Design and analysis of algorithms
Lab Assignment-2

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1. Write a C program to find the matrix multiplication of a m X n matrix

```
#include<stdio.h>
int main(){
    int m,n,p,q,i,j,k,a[100][100],b[100][100],c[100][100],sum=0;
    printf("Enter the order of the first matrix:\n");
    scanf("%d%d",&m,&n);
    printf("Enter the order of the second matrix:\n");
    scanf("%d%d",&p,&q);
    if(n!=p) printf("The given 2 arrays cannot be multiplied!!\n");
    else{
        printf("Enter the elements of the first matrix:\n");
        for(i=0;i<m;i++){
            for(j=0;j<n;j++){
                scanf("%d",&a[i][j]);
            }
        }
        printf("Enter the elements of the second matrix:\n");
        for(i=0;i<p;i++){
            for(j=0;j<q;j++){
                scanf("%d",&b[i][j]);
            }
        }
        for(i=0;i<m;i++){
            for(j=0;j<q;j++){
                for(k=0;k<p;k++){
                    sum+=a[i][k]*b[k][j];
                }
                c[i][j]=sum;
                sum = 0;
            }
        }
        printf("Product of the two matrices are:\n");
        for(i=0;i<m;i++){
            for(j=0;j<q;j++){
                printf("%d\t",c[i][j]);
            }
            printf("\n");
        }
    }
}
```

OUTPUT:

```
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ gcc matrix_mul.c
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ ./a.out matrix_mul.c
Enter the order of the first matrix:
3 3
Enter the order of the second matrix:
3 3
Enter the elements of the first matrix:
2 3 4
5 2 3
1 7 8
Enter the elements of the second matrix:
4 5 6
3 2 1
7 8 9
Product of the two matrices are:
45      48      51
47      53      59
81      83      85
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$
```

2. Write a C program to check all the elements in a given array are distinct.

```
#include<stdio.h>
int main(){
    int n,i,flag=0;
    printf("Enter the size of the array:\n");
    scanf("%d",&n);
    int a[n];
    printf("Enter the array elements:\n");
    for(i=0;i<n;i++){
        scanf("%d",&a[i]);
    }
    for(i=1;i<n;i++){
        if(a[i]==a[i-1]){
            flag=1;
        }
    }
    if(flag==1){
        printf("There are duplicate elements in the array!\n");
    }else printf("The elements of the array are distinct!\n");
}
```

OUTPUT:

```
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ gcc disctinct.c
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ ./a.out disctinct.c
Enter the size of the array:
10
Enter the array elements:
4 5 6 7 3 2 1 8 9 10
The elements of the array are distinct!
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ ./a.out disctinct.c
Enter the size of the array:
10
Enter the array elements:
2 2 3 4 4 5 6 6 6 6
There are duplicate elements in the array!
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$
```

3.Write a C program sort a given list of 'n' numbers using Selection sort

```
#include<stdio.h>
void sort(int a[],int n)
{
    int i,j,min_idx;
    for(i=0;i<n-1;i++)
    {
        min_idx=i;
        for(j=i+1;j<n;j++)
        if(a[j]<a[min_idx])
            min_idx = j;
        int temp = a[min_idx];
        a[min_idx]= a[i];
        a[i] = temp;
    }
}

int main(){
    int n,i;
    printf("Enter the size of the array:\n");
    scanf("%d",&n);
    int a[n];
    printf("Enter the array elements:\n");
    for(i=0;i<n;i++){
        scanf("%d",&a[i]);
    }
    sort(a,n);
    printf("Sorted array: \n");
    for (i=0;i<n;i++)
        printf("%d\t",a[i]);
    printf("\n");
}
```

OUTPUT:

```
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ gcc selection_sort.c
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ ./a.out selection_sort.c
Enter the size of the array:
8
Enter the array elements:
23 12 5 67 78 90 33 45
Sorted array:
5       12      23      33      45      67      78      90
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$ ./a.out selection_sort.c
Enter the size of the array:
5
Enter the array elements:
5 4 3 2 1
Sorted array:
1       2       3       4       5
rahulsg@pop-os:~/Documents/3rd sem/DAA_1/Assignment-2$
```