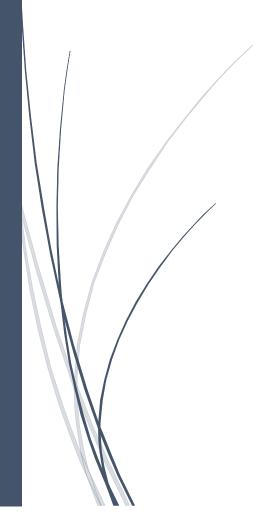# Programming Fundamental

Assignment 03

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Question 1. [10 Marks]

One of the master coders designed a subscript block that stores random characters in a multidimensional array…………..GREAT is not present → Score 1.

PROGRAM

```c
#include <stdio.h>
#include<stdlib.h>
#include <string.h>
int main()
{
    int array[5][6];
    int i,j,k=0;
    int random;
    int id[4]={4,4,8,9};
    for (i=0;i<5;i++)
    {
        if(i==4)
        {
            for (j=0;j<4;j++)
            {
                printf(" %d ",id[j]);
            }
            for (j=0;j<2;j++)
            {
                array[i][j]=(rand()%26)+65;
                printf(" %c ",array[i][j]);
            }
        }
        else
        {
            for (j=0;j<6;j++)
            {
                array[i][j]=(rand()%26)+65;

                printf(" %c ",array[i][j]);
            }
            printf("\n");
        }
    }
    char string[20];
    printf("\nEnter String to Find:");
    scanf("%s",string);
    int d=strlen(string);
    int a=0,b=0;
    int count=0;
    char parallel[20];
    char perpendicular[20];
    do
    {
        for (i=0;i<5;i++)
        {
            for (j=0;j<6;j++)
            {
                if(string[0]==array[i][j]&&string[1]==array[i][j+1])
                {
                    a=i;
                    b=j+1;
                    parallel[0]=array[i][j];
                    parallel[1]=array[i][j+1];
                    for (i=2,j=b+1;i<d,j<d;i++,j++)
                    {
                        parallel[i]=array[a][j];
                        if(parallel=='\0')
                        {
                            break;
                        }
                    }
                    break;
                }
            }
            if(strcmp(string,parallel)==0)
            {
                break;
            }
        }
    }
```

```c
for (i=0;i<5;i++)
{
    for (j=0;j<6;j++)
    {
        if(string[0]==array[i][j]&&string[1]==array[i+1][j])
        {
            a=i+1;
            b=j;
            perpendicular[0]=array[i][j];
            perpendicular[1]=array[i+1][j];
            for (i=2,j=a+1;i<d,j<d;i++,j++)
            {
                perpendicular[i]=array[j][b];
                if(perpendicular=='\0')
                {
                    break;
                }
            }
            break;
        }
    }
    if(strcmp(string,perpendicular)==0)
    {
        break;
    }
}
if(strcmp(string,perpendicular)==0||strcmp(string,parallel)==0)
{
    count++;
    printf("\n%s -->Present & Score--> %d",string,count);
}
else
{
    count--;
    printf("\n%s --> is not Present & Score--> &%d",string,count);
}
printf("\nEnter String to Find:");
scanf("%s",string);
int d=strlen(string);
}
while(string!="END");
}
```

```
P  H  Q  G  H  U
M  E  A  Y  L  N
L  F  D  X  F  I
R  C  V  S  C  X
4  4  8  9  G  G
Enter String to Find:PML

PML -->Present & Score--> 1
Enter String to Find:QAD

QAD -->Present & Score--> 2
Enter String to Find:UNI

UNI -->Present & Score--> 3
Enter String to Find:RHNMAK

RHNMAK --> is not Present & Score--> 2
Enter String to Find:END

------------------------------
```

Question 2. [10 Marks]

You are invited to participate in an encryption algorithm competition. Encryption is a method to change the formation of the message using pre-defined rules. After encryption, the message becomes secure and illegible………..“Brown fox jumps a yard.” after encryption “22k-1234 Wnbroay oxfay psjumay away rdyaay.”

PROGRAM

```c
#include <stdio.h>
#include<stdlib.h>
#include <string.h>
int main()
{
    char a[50];
    int i=0,j=0,k=0,b=0,m=0,q=1;
    int s[10];
    printf("Enter String: ");
    fgets(a,sizeof(a),stdin);
    int d=strlen(a);
    for (i=0;i<d;i++)
    {
        if(a[i]==' ')
        {
            s[j]=i;
            j++;
        }
    }
printf("22-k 4489 ");

    //Firt Word********************************************************
    if(a[0]=='s'&&a[1]=='c'&&a[2]=='h')
    {
        for (j=3;j<s[0];j++)
        {
            printf(" %c",a[j]);
        }
        printf("skay");
    }
    else if(a[0]=='y')
    {
        printf(" %c%c%c",a[s[0]-3],a[s[0]-2],a[s[0]-1]);
        for (j=0;j<s[0]-3;j++)
        {
            printf("%c",a[j]);
        }
        printf("ay");
    }
    else if((a[0]!='a')&&(a[0]!='e')&&(a[0]!='i')&&(a[0]!='o')&&(a[0]!='u'))
    {
        a[0]=a[0]+32;
        a[s[0]-2]=a[s[0]-2]-32;

        printf(" %c%c",a[s[0]-2],a[s[0]-1]);
        for (j=0;j<s[0]-2;j++)
        {
            printf("%c",a[j]);
        }
        printf("ay");
    }
    else if ((a[0]=='a')||(a[0]=='e')||(a[0]=='i')||(a[0]=='o')||(a[0]=='u'))
    {
        for (j=0;j<s[0];j++)
        {
            printf("%c",a[j]);
        }
        printf("way");
    }
```

```c
//Second Word**********************************************
if(a[s[0]+1]=='s'&&a[s[0]+2]=='c'&&a[s[0]+3]=='h')
{
    for (j=s[0]+4;j<s[1];j++)
    {
        printf(" %c",a[j]);
    }
    printf("skay");
}
else if(a[s[0]]+1=='y')
{
    printf(" %c%c%c",a[s[1]-3],a[s[1]-2],a[s[1]-1]);
    for (j=s[0]+1;j<s[1]-3;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if((a[s[0]+1]!='a')&&(a[s[0]+1]!='e')&&(a[s[0]+1]!='i')&&(a[s[0]+1]!='o')&&(a[s[0]+1]!='u'))
{
    printf(" %c%c",a[s[1]-2],a[s[1]-1]);
    for (j=s[0]+1;j<s[1]-2;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if ((a[s[0]+1]=='a')||(a[s[0]+1]=='e')||(a[s[0]+1]=='i')||(a[s[0]+1]=='o')||(a[s[0]+1]=='u'))
{
    for (j=s[0]+1;j<s[1];j++)
    {
        printf("%c",a[j]);
    }
    printf(" way");
}
//Third Word**************************************************
if(a[s[1]+1]=='s'&&a[s[1]+2]=='c'&&a[s[1]+3]=='h')
{
    for (j=s[1]+2;j<s[2];j++)
    {
        printf(" %c",a[j]);
    }
    printf("skay");
}
else if(a[s[1]+1]=='y')
{
    printf(" %c%c%c",a[s[2]-3],a[s[2]-2],a[s[2]-1]);
    for (j=s[2]+1;j<s[3]-3;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if((a[s[1]+1]!='a')&&(a[s[1]+1]!='e')&&(a[s[1]+1]!='i')&&(a[s[1]+1]!='o')&&(a[s[1]+1]!='u'))
{
    printf(" %c%c",a[s[2]-2],a[s[2]-1]);
    for (j=s[1]+1;j<s[2]-2;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if ((a[s[1]+1]=='a')||(a[s[1]+1]=='e')||(a[s[1]+1]=='i')||(a[s[1]+1]=='o')||(a[s[1]+1]=='u'))
{
    for (j=s[1]+1;j<s[2];j++)
    {
        printf("%c",a[j]);
    }
    printf(" way");
}
```

```c
//Forth word******************************************************
if(a[s[2]+1]=='s'&&a[s[2]+2]=='c'&&a[s[2]+3]=='h')
{
    for (j=s[2]+3;j<s[3];j++)
    {
        printf(" %c",a[j]);
    }
    printf("skay");
}
else if(a[s[2]+1]=='y')
{
    printf(" %c%c%c",a[s[3]-3],a[s[3]-2],a[s[3]-1]);
    for (j=s[2]+1;j<s[3]-3;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if((a[s[2]+1]!='a')&&(a[s[2]+1]!='e')&&(a[s[2]+1]!='i')&&(a[s[2]+1]!='o')&&(a[s[2]+1]!='u'))
{
    printf(" %c%c",a[s[3]-2],a[s[3]-1]);
    for (j=s[2]+1;j<s[3]-2;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if ((a[s[2]+1]=='a')||(a[s[2]+1]=='e')||(a[s[2]+1]=='i')||(a[s[2]+1]=='o')||(a[s[2]+1]=='u'))
{
    for (j=s[2]+1;j<s[3];j++)
    {
        printf(" %c",a[j]);
    }
    printf("way");
}
//fifth word******************************************************
if(a[s[3]+1]=='s'&&a[s[3]+2]=='c'&&a[s[3]+3]=='h')
{
    for (j=s[3]+3;j<s[4];j++)
    {
        printf(" %c",a[j]);
    }
    printf("skay");
}
else if(a[s[3]+1]=='y')
{
    printf(" %c%c%c",a[s[4]-3],a[s[4]-2],a[s[4]-1]);
    for (j=s[3]+1;j<s[4]-3;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if((a[s[3]+1]!='a')&&(a[s[3]+1]!='e')&&(a[s[3]+1]!='i')&&(a[s[3]+1]!='o')&&(a[s[3]+1]!='u'))
{
    printf(" %c%c",a[s[4]-2],a[s[4]-1]);
    for (j=s[3]+1;j<s[4]-2;j++)
    {
        printf("%c",a[j]);
    }
    printf("ay");
}
else if ((a[s[3]+1]=='a')||(a[s[3]+1]=='e')||(a[s[3]+1]=='i')||(a[s[3]+1]=='o')||(a[s[3]+1]=='u'))
{
    for (j=s[3]+1;j<s[4];j++)
    {
        printf(" %c",a[j]);
    }
    printf("way");
}
}
```

```
Enter String: Brown fox jumps a yard
22-k 4489  Wnbroay oxfay psjumay away ardyay
------------------------------
```

Question 3. [20 Marks]

Develop a system for the class teacher to store and retrieve data for PF course. The data includes student id, name, mid1, mid2, final, assignment and quiz score……….student. For example, if a user enter 21k-1234 or Aayan, both terms should be able to find the same record and print all the details.

PROGRAM

```c
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
struct data
{
    int stu_id;
    char name[30];
    float mid1;
    float mid2;
    float assignment;
    float quiz;
    float final;
};
float getGPA(float mid1,float mid2,float assignment, float quiz, float final)
{
    float total,GPA;
    total=mid1+mid2+assignment+quiz+final;
    GPA=(total/100)*4;
    return GPA;
}
float accumulateEvaluation(float mid1,float mid2,float assignment,float quiz,float final)
{
    float result;
    result = getGPA(mid1,mid2,assignment,quiz,final);
}

int main()
{
    printf("*****************************\n");
    printf("Name: Hafiz Muhammad Abdullah");
    printf("\nRoll no.: 22k-4489\n");
    printf("*****************************");
    int id;
    char ch;

    char option;
    int index;
    float mid1,mid2,assignment,quiz,final;
    char name[30];
    struct data std[10];
    printf("\nFor this There Will be only 10 Students: \n");
    printf("\nStudents Information: \n");
    jump:
    for (int i=0;i<10;i++)
    {
        printf("Student %d ID: 22k-",i+1);
        scanf("%d",&std[i].stu_id);
        for (int s=0;s>i;s++)
        {
            if(std[s].stu_id==std[i].stu_id)
            {
                printf("\nStudent ID already exists, please enter data for another student.\n");
                goto jump;
            }
        }
        printf("Student %d name: ",i+1);
        scanf(" %s",std[i].name);
        printf("Student %d mid1 score 15/",i+1);
        scanf("%f",&std[i].mid1);
        printf("Student %d mid2 score 15/",i+1);
        scanf("%f",&std[i].mid2);
        printf("Student %d assignment score 10/",i+1);
        scanf("%f",&std[i].assignment);
        printf("Student %d quiz score 10/",i+1);
        scanf("%f",&std[i].quiz);
        printf("Student %d final score 50/",i+1);
        scanf("%f",&std[i].final);
    }
```

```c
do
{
    printf("\n\t\t***Menu***");
    printf("\n\t\tg.Calculate GPA");
    printf("\n\t\ta.GPA of all students");
    printf("\n\t\tr.Replacing data");
    printf("\n\t\tf.Search student details");
    printf("\n\t\ts.Show statistics");
    printf("\n\t\te.Exit");
    printf("\nEnter option:\n");
    scanf("\n%c",&option);
    switch(option)
    {
        case 'g':
            {
                printf("\nInput Student NU-ID to find: 22k-");
                scanf("%d",&id);
                for (int i=0;i<10;i++)
                {
                    if(id==std[i].stu_id)
                    {
                        printf("\nStudent NU-ID: 22k-%d", std[i].stu_id);
                        printf("\nStudent name: %s", std[i].name);
                        printf("\nGPA: %.2f", accumulateEvaluation(std[i].mid1,std[i].mid2,std[i].assignment,std[i].quiz, std[i].final));
                    }
                }
            }
            break;
        case 'a':
            {
                printf("\n\tNU-ID\t\tName\t\t\tGPA");
                for (int i=0;i<10;i++)
                {
                    printf("\n\t22k-%d\t%s\t\t%.2f", std[i].stu_id,std[i].name,accumulateEvaluation(std[i].mid1,std[i].mid2,std[i].assignment,std[
                }
            }
            break;
        case 'r':
            {
                printf("ID: 22k-");
                scanf("%d", &id);
                printf("\nEnter new data:");
                printf("Name: ");
                scanf("%s",name);
                printf("Mid 1: ");
                scanf("%f", &mid1);
                printf("Mid 2: ");
                scanf("%f", &mid2);
                printf("Assignment: ");
                scanf("%f", &assignment);
                printf("Quiz: ");
                scanf("%f", &quiz);
                printf("Final: ");
                scanf("%f", &final);
                printf("Input index Number to which you want to replace: ");
                scanf("%d", &index);
                std[index-1].stu_id=id;
                for (int i=0;i<10;i++)
                {
                    std[index-1].name[i]=name[i];
                }
                std[index-1].mid1=mid1;
                std[index-1].mid2=mid2;
                std[index-1].assignment=assignment;
                std[index-1].quiz=quiz;
                std[index-1].final=final;
                printf("\n\tNU-ID\t\tName\t\tGPA");
                for (int i=0;i<10;i++)
                {
                    printf("\n\t22k-%d\t%s\t\t%.2f", std[i].stu_id,std[i].name,accumulateEvaluation(std[i].mid1,std[i].mid2,std[i].assignment,std[
                }
            }
            break;
        case 'f':
            {

            }
            break;
```

```c
        case 's':
            {
                float av1,av2,av3,avf;
                for (int i=0;i<10;i++)
                {
                    av1+std[i].mid1;
                    av2+std[i].mid2;
                    av3+std[i].final;
                    avf+std[i].mid1+std[i].mid2+std[i].assignment+std[i].quiz+std[i].final;

                }
                av1=av1/10;
                av2=av2/10;
                av3=av3/10;
                avf=avf/10;
                printf("\nAverage score mid1: %.2f", av1);
                printf("\nAverage score mid2: %.2f", av2);
                printf("\nAverage score final: %.2f", av3);
                printf("\nAverage total score: %.2f", avf);
                for (int i=0;i<10;i++)
                {
                    int totalscore;
                    totalscore=std[i].mid1+std[i].mid2+std[i].assignment+std[i].quiz+std[i].final;
                    if(totalscore<50)
                    {
                        printf("\n\n22k-%d %s didn't pass the course with %d marks.",std[i].stu_id,std[i].name,totalscore);
                    }
                }
                printf("\nThankYou, My ID is 22k-4489 and my name is Hafiz Muhammad Abdullah.");
            }
            break;
        case 'e':
            {
                exit(0);
            }
        }
    printf("\nWant to Continue? (y/n)\n");
    scanf("\n%c",&ch);
    }
    while (ch!='n');
}
```

```
***************************         Student 5 name: Ali
Name: Hafiz Muhammad Abdullah       Student 5 mid1 score 15/13
Roll no.: 22k-4489                  Student 5 mid2 score 15/13
***************************         Student 5 assignment score 10/5
For this There Will be only 10 Student Student 5 quiz score 10/5
                                    Student 5 final score 50/46
Students Information:               Student 6 ID: 22k-7890
Student 1 ID: 22k-4489              Student 6 name: Intikhab
Student 1 name: Abdullah            Student 6 mid1 score 15/8
Student 1 mid1 score 15/10          Student 6 mid2 score 15/0
Student 1 mid2 score 15/10          Student 6 assignment score 10/6
Student 1 assignment score 10/9     Student 6 quiz score 10/3
Student 1 quiz score 10/9           Student 6 final score 50/30
Student 1 final score 50/45         Student 7 ID: 22k-2345
Student 2 ID: 22k-4415              Student 7 name: Asad
Student 2 name: Asghar              Student 7 mid1 score 15/6
Student 2 mid1 score 15/10          Student 7 mid2 score 15/6
Student 2 mid2 score 15/9           Student 7 assignment score 10/6
Student 2 assignment score 10/8     Student 7 quiz score 10/6
Student 2 quiz score 10/8           Student 7 final score 50/44
Student 2 final score 50/30         Student 8 ID: 22k-5678
Student 3 ID: 22k-4264              Student 8 name: Anus
Student 3 name: Aarij               Student 8 mid1 score 15/13
Student 3 mid1 score 15/11          Student 8 mid2 score 15/14
Student 3 mid2 score 15/11          Student 8 assignment score 10/9
Student 3 assignment score 10/7     Student 8 quiz score 10/9
Student 3 quiz score 10/7           Student 8 final score 50/32
Student 3 final score 50/44         Student 9 ID: 22k-3267
Student 4 ID: 22k-3345              Student 9 name: Shahid
Student 4 name: Maaz                Student 9 mid1 score 15/8
Student 4 mid1 score 15/12          Student 9 mid2 score 15/8
Student 4 mid2 score 15/12          Student 9 assignment score 10/10
Student 4 assignment score 10/6     Student 9 quiz score 10/10
Student 4 quiz score 10/6           Student 9 final score 50/50
Student 4 final score 50/49         Student 10 ID: 22k-7834
Student 5 ID: 22k-5678              Student 10 name: Bashir
Student 5 name: Ali                 Student 10 mid1 score 15/9
Student 5 mid1 score 15/13          Student 10 mid2 score 15/9
Student 5 mid2 score 15/13          Student 10 assignment score 10/9
Student 5 assignment score 10/5     Student 10 quiz score 10/9
Student 5 quiz score 10/5           Student 10 final score 50/15
Student 5 final score 50/46
```

```
                  ***Menu***
                  g.Calculate GPA
                  a.GPA of all students
                  r.Replacing data
                  f.Search student details
                  s.Show statistics
                  e.Exit
Enter option:
g

Input Student NU-ID to find: 22k-4489

Student NU-ID: 22k-4489
Student name: Abdullah
GPA: 3.32
Want to Continue? (y/n)
```

```
Enter option:
a

        NU-ID               Name                    GPA
        22k-4489            Abdullah                3.32
        22k-4415            Asghar          2.60
        22k-4264            Aarij           3.20
        22k-3345            Maaz            3.40
        22k-5678            Ali             3.28
        22k-7890            Intikhab                1.88
        22k-2345            Asad            2.72
        22k-5678            Anus            3.08
        22k-3267            Shahid          3.44
        22k-7834            Bashir          2.04
Want to Continue? (y/n)
```

```
22k-7890 Intikhab didn't pass the course with 47 marks.
ThankYou, My ID is 22k-4489 and my name is Hafiz Muhammad Abdullah.
Want to Continue? (y/n)
```