
    cout<<"Enter index of a number you want to delete: ";
    cin>>num;
    if(num<0 || num>len){
        cout<<"Enter a valid index";
        exit(0);
    }
    for(i=num;i<len-1;i++){
        a[i]=a[i+1];
    }
    len--;
    display(a,len);
}

void search(int a[], int len){
    int num,count=0,i;
    cout<<"Enter number you want to search\n";
    cin>>num;
    for(i=0;i<num;i++){
        if(num==a[i]){
            count=1;
            break;
        }
    }
    if(count==1){
        cout<<"Number found\n";
    }
    else{
        cout<<"Number not found\n";
    }
}

void insert(int a[], int len, int n){
    cout<<"Start inserting elements: ";
    for(int i=0;i<len;i++){
```

```
        cin>>a[i];
    }
    if (n==3){
        cout<<"Insertion has occured\n";
        exit(0);
    }
    else if(n==4){
        del(a,len);
    }
    else{
        search(a,len);
    }
}
void create(int n){
    int len;
    cout<<"How many elements you want in your array\n";
    cin>>len;
    int a[len];
    cout<<"Array has been created\n";
    if(n==1){
        exit(0);
    }
    else if(n==2){
        display(a,len);
    }
    else if(n==3){
        insert(a,len,n);
    }
    else if(n==4){
        insert(a,len,n);
    }
    else{
        insert(a,len,n);
    }
}
int main(){
    int n;
    cout<<"Enter 1 if you want to create an array\nEnter 2 if you want to display the
array\nEnter 3 if you want to insert elements in array\nEnter 4 if you want to delete
element\nEnter 5 if you want to search element\nEnter 6 to exit\n";
    cin>>n;
    switch (n){
        case 1:
        create(n);
        break;

        case 2:
        cout<<"To display the array first create one\n";
        create(n);
        break;

        case 3:
```

```
        cout<<"To insert elements first create an array\n";
        create(n);
        break;

        case 4:
        cout<<"To perform deletion on the array first create array and fill it\n";
        create(n);
        break;

        case 5:
        cout<<"To perform linear search on the array first create array and fill it\n";
        create(n);
        break;

        case 6:
        exit(0);
        break;
    }
}
```

Output:

If I select 1:

```
Enter 1 if you want to create an array
Enter 2 if you want to display the array
Enter 3 if you want to insert elements in array
Enter 4 if you want to delete element
Enter 5 if you want to search element
Enter 6 to exit
1
How many elements you want in your array
6
Array has been created
```

If I select 2:

```
2
To display the array first create one
How many elements you want in your array
6
Array has been created
Array is --> -27754472 1 -27754320 1 2 0 %
```

If I select 3:

```
3
To insert elements first create an array
How many elements you want in your array
6
Array has been created
Start inserting elements: 1
2
3
4
5
6
Insertion has occured
```

If I select 4:

```
4
To perform deletion on the array first create array and fill it
How many elements you want in your array
6
Enter index of a number you want to delete: 8
Enter a valid index%
```

Alternate Case:

```
4
5
6
Enter index of a number you want to delete: 2
Array is --> 1 2 4 5 6 %
```

If I select 5:

```
5
To perform linear search on the array first create array and fill it
How many elements you want in your array
6
Array has been created
Start inserting elements: 1
2
3
4
5
6
Enter number you want to search
4
Number found
```

Alternative Case:

```
Enter number you want to search
12
Number not found
```

If I enter 6 program exits.

Answer 2:

// Remove duplicate elements in the array so that it prints unique elements

```
#include <iostream>
using namespace std;
int main(){
    int i,j,k,n;
    cout<<"Enter number of elements you want \n";
    cin>>n;
    int a[n];
    cout<<"Enter the elements in array\n";
    for(i=0;i<n;i++){
        cin>>a[i];
    }
    cout<<"Original Array\n";
    for(i=0;i<n;i++){
        cout<<a[i]<<' ';
    }
    for (i=0;i<n-1;i++){
        for(j=i+1;j<n;j++){
            if(a[i]==a[j]){
                for(k=i;k<n-1;k++){
                    a[k]=a[k+1];
                }
                j--;
                n--;
            }
```

```
    }
  }
  cout<<"\nNew Array\n";
  for(i=0;i<n;i++){
    cout<<a[i]<<' ';
  }
}
```

Output:

```
Enter number of elements you want
6
Enter the elements in array
1
2
2
3
3
3
Original Array
1 2 2 3 3 3
New Array
1 2 3 %
```

Answer 3:

Output of this code is 10000 because first element of the array is initialized with 1 and whole array is automatically initialized with zero so when we print the values in array it prints 10000.

Answer 4:
(A) Part

```
// Enter an array and reverse it

# include <iostream>
using namespace std;
int main(){
  int i,j,n;
  cout<<"Enter number of elements in array\n";
  cin>>n;
  int a[n];
  cout<<"Enter elements \n";
  for(i=0;i<n;i++){
    cin>>a[i];
  }
  cout<<"Original array is\n";
    for(i=0;i<n;i++){
    cout<<a[i]<<' ';
  }
  for(i=0;i<(n/2);i++){
    j=a[i];
    a[i]=a[n-i-1];
    a[n-i-1]=j;
```

```
    }
    cout<<"\nReversed array is\n";
    for(i=0;i<n;i++){
        cout<<a[i]<<' ';
    }
}
```

Output:

```
Enter number of elements in array
6
Enter elements
1
2
3
4
5
6
Original array is
1 2 3 4 5 6
Reversed array is
6 5 4 3 2 1 %
```

(B) Part:

// Write code for matrix multiplication

```
#include <iostream>
using namespace std;
int main(){
    int r1,c1,r2,c2,i,j,k;
    cout<<"Enter rows and columns of matrix 1\n";
    cin>>r1>>c1;
    cout<<"Enter rows and columns of matrix 2\n";
    cin>>r2>>c2;
    if (c1!=r2){
        cout<<"Matrix Multiplication is not possible";
    }
    else{
        int a[r1][c1],b[r2][c2],c[r1][c2];
        cout<<"Enter elements of matrix 1\n";
        for(i=0;i<r1;i++){
            for(j=0;j<c1;j++){
                cin>>a[i][j];
            }
        }
        cout<<"Enter elements of matrix 2\n";
        for(i=0;i<r2;i++){
            for(j=0;j<c2;j++){
                cin>>b[i][j];
            }
        }
        for(i=0;i<r1;i++){
            for(j=0;j<c2;j++){
                c[i][j]=0;
            }
        }
        for(i=0;i<r1;i++){
```

```
            for(j=0;j<c2;j++){
                for(k=0;k<r2;k++){
                    c[i][j]=c[i][j]+a[i][k]*b[k][j];
                }
                cout<<c[i][j]<<' ';
            }
            cout<<'\n';
        }
    }
}
```

Output:

```
Enter rows and columns of matrix 1
2
3
Enter rows and columns of matrix 2
3
4
Enter elements of matrix 1
1
2
3
4
5
6
Enter elements of matrix 2
1
2
3
4
5
6
7
8
9
10
11
12
38 44 50 56
83 98 113 128
```

(C) Part:

// Transpose of a matrix

```
#include <iostream>
using namespace std;
int main(){
    int r,c,i,j;
    cout<<"Enter rows and columns: ";
    cin>>r>>c;
    int a[r][c],b[c][r];
    cout<<"Enter elements in the array: ";
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            cin>>a[i][j];
        }
    }
    for(i=0;i<c;i++){
        for(j=0;j<r;j++){
            b[i][j]=a[j][i];
```

```
        }
    }
    for(i=0;i<c;i++){
        for(j=0;j<r;j++){
            cout<<b[i][j]<<' ';
        }
        cout<<'\n';
    }
}
```

Output:

```
Enter rows and columns: 2
3
Enter elements in the array: 1
2
3
4
5
6
1 4
2 5
3 6
```

Answer 5:

// Find sum of every row and column in 2d array

```
# include <iostream>
using namespace std;
int main(){
    int r,c,i,j,sumr=0,sumc=0;
    cout<<"Enter rows and columns you want in your array\n";
    cin>>r>>c;
    int a[r][c];
    cout<<"Start entering the elements \n";
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            cin>>a[i][j];
        }
    }
    for(i=0;i<r;i++){
        cout<<"Sum of all the elements of row "<<i+1<<" is ";
        for(j=0;j<c;j++){
            sumr=sumr+a[i][j];
        }
        cout<<sumr<<"\n";
        sumr=0;
    }
    for(i=0;i<c;i++){
        cout<<"Sum of all the elements of column "<<i+1<<" is ";
        for(j=0;j<r;j++){
            sumc=sumc+a[j][i];
        }
        cout<<sumc<<"\n";
        sumc=0;
    }
}
```

Output:

```
Enter rows and columns you want in your array
2
3
Start entering the elements
1
2
3
4
5
6
Sum of all the elements of row 1 is 6
Sum of all the elements of row 2 is 15
Sum of all the elements of column 1 is 5
Sum of all the elements of column 2 is 7
Sum of all the elements of column 3 is 9
```