2D Array Solution:

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1. i) Declare a 2 dimensional array of row size 3 and column size 3.

   ii) Fill the 2 dimensional array with values from the user.

   iii) Search for a user given value in the 2D array. If the value is not present, then print “Not found”, print “Found” otherwise.

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```c
#include <stdio.h>

#define r 3

#define c 3


int main(){


    int num[r][c];

    int n,i,j;

    int flag=0;


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

        for(j=0 ; j<r ; j++){

            printf("Enter num[%d][%d]:", i ,j);

            scanf("%d", & num[i][j]);

        }

    }
    printf("Enter a number to check:");
    scanf("%d", & n);

    for(i=0 ; i<r ; i++){
        for(j=0 ; j<r ; j++){
        if(num[i][j]==n){
            flag=1;
            break;
        }
        }
    }
    if(flag==1)
        printf("The number %d found in the array", n);
    else
        printf("The number %d not found in the array", n);

    return 0;
}
```

2. In this task, you will find the summation of the elements in a specific column of a matrix.

Read two integers, m and n, from the user. These are the dimensions of the matrix.

Next, read the elements of the matrix from the user. Then, read which column you have the sum. Finally, print the sum.

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```
#include <stdio.h>

int main(){

   int num[10][10];
   int m,n,x,i,j;
   int sum=0;

   printf("Enter the numbers of rows:");
   scanf("%d", &m);
   printf("Enter the numbers of column:");
   scanf("%d", & n);

   printf("\nInsert the elements in the matrix:\n");
   for(i=0 ; i<m ; i++){
      for(j=0 ; j<n ; j++){
         printf("Enter num[%d][%d]:", i,j);
         scanf("%d", &num[i][j]);
      }
   }
```

```
    printf("\nEnter the number of column:");
    scanf("%d", &x);
    for(j=x-1 ; j<=x-1 ; j++){
        for(i=0 ; i<m ; i++){
            sum=sum+num[i][j];
        }
    }
    printf("\nThe sum of column %d is:%d", x,sum);


    return 0;
}
```

3. In this task, you will find the summation of two matrices. Read two integers, m and n, from the user.

These are the dimensions of the matrices. Next, read the elements of the matrices from the user.

Then print the two matrices you read and finally, find the sum of two matrices and print it.

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```c
#include <stdio.h>

int main(){

    int mat_1[10][10];
    int mat_2[10][10];
    int sum[10][10];
    int i,j,m,n;

    printf("Enter the numbers of row:");
    scanf("%d", &m);
    printf("Enter the numbers of column:");
    scanf("%d", &n);

    printf("\nInsert the elements in the 1st matrix:\n");
    for(i=0 ; i<m ; i++){
        for(j=0 ; j<n ; j++){
            printf("mat_1[%d][%d]:", i ,j);
            scanf("%d", &mat_1[i][j]);
        }
    }
    printf("\nInsert the elements in the 2nd matrix:\n");
    for(i=0 ; i<m ; i++){
        for(j=0 ; j<n ; j++){
            printf("mat_2[%d][%d]:", i ,j);
            scanf("%d", &mat_2[i][j]);
        }
    }
    for(i=0 ; i<m ; i++){
        for(j=0 ; j<n ; j++){
            sum[i][j]=(mat_1[i][j]+mat_2[i][j]);
        }
    }

    printf("\nThe 1st matrix:\n");
    for(i=0 ; i<m ; i++){
        printf("\n");
        for(j=0 ; j<n ; j++){
        printf("%d  ", mat_1[i][j]);
        }
    }
    printf("\nThe 2nd matrix:\n");
    for(i=0 ; i<m ; i++){
        printf("\n");
        for(j=0 ; j<n ; j++){
        printf("%d  ", mat_2[i][j]);
        }
    }
    printf("\nsum:\n");
    for(i=0 ; i<m ; i++){
        printf("\n");
        for(j=0 ; j<n ; j++){
        printf("%d  ", sum[i][j]);
        }
    }

    return 0;
}
```

4. In this task, you will find the transpose of a matrix. Read two integers, m and n, from the user. These are the dimensions of the matrix. Next, read the elements of the matrix from the user. Then, print the transpose of the matrix.

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```
#include <stdio.h>

int main(){

   int num[10][10];
   int m,n,i,j;

   printf("Enter the numbers of rows:");
   scanf("%d", & m);

   printf("Enter the numbers of colimn:");
   scanf("%d", & n);

   for(i=0 ; i<m ; i++){
      for(j=0 ; j<n ; j++){
         printf("Enter num[%d][%d]:", i ,j);
         scanf("%d", & num[i][j]);
      }
   }
   printf("\nTranspose:\n");
   for(j=0 ; j<n ; j++){
        printf("\n");
        for(i=0 ; i<m ; i++){
            printf("%d  ", num[i][j]);
        }
    }

    return 0;
}
```

5. Consider int num[20][4] holds the four quiz marks of a class of 20 students. Write a program to find out, (mid)

    (i) Average marks of all the quizzes for each student.

    (ii) Student count who got more than 15 in at least TWO quizzes.

    (iii) Print the highest and lowest average marks.

____

```
#include <stdio.h>

int main(){
    int num[4][3];
    float avg[4];
    int totalMark[4]={0};
    int countSt=0;
    int i,j;
```

```
for(i=0 ; i<4 ; i++){
    for(j=0 ; j<3 ; j++){
        printf("Student %d quiz %d marks:",i,j);
        scanf("%d", & num[i][j]);
    }
    printf("\n");
}

for(i=0 ; i<4 ; i++){
    for(j=0 ; j<3 ; j++){
        totalMark[i]=totalMark[i]+num[i][j];
    }
    avg[i]=totalMark[i]/3.00;
    printf("\nAverage marks of student %d: %.2f", i,avg[i]);
}

float highest=avg[0];
float lowest=avg[0];

for(i=0 ; i<4 ; i++){

    if(avg[i]>highest)
        highest=avg[i];
    else if(avg[i]<lowest)
        lowest=avg[i];
}
printf("\nThe highest average marks: %.2f", highest);
printf("\nThe lowest average marks: %.2f", lowest);
```

```
  for(i=0 ; i<4 ; i++){
    int x=0;
    for(j=0 ; j<3 ; j++){
      if(num[i][j]>15){
      x++;
      }
    }
    if(x>=2){
      countSt++;
    }
  }
  printf("\nTotal number of students who got more than 15 in at least TWO quizzes are: %d",countSt);

return 0;

}
```

6. Consider int num[11][5] holds the runs of 5 t20 matches of 11 players. Write a program to find out ,

(i) Total run of each player in the entire series.

(ii) Average run of each player.

(iii) Find the maximum and minimum batting average.

(iv) Total runs in 2nd, 3rd and 5th matches.

(v) Count how many players had gone for a duck in at least 2 matches.

(vi) Count how many players had made runs over 50 in at least 1 match.

(vii) Find out the best score of each player.

```
#include <stdio.h>

int main(){

    int num[4][5];
    int totalRun[4]={0};
    float avg[4];
    int i,j,run[5]={0},best[4];
    int duck=0,fiftyplus=0;

    for(i=0 ; i<4 ; i++){
        for(j=0 ; j<5 ; j++){
            printf("Player %d match %d runs:",i,j);
            scanf("%d", & num[i][j]);
        }
        printf("\n");
    }

    for(i=0 ; i<4 ; i++){
        for(j=0 ; j<5 ; j++){
            totalRun[i]=totalRun[i]+num[i][j];
        }
        avg[i]=totalRun[i]/5.00;
        printf("\nTotal runs of player %d is:%d", i,totalRun[i]);
        printf("\nAverage run of player %d is:%.2f", i,avg[i]);
    }

    float max=avg[0];
    float min=avg[0];
```

```
for(i=0 ; i<4 ; i++){
    if(avg[i]>max)
        max=avg[i];
    else if(avg[i]<min)
        min=avg[i];
}
printf("\nThe maximum batting average is:%.2f", max);
printf("\nThe minimum batting average is:%.2f", min);

for(j=0 ; j<5 ; j++){
    for(i=0 ; i<4 ; i++){
        if(j=='0' || j=='3')
            continue;
        run[j]=run[j]+num[i][j];
    }
    printf("\nTotal runs of match %d is:%d", j,run[j]);
}

for(i=0 ; i<4 ; i++){
    int x=0;
    int y=0;
    for(j=0 ; j<5 ; j++){
        if(num[i][j]==0)
            x++;
        else if(num[i][j]>=50)
            y++;
    }
    if(x>=2)
```

```
            duck++;
        else if(y>=1)
            fiftyplus++;
    }
    printf("\nTotal players had gone for a duck in at least 2 matches are:%d", duck);
    printf("\nTotal players had made runs over 50 in at least 1 match are:%d", fiftyplus);

    for(i=0 ; i<4 ; i++){
        best[i]=-1;
        for(j=0 ; j<5 ; j++){
            if(num[i][j]>best[i])
                best[i]=num[i][j];
        }
        printf("\nThe maximum score of player %d id :%d", i,best[i]);
    }

return 0;

}
```

7. In this task, you will find the summation of major and minor diagonal elements of a matrix.

Read two integers, m and n, from the user. These are the dimensions of the matrix. Next, read the elements of the matrix from the user.

then print the summation of major and minor diagonal elements.

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```
#include <stdio.h>

int main(){

   int num[10][10];
   int i,j,m;
   int majorDio=0, minorDio=0;

   printf("Enter the number of row-column:");
   scanf("%d", &m);

   for(i=0 ; i<m ; i++){
      for(j=0 ; j<m ; j++){
         printf("Enter num[%d][%d]:",i,j);
         scanf("%d", & num[i][j]);
      }
   }

   for(i=0 ; i<m ; i++){
      printf("\n");
      for(j=0 ; j<m ; j++){
         printf("%d    ",num[i][j]);
      }
   }

   for(i=0 ; i<m ; i++){
      majorDio=majorDio+num[i][i];
```

```
        minorDio=minorDio+num[i][m-i-1];
    }
    printf("\nSummation of major diagonal:%d", majorDio);
    printf("\nSummation of minor diagonal:%d", minorDio);


    return 0;
}
```