Write a C program that will take a 2D square matrix as input and would do the following: i) Print the matrix in spiral form. For example, if input is

1 5 3 4

9 7 6 8

5 6 7 22

13 14 2 11

Output will be: 1 5 3 4 8 6 7 9 5 6 7 22 11 2 14 13 ii) Find the difference between the sum of the diagonal elements. e.g. (1+7+7+11) – (4+6+6+13) = 26 – 29 = -3

sol:

```c
#include<stdio.h>
int main(){
    int n;
    printf("Enter the order of the square matrix to be created: ");
    scanf("%d",&n);
    int arr[n][n];
    int i,j,d1=0,d2=0;
    for( i=0;i<n;++i){
        for( j=0;j<n;++j){
            printf("enter the value at %d,%d ",i,j);
            scanf("%d",&arr[i][j]);
        }
    }
    for( i=0;i<n;++i){
        if(i%2==0){
            for( j=0;j<n;++j){
                printf("%d ",arr[i][j]);
            }
        }
        else{
            for(j=n-1;j>=0;--j){
                printf("%d ",arr[i][j]);
            }
        }
    }
    for( i=0;i<n;++i){
        for( j=0;j<n;++j){
            if(i==j){
                d1+=arr[i][j];
            }
            else if(i+j==n-1){
                d2+=arr[i][j];
            }
        }
    }
    printf("the difference of the diagonals is %d",d1-d2);
}
```

```c
#include<stdio.h>

int main(){

        int n;

        printf("Enter the order of the square matrix to be created: ");

        scanf("%d",&n);
```

```
int arr[n][n];
int i,j,d1=0,d2=0;
for( i=0;i<n;++i){
	for( j=0;j<n;++j){
		printf("enter the value at %d,%d ",i,j);
		scanf("%d",&arr[i][j]);
	}
}
for( i=0;i<n;++i){
	if(i%2==0){
		for( j=0;j<n;++j){
			printf("%d ",arr[i][j]);
		}
	}
	else{
		for(j=n-1;j>=0;--j){
			printf("%d ",arr[i][j]);
		}
	}
}
for( i=0;i<n;++i){
	for( j=0;j<n;++j){
		if(i==j){
			d1+=arr[i][j];
		}
		else if(i+j==n-1){
			d2+=arr[i][j];
		}
	}
}
printf("the difference of the diagonals is %d",d1-d2);
```

}

```
Enter the order of the square matrix to be created: 4
1 5 3 4
9 7 6 8
5 6 7 22
13 14 2 11
1 5 3 4 8 6 7 9 5 6 7 22 11 2 14 13 the difference of the diagonals is -3
--------------------------------
Process exited after 6.897 seconds with return value 37
Press any key to continue . . .
```

Problem 2: Records of some employees are to be stored. Each employee has the following attributes – Name (string type) - Employee-ID (4-digit integer) - Department-name (string type) - Basic salary (float type) - Net-salary (float type) Calculate the Net-salary of the employees as follows: Net-salary = Basic + Basic*HRA + Basic*DA The percentage of the HRA and DA depends on in which range the basic salary of the employee falls (please check the table below). Basic HRA DA

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1 - 4000	**10%**	**50%**
4001 - 8000	**20%**	**60%**
8001 - 12000	**25%**	**70%**
12000 and above	**30%**	**80%**

Write a C program to take input of 5 such employees (user will give input to all the attributes except the Net-salary). Net-salary must be calculated as per the equation stated above. Store the employee records and display them on screen.

Sol:

```
#include<stdio.h>
struct empl{
    char name[20];
    int emplid;
    char dname[30];
    float bsala;
    float nsala;
};
struct empl e[5];
int main(){
    int i;
    for( i=0;i<5;++i){
        printf("\n Enter the name of the employee %d : ",i+1);
        gets(e[i].name);
        fflush(stdin);
        printf("\n Enter the Employee ID number of the employee %d : ",i+1);
        scanf("%d", &e[i].emplid);
        fflush(stdin);
        printf("\n Enter the department name of the employee %d: ",i+1);
        gets(e[i].dname);
        fflush(stdin);
        printf("\n Enter the basic salary of the employee %d: ",i+1);
        scanf("%f", &e[i].bsala);
        fflush(stdin);
        int hra,da;
        if(e[i].bsala>0 && e[i].bsala<=4000){
            hra =10;
            da=5;
        }
        else if(e[i].bsala>4000 && e[i].bsala<=8000){
            hra=20;
            da=6;
        }
        else if(e[i].bsala>8000 && e[i].bsala<=12000){
            hra=25;
            da=7;
        }
        else{
            hra=30;
            da=8;
        }
        e[i].nsala=e[i].bsala+(e[i].bsala*hra)+(e[i].bsala*da);
    }
    for( i=0;i<5;++i){
        printf("\nthe name of the employee %d:%s ",i+1,e[i].name);
        printf("\nthe Employee ID number of the employee %d: %d",i+1,e[i].emplid);
        printf("\nthe department name of the employee %d: %s",i+1,e[i].dname);
        printf("\nthe basic salary of the employee %d: %f",i+1,e[i].bsala);
        printf("\nthe net salary of the employee %d: %f",i+1,e[i].nsala);
    }
}
```


#include<stdio.h>

struct empl{

    char name[20];

    int emplid;

    char dname[30];

    float bsala;

    float nsala;

};

struct empl e[5];

int main(){

    int i;

    for(i=0;i<5;++i){

```
        printf("\n Enter the name of the employee %d : ",i+1);
        gets(e[i].name);
        fflush(stdin);
        printf("\n Enter the Employee ID number of the employee %d : ",i+1);
        scanf("%d", &e[i].emplid);
        fflush(stdin);
        printf("\n Enter the department name of the employee %d: ",i+1);
        gets(e[i].dname);
        fflush(stdin);
        printf("\n Enter the basic salary of the employee %d: ",i+1);
        scanf("%f", &e[i].bsala);
        fflush(stdin);
        int hra,da;
        if(e[i].bsala>0 && e[i].bsala<=4000){
                hra =10;
                da=50;
        }
        else if(e[i].bsala>4000 && e[i].bsala<=8000){
                hra=20;
                da=60;
        }
        else if(e[i].bsala>8000 && e[i].bsala<=12000){
                hra=25;
                da=70;
        }
        else{
                hra=30;
                da=80;
        }
        e[i].nsala=e[i].bsala+(e[i].bsala*hra)+(e[i].bsala*da);
}
```

```
	for( i=0;i<5;++i){
		printf("\nthe name of the employee %d:%s ",i+1,e[i].name);
		printf("\nthe Employee ID number of the employee %d: %d",i+1,e[i].emplid);
		printf("\nthe department name of the employee %d: %s",i+1,e[i].dname);
		printf("\nthe basic salary of the employee %d: %f",i+1,e[i].bsala);
		printf("\nthe net salary of the employee %d: %f",i+1,e[i].nsala);
	}
}
```

```
Enter the name of the employee 1 : Manikanta

Enter the Employee ID number of the employee 1 : 200335

Enter the department name of the employee 1: cse

Enter the basic salary of the employee 1: 40000

Enter the name of the employee 2 : Jugal

Enter the Employee ID number of the employee 2 : 200345

Enter the department name of the employee 2: cse

Enter the basic salary of the employee 2: 130000

Enter the name of the employee 3 : Vijay

Enter the Employee ID number of the employee 3 : 200348

Enter the department name of the employee 3: ece

Enter the basic salary of the employee 3: 50000

Enter the name of the employee 4 : Surya

Enter the Employee ID number of the employee 4 : 140234

Enter the department name of the employee 4: ece

Enter the basic salary of the employee 4: 13456

Enter the name of the employee 5 : Manjula

Enter the Employee ID number of the employee 5 : 132456

Enter the department name of the employee 5: matelugu

Enter the basic salary of the employee 5: 50000

the name of the employee 1:Manikanta
the Employee ID number of the employee 1: 200335
the department name of the employee 1: cse
the basic salary of the employee 1: 40000.000000
the net salary of the employee 1: 4440000.000000
the name of the employee 2:Jugal
the Employee ID number of the employee 2: 200345
the department name of the employee 2: cse
the basic salary of the employee 2: 130000.000000
```