

DS Lab 1 Solutions

SP 1.1.1

```
#include <stdio.h>

v int main(){
    —>int n, num[30], i, rev[30], j;
    —>printf("Enter how many values you want to read: ");
    —>scanf("%d", &n);
v —>for(i=0; i<n; i++){
    —>—>printf("Enter the value of a[%d]: ", i);
    —>—>scanf("%d", &num[i]);
    —>}
    —>printf("The array elements are: ");
v —>for(i=0; i<n; i++){
    —>—>printf("%d ", num[i]);
    —>}
    —>printf("\n");
v —>for(i=n-1; i>=0; i--){
    —>—>rev[j]=num[i];
    —>—>j++;
    —>}
    —>printf("Elements in backward direction: ");
v —>for(i=0; i<n; i++){
    —>—>printf("%d ", rev[i]);
    —>}
    —>printf("\n");
}
```

SP 1.1.2

```

#include <stdio.h>

v int main(){
    —>int n, a[30], key, i, flag=0;
    —>printf("Enter value of n: ");
    —>scanf("%d",&n);
v —>for(i=0;i<n;i++){
    —>—>printf("Enter element for a[%d]: ",i);
    —>—>scanf("%d",&a[i]);
    —>}
    —>printf("Enter key element: ");
    —>scanf("%d",&key);
v —>for(i=0;i<n;i++){
v —>—>if(a[i]==key){
    —>—>—>printf("The key element %d is found at the position
    %d\n",key,i);
    —>—>—>flag=1;
    —>—>—>break;
    —>—>}
    —>}
v —>if(flag==1){
    —>—>printf("The key element %d is found at the position %d\n",key,i);
    —>}
v —>else{
    —>—>printf("The key element %d is not found in the array\n",key);
    —>}
    —>
}

```

SP 1.1.3

```

#include<stdio.h>

v int main(){
    —>int n,num[30],i,count,j,freq[100];
    —>printf("Enter the size of array (n<=10): ");
    —>scanf("%d",&n);
    —>printf("Enter %d Elements:",n);
v —>for(i=0;i<n;i++){
    —>scanf("%d",&num[i]);
    —>freq[i]=1;
    —>}
v —>for(i=0;i<n;i++){
    —>count=1;
v —>for(j=i+1;j<n;j++){
v —>if(num[i]==num[j]){
    —>count++;
    —>freq[j]=0;
    —>}
    —>}
v —>if(freq[i]!=0){
    —>freq[i]=count;
    —>}
    —>}
v —>for(i=0;i<n;i++){
v —>if(freq[i]!=0){
    —>printf("%d occurs %d times\n",num[i],freq[i]);
    —>}
    —>}
}

```

SP 1.2.1

```

#include <stdio.h>

void readElement(int n, int mats[30][30]){
    printf("Enter the matrix elements of order %d by %d:", n, n);
    for(int i = 0; i < n; i++){
        for(int j = 0; j < n; j++){
            scanf("%d", &mats[i][j]);
        }
    }
}

void upperMatrix(int n, int mats[30][30]){
    printf("The Upper Triangle matrix for the given input is:\n");
    for(int i = 0; i < n; i++){
        for(int j = 0; j < n; j++){
            if(i > j){
                printf("0.");
            }
            else{
                printf("%d.", mats[i][j]);
                printf(".");
            }
        }
        printf("\n");
    }
}

void lowerMatrix(int n, int mats[30][30]){
    printf("The Lower Triangle matrix for the given input is:\n");
    for(int i = 0; i < n; i++){
        for(int j = 0; j < n; j++){
            if(i < j){
                printf("0.");
            }
            else{
                printf("%d.", mats[i][j]);
                //printf(".");
            }
        }
        printf("\n");
    }
}

int main(){
    int n, mats[30][30];
    printf("Reading the order of a square matrix\n");
    printf("Enter the number of rows/columns:");
    scanf("%d", &n);
    readElement(n, mats);
    lowerMatrix(n, mats);
    upperMatrix(n, mats);
}

```

1.2.2

```

#include <stdio.h>

v int main(){
    —> long int n;
    —> int a[30] = {0}, rem, i;
    —> printf("Enter a number: ");
    —> scanf("%ld", &n);
v —> while (n){
    —> —> rem = n%10;
    —> —> a[rem] = a[rem] + 1;
    —> —> n = n/10;
    —> }
v —> for(i=0; i<10; i++){
v —> —> if(a[i] != 0){
    —> —> —> printf("Count of %d: %d time(s)\n", i, a[i]);
    —> —> }
    —> }
    —> }
}

```

1.2.3

```

#include <stdio.h>
v void main(){
    —> char str[100]; int arr[256] = {0};
    —> printf("Enter a string: ");
    —> gets(str);
    —> printf("Frequency of all characters in the given string:\n");
    —> int asc, i;
v —> for(i=0; str[i] != '\0'; i++){
    —> —> asc = (int)str[i];
    —> —> arr[asc]++;
    —> }
v —> for(i=0; i<123; i++){
v —> —> if(arr[i] != 0){
    —> —> —> printf("%c=%d time(s)\n", (char)i, arr[i]);
    —> —> }
    —> }
}

```

1.2.4

```

#include <stdio.h>
#include <string.h>
#include <ctype.h>
v void count_letters(char *str, int *freq){
v   for(int i=0; i<26; i++){
v     freq[i]=0;
v   }
v   for(int i=0; i<strlen(str); i++){
v     char c=tolower(str[i]);
v     if(c>='a' && c<='z'){
v       freq[c-'a']++;
v     }
v   }
v }
v int is_anagram(char *str1, char *str2){
v   int freq1[26], freq2[26];
v   count_letters(str1, freq1);
v   count_letters(str2, freq2);
v   for(int i=0; i<26; i++){
v     if(freq1[i]!=freq2[i]){
v       return 0;
v     }
v   }
v   return 1;
v }
v int main(){
v   char word1[100], word2[100];
v   printf("Enter Phrase1/Word1: ");
v   fgets(word1, 100, stdin);
v   printf("Enter Phrase2/Word2: ");
v   fgets(word2, 100, stdin);
v   if(is_anagram(word1, word2)){
v     printf("Anagram of each other\n");
v   }
v   else{
v     printf("Not anagram of each other\n");
v   }
v }

```

1.2.5

```

#include <stdio.h>
v int main(){
    —>int a[100],i,k,n,t,m;
    —>printf("Enter the size of the array: ");
    —>scanf("%d",&n);
    —>printf("Enter the elements of the array:\n");
v —>for(i=0;i<n;i++){
    —>—>scanf("%d",&a[i]);
    —>}
    —>printf("Enter the value of k: ");
    —>scanf("%d",&k);
v —>for(i=0;i<n;i++){
v —>—>—>if(a[i]==k){
    —>—>—>a[i+1]=a[i+4];
    —>—>—>n=n-3;
v —>—>—>if(i==2){
    —>—>—>—>n=n-3;
    —>—>—>}
    —>—>}
    —>}
    —>printf("Resultant Array: ");
v —>for(i=0;i<n;i++){
    —>—>printf("%d ",a[i]);
    —>}
    —>printf("\nTotal Elements: %d\n",n);
}

```