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#PROGRAMING FOR PROBLEM SOLVING LAB PRACTICAL #MY PROGRAMS

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####1. Hello Budding Engineers #include<stdio.h> int main() { puts("Hello Budding Engineers\n"); return 0; }

OUTPUT:

> Hello Budding Engineers

####2. Address using puts #include<stdio.h> int main() { puts("My address:"); puts(Halwara,Ludhiana,Punjab, India"); return 0; } #####OUTPUT:

> My address: Halwara,Ludhiana, Punjab, India

####3. Sum of two numbers #include<stdio.h> int main() { int a, b, sum; printf("Enter two numbers\n"); scanf("%d %d",&a,&b); sum=a+b; printf("sum=%d\n",sum); return 0; } #####OUTPUT:

> Enter two numbers 12 26 sum=38

####4. Convert Celsius to Fahrniet #include<stdio.h>

```
 int main()
  {
    float fahr, cel;
    printf("Enter the temperature in celsius: ");
    scanf("%f", &cel);

    fahr = (1.8 * cel) + 32.0;
    printf("\nTemperature in Fahrenheit: %.2f F\n", fahr);

    return 0;
    }
```

#####OUTPUT:

> Enter the temperature in celsius: 32
>
> Temperature in Fahrenheit: 89.60 F
> ####5. Multiplication Table #include<stdio.h> int main() { int num,n, i,table; printf("Enter a number"); scanf("%d",&num); printf("Enter the number upto which you wanna see the table\n"); scanf("%d",&n); for(i=1;i<=n;i++) { table=0; table=num*i; printf("%d*%d=%d\n",num,i,table); } return 0; } #####OUTPUT: Enter a number 7 Enter the number upto which you wanna see the table 10
> *71=7 7*2=14 *73=21 7*4=28 *75=35 7*6=42 *77=49 7*8=56 *79=63 7*10=70

####6. Perimeter and area of circle #include<stdio.h> #define PI 3.14 int main() { float radius,area,peri; printf("Enter the radius of circle\n"); scanf("%f",&radius); area=PI*radius*radius; peri=2*PI*radius; printf("Area of the circle=%f\n",area); printf("Perimeter of the circle=%f\n",peri); return 0; } #####OUTPUT:

> Enter the radius of circle 5 Area of the circle=78.500000 Perimeter of the circle=31.400000 ####7. Reverse #include <stdio.h> int main() { int n, reversedNumber = 0, remainder; printf("Enter an integer: "); scanf("%d", &n); while(n != 0) { remainder = n%10; reversedNumber = reversedNumber*10 + remainder; n /= 10; } printf("Reversed Number = %d", reversedNumber); return 0; } #####OUTPUT: Enter an integer: 1356 Reversed Number = 6531 ####8. Swapping without using a third variable
> #include <stdio.h>

```
int main()
{
  int x, y, t;

  printf("Enter two integers\n");
  scanf("%d%d", &x, &y);

  printf("Before Swapping\nFirst integer = %d\nSecond integer = %d\n", x, y);

  t = x;
  x = y;
  y = t;

  printf("After Swapping\nFirst integer = %d\nSecond integer = %d\n", x, y);

  return 0;
}
```

#####OUTPUT:

> Enter an integer: 1356 Reversed Number = 6531 ####9. Even Odd #include <stdio.h> int main() { int number; printf("Enter an integer: "); scanf("%d", &number);

```
    if(number % 2 == 0)
        printf("%d is even.", number);
    else
        printf("%d is odd.", number);
    return 0;
}
```

#####OUTPUT:

> Enter an integer: 13 13 is odd. ####10. Factorial

```
    #include<stdio.h>
int main()
{
 int i,fact=1,number;
 printf("Enter a number: ");
  scanf("%d",&number);
    for(i=1;i<=number;i++){
      fact=fact*i;
  }
  printf("Factorial of %d is: %d",number,fact);
return 0;
}
```

#####OUTPUT:

> Enter a number: 3 Factorial of 3 is: 6 ####11. Weekdays using switch case

```
#include <stdio.h>

  int main()
    {

int week;

printf("Enter week number(1-7): ");
scanf("%d", &week);

switch(week)
{
    case 1:
        printf("Monday");
        break;
    case 2:
        printf("Tuesday");
        break;
    case 3:
        printf("Wednesday");
        break;
    case 4:
        printf("Thursday");
        break;
    case 5:
        printf("Friday");
        break;
    case 6:
        printf("Saturday");
        break;
    case 7:
        printf("Sunday");
        break;
    default:
        printf("Invalid input! Please enter week number between 1-7.");
}

  return 0;
}
```

#####OUTPUT:

> Enter week number(1-7): 4 Thursday ####12. Arithmetic operations using switch case #include<stdio.h>

```
void main()
{
    int a,b;
    int op;

    printf(" 1.Addition\n 2.Subtraction\n 3.Multiplication\n 4.Division\n");
    printf("Enter the values of a & b: ");
    scanf("%d %d",&a,&b);
    printf("Enter your Choice : ");
    scanf("%d",&op);
    switch(op)
    {
    case 1  :
        printf("Sum of %d and %d is : %d",a,b,a+b);
        break;
    case 2  :
        printf("Difference of %d and %d is : %d",a,b,a-b);
        break;
    case 3  :
        printf("Multiplication of %d and %d is : %d",a,b,a*b);
        break;
    case 4  :
        printf("Division of Two Numbers is %d : ",a/b);
        break;
    default :
        printf(" Enter Your Correct Choice.");
        break;
    }

}
```

#####OUTPUT:

> 1.Addition 2.Subtraction 3.Multiplication 4.Division Enter the values of a & b: 12 76 Enter your Choice : 3 Multiplication of 12 and 76 is : 912 ####13. Prime Numbers #include <stdio.h> int main() { int n, i, flag = 0; printf("Enter a positive integer: "); scanf("%d", &n); for(i = 2; i ⇐ n/2; ++i) {

```
        if(n%i == 0)
        {
            flag = 1;
            break;
        }
    }
    if (n == 1)
    {
      printf("1 is neither a prime nor a composite number.");
    }
    else
    {
        if (flag == 0)
          printf("%d is a prime number.", n);
        else
          printf("%d is not a prime number.", n);
    }
    return 0;
    }
```

#####OUTPUT:

> Enter a positive integer: 13 13 is a prime number.
> ####14. Fibonacci Series #include <stdio.h> int main() { int prev=0; int curr=1; int n; int next,a; printf("Enter the number of terms\n"); scanf("%d", &n);

```
  printf("First %d terms of Fibonacci series are:\n",n);

  for (a = 0; a < n; a++)
  {
    if (a <= 1)
      next = a;
    else
    {
      next = prev + curr;
      prev = curr;
      curr = next;
    }
    printf("%d\n", next);
  }

  return 0;
}
```

#####OUTPUT:

> Enter the number of terms 8 First 8 terms of Fibonacci series are: 0 1 1 2 3 5 8 13

####15. Palindrome #include <stdio.h> int main() { int n, reversedInteger = 0, remainder, originalInteger; printf("Enter an integer: "); scanf("%d", &n); originalInteger = n; while(n!=0) { remainder = n%10; reversedInteger = reversedInteger*10 + remainder; n /= 10; } if (originalInteger == reversedInteger) printf("%d is a palindrome.", originalInteger); else printf("%d is not a palindrome.", originalInteger);

```
    return 0;
}
```

#####OUTPUT:

> Enter an integer: 12321 12321 is a palindrome. ####16. Palindrome words #include <stdio.h> #include <string.h>

```
void check(char [], int);

int main()
{
    char word[15];

    printf("Enter a word to check if it is a palindrome\n");
    scanf("%s", word);
    check(word, 0);

    return 0;
}

void check(char word[], int index)
{
    int len = strlen(word) - (index + 1);
    if (word[index] == word[len])
    {
        if (index + 1 == len || index == len)
        {
            printf("The entered word is a palindrome\n");
            return;
        }
        check(word, index + 1);
    }
    else
    {
        printf("The entered word is not a palindrome\n");
    }
}
```

#####OUTPUT:

> Enter a word to check if it is a palindrome naman The entered word is a palindrome

####17. Star Half Pyramid #include <stdio.h> int main() { int x, y, rows; printf("Enter number of rows: "); scanf("%d",&rows); for(x=1; x<=rows; ++x) { for(y=1; y<=x; ++y) { printf("* "); } printf("\n"); } return 0; } #####OUTPUT:

> Enter number of rows: 5 *
>
> - -
>
> ---
> ---
> ---

####18. Star Full Pyramid #include <stdio.h>
int main() { int i, j, rows; printf("Enter number of rows: "); scanf("%d",&rows); for(i=rows; i>=1; --i) { for(j=1; j<=i; ++j) { printf("%d ",j); } printf("\n"); } return 0; } #####OUTPUT:

> Enter number of rows: 8 *
>
> ---
> ---
> ---

####19. Star Inverted Half Pyramid #include <stdio.h> int main() { int i, j, rows; printf("Enter number of rows: "); scanf("%d",&rows); for(i=rows; i>=1; --i) { for(j=1; j<=i; ++j) { printf("* "); } printf("\n"); }

```
    return 0;
}
```

#####OUTPUT:

> Enter number of rows: 4
>
> ---
> ---
>
> - -
> -

####20. 1D Array #include <stdio.h>

```
  void  main()
{
    int arr[10];
    int i;
       printf("\n\nRead and Print elements of an array:\n");
       printf("-----------------------------------------\n");

    printf("Input 10 elements in the array :\n");
    for(i=0; i<10; i++)
    {
     printf("element - %d : ",i);
        scanf("%d", &arr[i]);
    }

    printf("\nElements in array are: ");
    for(i=0; i<10; i++)
    {
        printf("%d  ", arr[i]);
    }
    printf("\n");
}
```

#####OUTPUT:

> Read and Print elements of an array:
>
> ---
>
> Input 10 elements in the array : element - 0 : 1 element - 1 : 3 element - 2 : 4 element - 3 : 2 element - 4 : 6 element - 5 : 8 element - 6 : 5 element - 7 : 7 element - 8 : 0 element - 9 : 9
>
> Elements in array are: 1 3 4 2 6 8 5 7 0 9 ####21. Maximum Size of an array #include <stdio.h>

```
#define MAX_SIZE 100  // Maximum array size

int main()
{
    int arr[MAX_SIZE];
    int size, i, toSearch, found;

    printf("Enter size of array: ");
    scanf("%d", &size);


    printf("Enter elements in array: ");
    for(i=0; i<size; i++)
    {
        scanf("%d", &arr[i]);
    }

    printf("\nEnter element to search: ");
    scanf("%d", &toSearch);


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

        if(arr[i] == toSearch)
        {
            found = 1;
            break;
        }
    }

    if(found == 1)
    {
        printf("\n%d is found at position %d", toSearch, i + 1);
    }
    else
    {
        printf("\n%d is not found in the array", toSearch);
    }

    return 0;
}
```

#####OUTPUT:

> Enter the number of elements in array 4 Enter 4 integers 2 4 0 9 Maximum element is present at location 4 and it's value is 9.

####22. 2D Array #include<stdio.h> int main(){ /* 2D array declaration*/ int disp[2][3]; /*Counter variables for the loop*/ int i, j; for(i=0; i<2; i++) { for(j=0;j<3;j++) { printf("Enter value for disp[%d][%d]:", i, j); scanf("%d", &disp[i][j]); }

}

```
   printf("Two Dimensional array elements:\n");
   for(i=0; i<2; i++) {
      for(j=0;j<3;j++) {
         printf("%d ", disp[i][j]);
         if(j==2){
            printf("\n");
         }
      }
   }
   return 0;
}
```

#####OUTPUT:

> Enter value for disp[0][0]:2 Enter value for disp[0][1]:3 Enter value for disp[0][2]:2 Enter value for disp[1][0]:3 Enter value for disp[1][1]:4 Enter value for disp[1][2]:2 Two Dimensional array elements: 2 3 2 3 4 2 ####23. Sum of two matrices #include <stdio.h>

```
int main()
{
   int m, n, c, d, first[10][10], second[10][10], sum[10][10];

   printf("Enter the number of rows and columns of matrix\n");
   scanf("%d%d", &m, &n);
   printf("Enter the elements of first matrix\n");

   for (c = 0; c < m; c++)
      for (d = 0; d < n; d++)
         scanf("%d", &first[c][d]);

   printf("Enter the elements of second matrix\n");

   for (c = 0; c < m; c++)
      for (d = 0 ; d < n; d++)
         scanf("%d", &second[c][d]);

   printf("Sum of entered matrices:-\n");

   for (c = 0; c < m; c++) {
      for (d = 0 ; d < n; d++) {
         sum[c][d] = first[c][d] + second[c][d];
         printf("%d\t", sum[c][d]);
      }
      printf("\n");
   }

   return 0;
}
```

#####OUTPUT:

> Enter the number of rows and columns of matrix 2 3 Enter the elements of first matrix 1 2 3 6 4 8 Enter the elements of second matrix 2 4 7 2 5 7 Sum of entered matrices:- 3 6 10 8 9 15

####24. Transpose of matrix #include<stdio.h> void main() { int a[10][10], b[10][10]; int m,n,i,j; printf("Enter size of matrix A as m, n:"); scanf("%d%d",&m,&n); printf("\n Enter elements of matrix A row wise\n",m ,n); for(i=0;i<m;i++) { for(j=0;j<n;j++) { scanf("%d",&a[i][j]); } } for(i=0;i<m;i++) { for(j=0;j<n;j++) { b[j][i]=a[i][j]; } } printf("\n\nTranspose of matrix is:\n"); for(i=0;i<n;i++) { for(j=0;j<m;j++) { printf("%d",b[i][j]); } } } #####OUTPUT:

> Enter size of matrix A as m, n:3 2
>
> Enter elements of matrix A row wise 1 4 2 5 7 9
>
> Transpose of matrix is: 127459 ####25. Substraction of two matrices #include <stdio.h>

```
  int main()
  {
     int m, n, c, d, first[10][10], second[10][10], difference[10][10];

     printf("Enter the number of rows and columns of matrix\n");
     scanf("%d%d", &m, &n);
     printf("Enter the elements of first matrix\n");

     for (c = 0; c < m; c++)
       for (d = 0 ; d < n; d++)
         scanf("%d", &first[c][d]);

     printf("Enter the elements of second matrix\n");

     for (c = 0; c < m; c++)
       for (d = 0; d < n; d++)
           scanf("%d", &second[c][d]);

     printf("Difference of entered matrices:-\n");

     for (c = 0; c < m; c++) {
       for (d = 0; d < n; d++) {
         difference[c][d] = first[c][d] - second[c][d];
         printf("%d\t",difference[c][d]);
       }
       printf("\n");
     }

     return 0;
}
```

#####OUTPUT:

> Enter the number of rows and columns of matrix 2 2 Enter the elements of first matrix 3 2 4 5 Enter the elements of second matrix
>
> 7 9 0 2 Difference of entered matrices:- -4 -7 4 3

####26. Multiplication of two matrices

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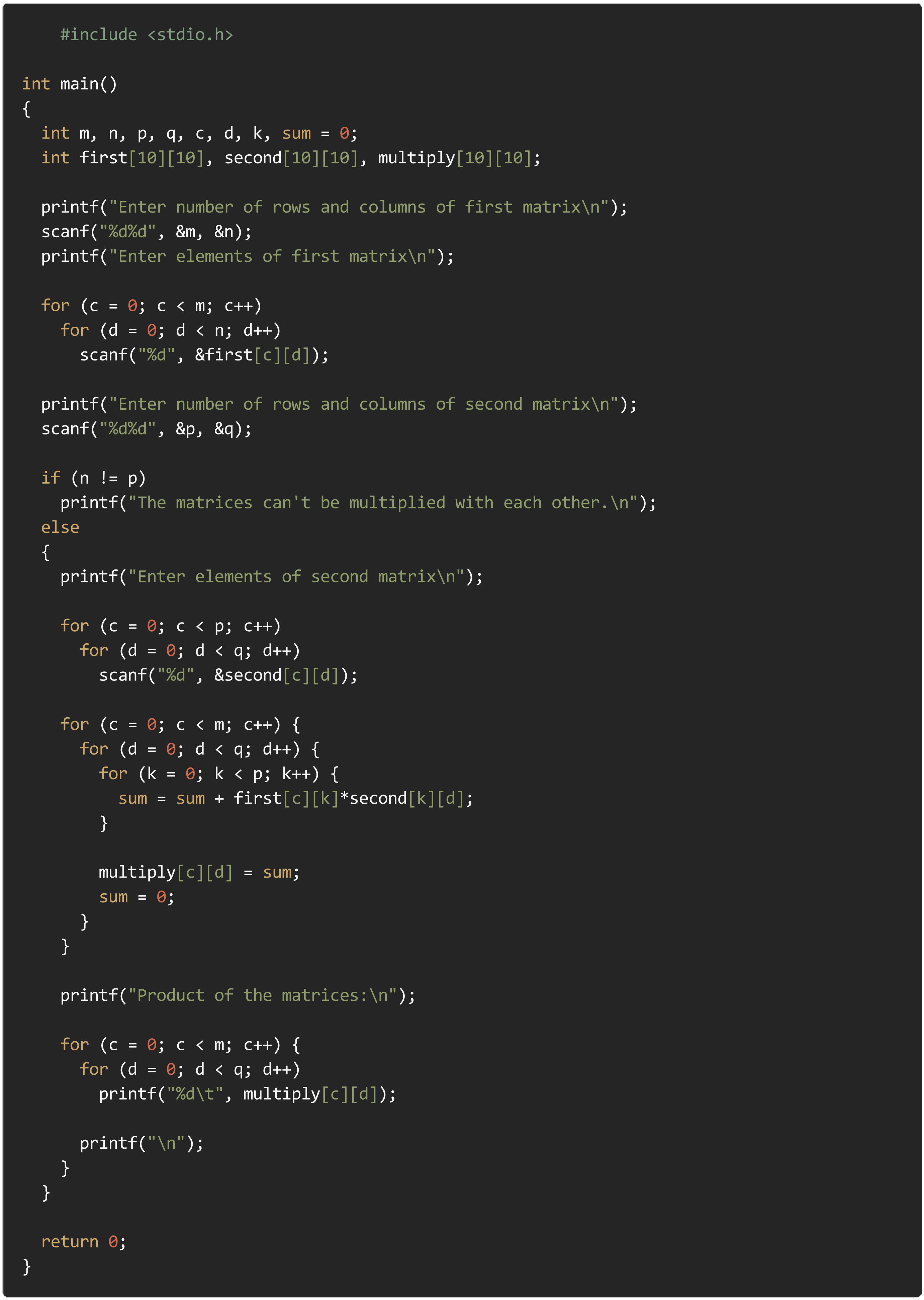

```c
    #include <stdio.h>

int main()
{
  int m, n, p, q, c, d, k, sum = 0;
  int first[10][10], second[10][10], multiply[10][10];

  printf("Enter number of rows and columns of first matrix\n");
  scanf("%d%d", &m, &n);
  printf("Enter elements of first matrix\n");

  for (c = 0; c < m; c++)
    for (d = 0; d < n; d++)
      scanf("%d", &first[c][d]);

  printf("Enter number of rows and columns of second matrix\n");
  scanf("%d%d", &p, &q);

  if (n != p)
    printf("The matrices can't be multiplied with each other.\n");
  else
  {
    printf("Enter elements of second matrix\n");

    for (c = 0; c < p; c++)
      for (d = 0; d < q; d++)
        scanf("%d", &second[c][d]);

    for (c = 0; c < m; c++) {
      for (d = 0; d < q; d++) {
        for (k = 0; k < p; k++) {
          sum = sum + first[c][k]*second[k][d];
        }

        multiply[c][d] = sum;
        sum = 0;
      }
    }

    printf("Product of the matrices:\n");

    for (c = 0; c < m; c++) {
      for (d = 0; d < q; d++)
        printf("%d\t", multiply[c][d]);

      printf("\n");
    }
  }

  return 0;
}
```

#####OUTPUT:

> Enter number of rows and columns of first matrix 2 2 Enter elements of first matrix 23 65 98 10 Enter number of rows and columns of second matrix 2 2 Enter elements of second matrix 54 60 0 160 Product of the matrices: 1242 11780 5292 7480

####27. Square of a number using function
#include<stdio.h>

```
int square(int); // function prototype declaration.

void main()
{
     int number, answer;

     printf("Enter your number:");
     scanf("%d", &number);

     answer = square(number);  //Call function.

     printf("Square of %d is %d.", number, answer);
}

int square(int n)
{

     return(n*n);
}
```

#####OUTPUT:

> Enter your number:6 Square of 6 is 36. ####28. Swaping call by value #include <stdio.h>

```
void swap(int, int);

int main()
{
    int x, y;

    printf("Enter the value of x and y\n");
    scanf("%d%d",&x,&y);

    printf("Before Swapping\nx = %d\ny = %d\n", x, y);

    swap(x, y);

    printf("After Swapping\nx = %d\ny = %d\n", x, y);

    return 0;
}

void swap(int a, int b)
{
    int temp;

    temp = b;
    b = a;
    a = temp;
     printf("Values of a and b is %d  %d\n",a,b);
}
```

#####OUTPUT:

> Enter the value of x and y 5 8 Before Swapping x = 5 y = 8 Values of a and b is 8 5 After Swapping x = 5 y = 8

####29. Swapping call by reference #include <stdio.h> void swap(int _n1, int n2); int main() { int num1, num2; printf("Enter the num1 and num2"); scanf("%d%d",&num1,&num2); swap(&num1, &num2); printf("num1 = %d\n", num1); printf("num2 = %d", num2); return 0; } void swap(int n1, int_ n2) { int temp; temp = *n1; *n1 = *n2; *n2 = temp; }

#####OUTPUT:

> Enter the num1 and num2 3 5 num1 = 5 num2 = 3 ####30. Factorial using recursion #include<stdio.h> int main() { #include <stdio.h> long int multiplyNumbers(int n); int main() { int n; printf("Enter a positive integer: "); scanf("%d", &n); printf("Factorial of %d = %ld", n, multiplyNumbers(n)); return 0; } long int multiplyNumbers(int n) { if (n >= 1) return n*multiplyNumbers(n-1); else return 1; }

#####OUTPUT:

> Enter a positive integer: 5 Factorial of 5 = 120
> ####31. Fibonacci series using recursion
> #include<stdio.h>

```
int Fibonacci(int);

int main()
{
   int n, i = 0, c;

   scanf("%d",&n);

   printf("Fibonacci series\n");

   for ( c = 1 ; c <= n ; c++ )
   {
      printf("%d\n", Fibonacci(i));
      i++;
   }

   return 0;
}

int Fibonacci(int n)
{
   if ( n == 0 )
      return 0;
   else if ( n == 1 )
      return 1;
   else
      return ( Fibonacci(n-1) + Fibonacci(n-2) );
}
```

#####OUTPUT:

> 4 Fibonacci series 0 1 1 2

####32. Structure
#include <stdio.h> struct student { char name[50]; int roll; float marks; } s[10]; int main() { int i; printf("Enter information of students:\n"); // storing information for(i=0; i<10; ++i) { s[i].roll = i+1; printf("\nFor roll number%d,\n",s[i].roll); printf("Enter name: "); scanf("%s",s[i].name); printf("Enter marks: "); scanf("%f",&s[i].marks); printf("\n"); } printf("Displaying Information:\n\n"); // displaying information for(i=0; i<10; ++i) { printf("\nRoll number: %d\n",i+1); printf("Name: "); puts(s[i].name); printf("Marks: %.1f",s[i].marks); printf("\n"); } return 0; }

#####OUTPUT:

> Roll number: 5 Name: bhola Marks: 32.0
>
> Roll number: 6 Name: kaka Marks: 66.0
>
> Roll number: 7 Name: billa Marks: 100.0
>
> Roll number: 8 Name: john Marks: 89.0
>
> Roll number: 9 Name: jacky Marks: 38.0
>
> Roll number: 10 Name: Blacky Marks: 42.0

####33. Pointers #include<stdio.h> int main() { int a,*p; a=10; p=&a; printf("%d\n",p); printf("%d\n",*p); printf("%d\n",&p); return 0; }

#####OUTPUT:

> -1306961924 10 -1306961936

####34. Addition using Pointers #include <stdio.h>

```
int main()
{
   int first, second, *p, *q, sum;

   printf("Enter two integers to add\n");
   scanf("%d%d", &first, &second);

   p = &first;
   q = &second;

   sum = *p + *q;

   printf("Sum of the numbers = %d\n", sum);

   return 0;
}
```

#####OUTPUT:

> Enter two integers to add 4 65 Sum of the numbers = 69

####35. Pointers to an array #include<stdio.h>

```
int main()
{
  int arr[5] = { 1, 2, 3, 4, 5 };
  int *ptr = arr;

  printf("%p\n", ptr);
  return 0;
}
```

#####OUTPUT:

```
0x7ffd4b542230
```

####36. Pointers to a function #include <stdio.h>

```
void fun(int a)
{
    printf("Value of a is %d\n", a);
}

int main()
{
    void (*fun_ptr)(int) = fun;

    fun_ptr(10);

    return 0;
}
```

#####OUTPUT:

```
Value of a is 10
```

####37. Printing values of an array using pointers #include<stdio.h> void main() { int a[5]= {5,4,6,8,9}; int *p=&a[0]; int i;

```
    for(i=0; i<5; i++)
        printf("\nArray[%d] is %d ",i,*(p+i));
    for(i=0; i<5; i++)
        printf("\n %d at %u ",*(p+i),(p+i));
  }
```

#####OUTPUT:

```
Enter two integers to add 58 94 Sum of the numbers = 152
```

####38. Bubble Sort #include <stdio.h>

```
int main()
{
  int array[100], n, c, d, swap;

  printf("Enter number of elements\n");
  scanf("%d", &n);

  printf("Enter %d integers\n", n);

  for (c = 0; c < n; c++)
    scanf("%d", &array[c]);

  for (c = 0 ; c < n - 1; c++)
  {
    for (d = 0 ; d < n - c - 1; d++)
    {
      if (array[d] > array[d+1]) /* For decreasing order use < */
      {
        swap       = array[d];
        array[d]   = array[d+1];
        array[d+1] = swap;
      }
    }
  }

  printf("Sorted list in ascending order:\n");

  for (c = 0; c < n; c++)
     printf("%d\n", array[c]);

  return 0;
}
```

#####OUTPUT:

> Enter number of elements 5 Enter 5 integers 23 4 54 87 98 Sorted list in ascending order: 4 23 54 87 98 ####39. Quick Sort Using Recursion #include <stdio.h>

```
    void quicksort (int [], int, int);



      int main()

{
    int list[50];

    int size, i;



    printf("Enter the number of elements: ");

    scanf("%d", &size);

    printf("Enter the elements to be sorted:\n");

    for (i = 0; i < size; i++)

    {

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

    }

    quicksort(list, 0, size - 1);

    printf("After applying quick sort\n");

    for (i = 0; i < size; i++)

    {

        printf("%d ", list[i]);

    }

    printf("\n");



    return 0;

}

void quicksort(int list[], int low, int high)

{

int pivot, i, j, temp;

if (low < high)

{

    pivot = low;

    i = low;
    j = high;

    while (i < j)

    {

        while (list[i] <= list[pivot] && i <= high)

        {

            i++;

        }

        while (list[j] > list[pivot] && j >= low)

        {

            j--;

        }

        if (i < j)

        {

            temp = list[i];

            list[i] = list[j];

            list[j] = temp;

        }

    }

    temp = list[j];

    list[j] = list[pivot];

    list[pivot] = temp;

    quicksort(list, low, j - 1);

    quicksort(list, j + 1, high);

}

}
```

#####OUTPUT:

gurjot

```
Enter the number of elements: 5 Enter the elements to be sorted: 45 32 76 455 34 After applying quick sort 32 34 45 76 455
```