

# ARRAYS

\* Write a program to create an array of 10 elements. Insert elements in the array and display them along with their sum.

```
#include < stdio.h >
#include < conio.h >
void main()
{
    int a[10], i, Sum = 0;
    clrscr();
    printf("Enter 10 elements of array:-");
    for(i=0; i<10; i++)
        scanf("%d", &a[i]);
    for(i=0; i<10; i++)
        Sum = Sum + a[i];
    printf("Elements you entered are:-");
    for(i=0; i<10; i++)
        printf("\t %d", a[i]);
    printf("\n sum = %d", Sum);
}
```

\* Write a program to create an array of 10 elements. Insert elements in the array then find the largest and smallest element of an array.

```
#include < stdio.h >
#include < conio.h >
void main()
{
    int a[10], i, Max, Min;
    clrscr();
    printf("Enter 10 elements of array:-");
    for(i=0; i<10; i++)
        scanf("%d", &a[i]);
    Max = a[0];
    Min = a[0];
    for(i=1; i<10; i++)
    {
        if(a[i] > Max)
            Max = a[i];
        if(a[i] < Min)
            Min = a[i];
    }
    printf("Largest element = %d", Max);
    printf("\n Smallest element = %d", Min);
}
```

```

    int a[10], i, l, S;
    clrscr();
    printf(" Enter 10 elements of array");
    for (i = 0; i < 10; i++)
        scanf("%d", &a[i]);
    if (i == 0)
        l = S = a[i];
    else if (a[i] > l)
        l = a[i];
    else if (a[i] < S)
        S = a[i];
    printf(" largest element = %d\n"
           " smallest element = %d", l, S);
}

```

(C.)\*

~~Write a program to create an array of 10 elements. Insert n elements into the array then find the sum of odd and even elements separately and also count -ve elements, +ve and zero elements.~~

~~#include<stdio.h>~~

~~#include<conio.h>~~

~~void main()~~

~~{~~

```

int a[10], i, e=0, o=0, p=0, z=0;
clrscr();
printf(" Enter %d element of array");

```

```

Scansf ("Enter elements in array :-"), n);
for (i=0; i<n; i++)
    Scanf ("%d", &a[i]);
for (i=0; i<n; i++)
    if (a[i] % 2 == 0)
        e = e + a[i];
    else if (a[i] > 0)
        p++;
    else if (a[i] < 0)
        n++;
    else
        z++;
printf ("\n sum of even number = %.d", e);
printf ("\n sum of odd number = %.d", o);
printf ("\n total positive = %.d", p);
printf ("\n total negative = %.d", n);
printf ("\n total zero = %.d", z);
getch();
    
```

- Q. Write a program to create an array of 10 elements. Insert n elements in the array and sort them in ascending order using
- Interchange Sort method.
  - Bubble Sort.
  - Selection Sort -

1. ~~Binary Search~~ (Searched)

~~if (arr[0] == arr[n-1])~~ → ~~Binary Search~~

~~mid = arr[0]~~

~~for (int i=0; i<n; i++)~~

~~if (arr[i] < arr[mid])~~

~~low = mid + 1;~~

~~else if (arr[i] > arr[mid])~~

~~high = mid - 1;~~

~~else~~

~~return mid;~~

~~mid = (low + high) / 2;~~

~~if (arr[low] == arr[mid])~~

~~return low;~~

~~else if (arr[low] < arr[mid])~~

~~return low + 1;~~

~~else~~

~~return high + 1;~~

Print("Enter no. of elements:-");  
 Scan("n", &n); // Input 3

Print("Enter n elements in array", n);  
 for (i=0; i<n; i++) {  
 a[i] = 0;
 }

Scan("a[" + i + "]", &a[i]); // Input 10, 20, 30

Print("Elements of array before sorting:-");  
 for (i=0; i<n; i++) {  
 Print(a[i]);
 }

Print("a[" + i + "]", a[i]); // Output 10, 20, 30

(2) Pass + For (i=0; i<n-1; i++) {  
 for (j=i+1; j<n; j++) {  
 if (a[i] > a[j]) {  
 swap();
 }
 }
}

(3) Pass + For (i=0; i<n-1; i++) {  
 for (j=i+1; j<n; j++) {  
 if (a[i] > a[j]) {  
 swap();
 }
 }
}

(4) Pass + For (i=0; i<n-1; i++) {  
 for (j=i+1; j<n; j++) {  
 if (a[i] > a[j]) {  
 swap();
 }
 }
}

(5) Pass + For (i=0; i<n-1; i++) {  
 for (j=i+1; j<n; j++) {  
 if (a[i] > a[j]) {  
 swap();
 }
 }
}

Swap  
 {  
 a[i] = a[j];  
 a[j] = temp;  
 }  
 >

Print("After sorting elements of array are :-");  
 for (i=0; i<n; i++) {  
 Print("a[" + i + "]", a[i]);
 }

Swap  
 {  
 a[i] = a[j];  
 a[j] = temp;  
 }  
 >

Swap  
 {  
 a[i] = a[j];  
 a[j] = temp;  
 }  
 >

Q. #include < stdio.h> // Header file for I/O operations  
 #include < comio.h> // Header file for memory management  
 void main()  
{  
 int a[10], n, i, j, temp; // Declaring array and variables  
 clrscr();  
 printf("Enter no. of elements:-");  
 scanf("%d", &n);  
 printf("Enter %d elements in array", n);  
 for (i = 0; i < n; i++) {  
 scanf("%d", &a[i]);  
 }  
 printf("Elements of array before sorting:-");  
 for (i = 0; i < n; i++) {  
 printf("%d", a[i]);  
 }  
 for (i = 1; i < n; i++) {  
 for (j = 0; j < n - i; j++) {  
 if (a[j] > a[j + 1]) {  
 temp = a[j];  
 a[j] = a[j + 1];  
 a[j + 1] = temp;  
 }
 }
 }  
 printf("After sorting elements of  
 array are:-");  
 for (i = 0; i < n; i++) {  
 printf("%d", a[i]);  
 }  
 getch();
}

```

3. #include <stdio.h>
#include <conio.h>
void main()
{
    int arr[], i, j, temp, n, s;
    clrscr();
    printf("Enter no. of elements");
    scanf("%d", &n);
    printf("Enter %d elements of array", n);
    for(i=0; i<n; i++)
        scanf("%d", &arr[i]);
    printf("Elements of array before sorting");
    for(i=0; i<n; i++)
        printf("%d ", arr[i]);
    for(i=0; i<n-1; i++)
    {
        s=i;
        for(j=i+1; j<n; j++)
            if(arr[j] < arr[s])
                s=j;
        if(i!=s)
        {
            temp=arr[i];
            arr[i]=arr[s];
            arr[s]=temp;
        }
    }
    printf("After Sorting Elements of array are:-");
    for(i=0; i<n; i++)
        printf("%d ", arr[i]);
    getch();
}

```

Q. Write a program to print the binary equivalent of a decimal number using array.

(With logic)

```
#include < stdio.h >
#include < conio.h >
void main()
{
    int bin[10], i=0, n;
    clrscr();
    printf("Enter a decimal no.:");
    scanf("%d", &n);
    while (n>0)
    {
        bin[i++] = n % 2;
        n = n / 2;
    }
}
```

Prints "Binary equivalent of the given number:";

```
for (i=i-1; i>=0; i--)
    printf("%d", a[i]);
```

getch();

```
}
```

Q. Write a program to create an array of 10 elements. Insert elements into the array then find the smallest and largest element of array

3      1

```

#include <stdio.h>
#include <conio.h>
void main()
{
    int i, a[10], first, second;
    clrscr();
    printf("Enter element of array\n");
    for (i = 0; i < 10; i++)
        scanf("%d", &a[i]);
    if (a[0] > a[1])
        first = a[0];
    else
        first = a[1];
    second = a[1];
    for (i = 2; i < n; i++)
    {
        if (a[i] > first)
            first = a[i];
        else if (a[i] > second)
            second = a[i];
    }
    printf("Largest element = %d", first);
    getch();
}

```

Q. Write a program to print first 50 prime numbers using array.

~~With the help of array you can do it.~~

⇒ ~~#include <stdio.h>~~

~~#include <conio.h>~~

~~void main()~~

~~{~~

~~int a[50], i, j = 0, R, k;~~

~~clrscr();~~

~~for (i = 1; j < 50; i++) {~~

~~{~~

~~if (R == 1 & i % 2 == 0) {~~

~~R = 0; } else if (i % 2 != 0)~~

~~else { for (k = 3; k \* k <= i; k += 2)~~

~~if (i % k == 0) { R = 1; break; }~~

~~{~~

~~R = 0; } else { R = 1; }~~

~~} break; }~~

~~>~~

~~i ("prime")~~

~~if (R == 1)~~

~~a[j] = i;~~

~~>~~

~~printf ("The first 50 prime nos. are: ");~~

~~for (i = 0; i < 50; i++)~~

~~printf ("%d\t", a[i]);~~

~~getch();~~

~~return 0;~~

~~Program developed by~~

\* write a program in C to create a matrix of  $3 \times 4$ . Insert the matrix in array and then display them.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int a[3][4], i, j;
    clrscr();
    printf("Enter 3x4 elements of matrix");
    for (i=0; i<3; i++)
        for (j=0; j<4; j++)
            scanf("%d", &a[i][j]);
    printf("The matrix entered is:-\n");
    for (i=0; i<3; i++)
        for (j=0; j<4; j++)
            printf("%d", a[i][j]);
    printf("\n");
    getch();
}
```

Q. write a program in C to create a matrix of  $3 \times 4$ . Insert and print the matrix then also print the transpose of matrix.

```
#include <stdio.h>
#include <conio.h>
```

void main() {

```
int a[3][4], i, j;
clrscr();
printf("Enter 3x4 elements of matrix");
for (i = 0; i < 3; i++)
    for (j = 0; j < 4; j++)
        scanf("%f", &a[i][j]);

```

Printed "In The matrix entered is : m";

```
for (i = 0; i < 3; i++)
    for (j = 0; j < 4; j++)
        printf("%d", a[i][j]);

```

```
for (j = 0; j < 4; j++)
    for (i = 0; i < 3; i++)
        printf("%d", a[i][j]);

```

```
printf("m transpose m");
for (i = 0; i < 3; i++)
    for (j = 0; j < 4; j++)
        printf("%d", a[j][i]);

```

Printed "m";

```
> (Pm14) 20089
printf("In transpose m");

```

```
for (i = 0; i < 3; i++)
    for (j = 0; j < 4; j++)
        printf("%d", a[j][i]);

```

```
for (j = 0; j < 4; j++)
    for (i = 0; i < 3; i++)
        printf("%d", a[i][j]);

```

```
printf("m transpose m");
for (i = 0; i < 3; i++)
    for (j = 0; j < 4; j++)
        printf("%d", a[i][j]);

```

Printed "m";

getch();

\* Write a program to add two matrix.

```
#include <stdio.h> // I/O devices
```

```
#include <conio.h>
```

```
void main() {
```

```

    int a[10][10], b[10][10], c[10][10], r1, r2, c1, r2, c2; // r1, r2, c1, c2 are row and column indices
    cout << "Enter order of 1st matrix: ";
    cin >> r1 >> r2 >> c1 >> c2;

```

```

    cout << "Enter order of 2nd matrix: ";
    cin >> r3 >> r4 >> c3 >> c4;
    cout << "Enter 1st matrix";
    for (i = 0; i < r1; i++)

```

```

        for (j = 0; j < c1; j++)

```

```

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

```

```

    cout << "Enter order of 3rd matrix: ";
    cin >> r5 >> r6 >> c5 >> c6;
    cout << "Enter 2nd matrix";
    for (i = 0; i < r2; i++)

```

```

        for (j = 0; j < c2; j++)

```

```

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

```

```

    cout << "m";

```

```

    if ("m" == m) {

```

```

        cout << "Multiplication of matrices: ";

```

```

        for (i = 0; i < r1; i++)

```

```

            for (j = 0; j < c2; j++)

```

```

                printf("%d", a[i][j] * b[j][i]);

```

```

            cout << "m";

```

```

    cout << "m and matrix is: ";

```

```

        for (i = 0; i < r1; i++)

```

```

            for (j = 0; j < c1; j++)

```

```

                printf("%d", a[i][j]);

```

```

            cout << "m";

```

```

        }
    }

```

```

if (condition) {
    // code
}
else {
    // code
}

for (i=0; i<=n; i++) {
    for (j=0; j<=m; j++) {
        C[i][j] = a[i][j] + b[i][j];
    }
    printf("Resultant matrix is: \n");
    for (i=0; i<n; i++) {
        for (j=0; j<m; j++) {
            printf("%d\t", C[i][j]);
        }
        printf("\n");
    }
}
else {
    printf("Addition not possible");
}
getch();
}

```

Q. Write a program to multiply two matrix.

```

#include <stdio.h>
#include <conio.h>
void main()
{
    int a[10][10], b[10][10], c[10][10], i, j, k, r1, c1, r2, c2;
    clrscr();
    printf("Enter Order of 1st matrix");
    scanf("%d %d", &r1, &c1);
    for (i=0; i<r1; i++)
    {
        for (j=0; j<c1; j++)
        {
            scanf("%d", &a[i][j]);
        }
    }
    printf("Enter Order of 2nd matrix");
    scanf("%d %d", &r2, &c2);
    for (i=0; i<r2; i++)
    {
        for (j=0; j<c2; j++)
        {
            scanf("%d", &b[i][j]);
        }
    }
}

```

printf("Enter order of A and matrix\n");

scanf("%d %d", &R1, &C1);

for(i=0; i<R1; i++)

{ for(j=0; j<C1; j++)

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

printf("\n");

}

printf("M: 1st matrix is\n");

for(i=0; i<R1; i++)

{

for(j=0; j<C1; j++)

printf("%d", A[i][j]);

printf("\n");

}

printf("M and matrix is\n");

for(i=0; i<R1; i++)

{

for(j=0; j<C1; j++)

printf("%d", B[i][j]);

printf("\n");

}

for(i=0; i<R1; i++)

for(j=0; j<C1; j++)

c[i][j]=0;

for(k=0; k<R1; k++)

c[i][j]=c[i][j]+A[i][k]\*B[k][j];

for(i=0; i<R1; i++)

for(j=0; j<C1; j++)

c[i][j]=c[i][j]/C;

for(i=0; i<R1; i++)

for(j=0; j<C1; j++)

```

for (j=0; j<c2; j++)
    for (k=0; k<c1; k++)
        C[i][j] = C[i][j] + a[i][k] * b[k][j];
    printf("The matrix after multiplication is\n");
}

for (i=0; i<r1; i++)
{
    for (j=0; j<c2; j++)
        printf("%d\t", C[i][j]);
    printf("\n");
}
else
    printf("Multiplication not possible");
getch();

```

- Q. Write a program to find the sum of rows and columns of row and columns of a matrix separately.

```

#include <stdio.h>
#include <conio.h>
void main()
{
    int a[3][4], i, j, sum, s[2] = {0};
    clrscr();
    printf("Enter element of matrix\n");
    for (i=0; i<3; i++)
        for (j=0; j<4; j++)
            scanf("%d", &a[i][j]);
    printf("The matrix is\n");
}

```

```

printf("In the matrix is %d", m);
printf("In case case for all rows sum");
for (i=0; i<3; i++)
    {
        printf("In row %.1f", i);
        sum = 0;
        for (j=0; j<4; j++)
            {
                sum = sum + q[i][j];
                printf(" %.1f", q[i][j]);
            }
        printf(" sum %.1f", sum);
        s[i] = s[i] + sum;
    }
    printf(" sum %.1f", s[i]);
}
printf("The sum of all rows is %d", s[0]);
    
```

# Function

- \* TYPES OF Function :-
  - (1) Function with argument with return
  - (2) Function with argument without return
  - (3) Function without argument with return
  - (4) Function without argument without return
  - (5) Function returning multiple values.

## Questions :

- (1) Write a program to find the LCM of two nos. using a function (with argument with return)
- (2) Write a program to print the table of a number entered by the user using a function (with argument without return)

(3) Write a program to find the sum of 1st ten natural nos. using a function (without argument column required)

(4) Write a program to print your name and the name of the college using a function (without argument column required)

### Solution:

1. #include <stdio.h>

#include <conio.h>

int lcm (int, int);

void main()

{

int a, b; i;

clrscr();

printf("Enter two nos.:");

scanf("%d %d", &a, &b);

i = lcm(a, b);

printf("LCM = %d", i);

getch();

int lcm (int a, int b)

{ int i;

int j;

for (j=1; j<=b; j++)

if (j%a == 0 & j%b == 0)

break;

return j;

→ LCM of two nos. is found by a function

→ If both nos. are divisible by a no. then that no. is LCM

→ If both nos. are not divisible by a no. then that no. is LCM

Q.

~~#include <stdio.h>~~

~~#include <conio.h>~~

~~void main();~~

~~void main()~~

~~{~~

~~int n;~~

~~clrscr();~~

~~printf("Enter No:-");~~

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

~~tavre(n);~~

~~getch();~~

~~}~~

~~void tavre (int n)~~

~~{~~

~~int i;~~

~~for (i=1; i<=10; i++)~~

~~printf("n %d", i\*n);~~

~~}~~

3. ~~#include <stdio.h>~~

~~#include <Conio.h>~~

~~int sum();~~

~~void main()~~

~~{~~

~~int s;~~

~~clrscr();~~

~~s = sum();~~

~~printf("Sum of first 10 natural nos=%d", s);~~

~~getch();~~

~~}~~

~~if "int sum()"~~

~~{~~

~~int i, s=0;~~

Scanned with CamScanner

```

for(i=1; i<=10; i++)
    s=s+i;
return s;
>

```

4. ~~#include <stdio.h>~~~~#include <conio.h>~~~~void Print();~~~~void main()~~~~&~~~~clrscr();~~~~Print();~~~~getch();~~~~>~~~~void Print()~~~~&~~~~Print("Saurabh");~~~~Print("I.S College, Muz");~~~~>~~

## 5 Q. write a program to interchange the values of a variable using function

~~=> #include <stdio.h>~~~~#include <conio.h>~~~~void interchange(int \*x, int \*y)~~~~void main()~~~~int a, b;~~~~clrscr();~~~~Print("Enter values of a and b: ");~~~~Scanf("%d,%d", &a, &b);~~~~(Q=2(i))~~

```

printf("Before interchange n1=%d n2=%d", n1, n2);
if (*n1 > *n2) {
    interchange(&n1, &n2);
    printf("After interchange n1=%d n2=%d", n1, n2);
}
getch();
}

void interchange(int *x1, int *x2) {
    int t;
    t = *x1;
    *x1 = *x2;
    *x2 = t;
}

```

Q. Write a C program to find sum, difference, product and ratio of two nos. entered by the user using a single function.

```

#include <stdio.h>
#include <conio.h>
void calculate(int x, int y, int *sum, int *diff, float *product, float *ratio);
void main() {
    int x, y, sum, diff;
    float product, ratio;
    clrscr();
    printf("Enter two nos: ");
    scanf("%d %d", &x, &y);
    calculate(x, y, &sum, &diff, &product, &ratio);
    printf("Sum = %d\n", sum);
    printf("Difference = %d\n", diff);
    printf("Product = %.2f\n", product);
    printf("Ratio = %.2f\n", ratio);
}

```

```
    printf("In Difference = %d", d);
```

```
    printf(" In Product = %d", P);
```

```
    printf(" In Ratio = %f", R);
```

```
getch();
```

$$i(2)(10) \times 10^{-3} = 2$$

```
void calculate (int a, int b, int &S, int &P,
                int &R, float &R)
```

(Q3. & in code don't consider this)

$$* S = a+b;$$

$$* d = a>b ? a-b : b-a; i.e. d = |a-b|$$

$$* P = a*b;$$

$$* R = (\text{float}) a/b; \quad (Q3. don't consider this)$$

→

7 Q. Write a program to check that a number is prime or not using function.

```
#include <stdio.h>
```

```
#include <conio.h>
```

```
int prime (int);
```

```
void main()
```

(Take the value of m from user, and check whether it is prime or not.)

```
int m; // User Input
```

```
clrscr();
```

```
printf("Enter a no");
```

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

```
if (prime(m) == 1):
```

```
    printf("%d is a prime", m);
```

```
else: (if m is not prime)
```

```
    printf("%d is not prime", m);
```

```
getch();
```

→ (Q3. Don't consider this)

```

int Prime (int n)
{
    int i;
    if (n < 2) return 0;
    if (n == 2) return 1;
    if (n % 2 == 0) return 0;
    for (i = 3; i * i <= n; i = i + 2)
        if (n % i == 0) return 0;
    return 1;
}
    
```

Q. Write a program to create an array of 10 elements. Insert elements in the array and display them along with their sum using different function.

```

#include <stdio.h>
#include <conio.h>
void create(int *a, int n);
void display(int *a, int n);
void main()
{
    int a[10];
    clrscr();
    create(a, 10);
    display(a, 10);
    getch();
}
void create(int *a, int n)
{
    int i;
    printf("Enter %d element of array: ", n);
    for (i = 0; i < n; i++)
        scanf("%d", &a[i]);
}
void display(int *a, int n)
{
    int i;
    for (i = 0; i < n; i++)
        printf("%d ", a[i]);
}
    
```

```
for(i=0; i<n; i++) {
    cout << arr[i] << " ";
    sum += arr[i];
}
```

&gt;

```
void display (int n, int sum) {
    if(n == 0)
        return;
}
```

&lt;

```
int s, S=0; for(i=0; i<n; i++) {
    cout << arr[i] << " ";
    S += arr[i];
}
```

```
cout << "Elements of array are : ";
    cout << endl;
```

```
for(i=0; i<n; i++) {
    cout << arr[i] << " ";
}
```

&lt;

```
cout << endl;
    cout << "Sum = " << S;
    cout << endl;
```

```
S=S+arr[i];
```

```
} // end of for loop
    cout << endl;
    cout << "Sum = " << S;
    cout << endl;
}
```

## Recursion

Q. Write a program to find the factorial of a number using recursion.

```
#include <iostream>
```

```
#include <conio.h>
```

```
int Factorial (int);
```

```
void main()
```

&lt;

```
int n, f;
```

```
clrscr();
```

```
printf ("Enter value of n");
```

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

```
f = Factorial(n);
```

```
printf ("Factorial = %d", f);
```

```
getch();
```

```
} // end of main
```

int factorial(int n) {

&

if (n == 1)

return 1;

else {

int m = n - 1;

int fact\_m = factorial(m);

return (n \* fact\_m);

}

Recursion with backtracking (using call stack)

Recursion Tree: A tree diagram showing the recursive calls.

main

scanf("%d", &n);

fact(n);

factorial

scanf("%d", &n);

fact(n);

fact(4);

fact(3);

fact(2);

fact(1);

fact(0);

fact(-1);

fact(-2);

fact(-3);

fact(-4);

fact(-5);

fact(-6);

fact(-7);

fact(-8);

fact(-9);

fact(-10);

fact(-11);

fact(-12);

fact(-13);

fact(-14);

fact(-15);

fact(-16);

fact(-17);

fact(-18);

fact(-19);

fact(-20);

Date \_\_\_\_\_

Question based on the question.

- Q.1.** Write a program to find the first 10 natural number using recursive function.
- Q.2.** Write a program to find the sum of digits of a no. entered by the user using recursive function.
- Q.3.** Write a program to find the reverse of a number using recursive function.
- Q.4.** Write a program to find the binary, octal and hexadecimal equivalent of a no. using recursive function.
- Q.5.** Write a program to print all prime factors of a no. using recursive function.
- Q.6.** Write a program to find the  $n^{\text{th}}$  term of Fibonacci Series.

Solution

```

1 #include <stdio.h>
2 #include <conio.h>
3 int Sum(int);
4 void main()
5 {
6     int S;
7     clrscr();
8     S = Sum(10);
9     printf("Sum of 1st 10 natural nos

```

```

= ".0d", S);
getch();
>
int sum(int x)
{
    if (n == 1)
        return 1;
    else
        return (x + sum(n - 1));
}
    
```

Q. #include <stdio.h>

```

#include <conio.h>
int sum(int)
void main()
{
    int n, S;
    clrscr();
    printf("Enter a no");
    scanf(".0d", &n);
    S = sum(n);
    printf("Sum of digits = ".0d", S);
    getch();
}

int sum(int x)
{
    if (n == 0)
        return 0;
    else
        return (x % 10 + sum(x / 10));
}
    
```

3. #include <stdio.h>  
 #include <conio.h>  
 void reverse (int);  
 void main ()  
 {  
 int n, s;  
 clrscr();  
 printf("Enter a no. to find its  
 reverse : ");  
 scanf("%d", &n);  
 printf("reverse = ");  
 reverse (n);  
 getch();  
 }

void reverse (int x)  
{

if (x > 0)

{

printf ("%d", x % 10);  
 reverse (x / 10);  
 }

i (2) "loop -> add so result will be 0 + 10 + 2 = 12

initial state

4. #include <stdio.h>

#include <conio.h>

void bin (int);

void dec (int);

void hex (int);

void main ()

i (2) "loop -> add so result will be 0 + 10 + 2 = 12

int n;

clrscr();

```

(6/22) printf("enter a no");
scanf("%d", &n); int

(6/21) printf("in binary equivalent");
bin(n);

printf("in octal equivalent");
oct(n);

printf("in hexadecimal equivalent");
hex(n);

> getch(); function to stop program (and) press any key function to exit

void bin(int x)
{
    SF(x>0) if x>0
    bin(x/2); if x>0
    printf("%d", x%2); if x>0
}

void oct(int x)
{
    SF(x>0) if x>0
    oct(x/8); if x>0
    printf("%d", x%8); if x>0
}

void hex(int x)
{
    SF(x>0) if x>0
    bin(x/16); if x>0
    SF(x%16>9) if x%16>9
}

```

if (prime("1.0", x / 16 + 55));

else

if (prime("1.0", x / 16));

}

{ if (prime("1.0", x / 16))

(100) 100

(100) 100

#include <stdio.h>

#include <conio.h>

void factors (int, int);

void main()

{

int n;

clrscr();

printf("Enter a No.:");

scanf("%d", &n);

printf("The Prime Factors = ");

factors (n, 2);

getch();

}

void factors (int x, int m)

{

if (x == 1)

{

(100) 100

if (x % m == 0)

{

printf("X %.d", m);

factors (x / m, m);

{

else

(0.5M) 50

factors (x, m + m);

{

(0.5M) X 100

}

(P.E.:0.5M X 100)

Q. #include <stdio.h>

#include <conio.h>

int fibo(int);

void main()

{ }

int m, t;

clrscr();

printf("Enter term no");

scanf("%d", &m);

t = fibo(m);

printf("Term=%d", t);

getch();

int fibo(int x)

{ }

if (x == 1)  
return 0;

else if (x == 2)

return 1;

else

return (fibo(x-1) + fibo(x-2));

}

## Storage Classes

Q. Write a program to show the use  
of ~~auto~~ automatic type variable. (auto)

⇒ #include <stdio.h>

#include <conio.h>

void main()

auto int x;

printf("value of x=%d", x);

OP - Garbage

```

    10
    X = 10;
    printf("The new value of x = %d", x);
    getch();
    }
  
```

Q. write a program to use a global (external) variable (extern)

```

    i
    #include <stdio.h>
    #include <conio.h>
    void Print();
    void main()
    {
        extern int x;
        clrscr();
        printf("value of x = %d", x);
        x = x + 10;
        Print();
        printf("new value of x = %d", x);
        getch();
    }
  
```

```

    i
    int x = 10;
    void Print()
    {
        clrscr();
        printf("value of x = %d", x);
        x = x + 10;
    }
  
```

Q. write a program to declare and use two variables with same name.

Answer - 810

```

#include <stdio.h>
#include <conio.h>
void main()
{
    int x = 10;
    clrscr();
    printf("Value of x=%d\n", x);
    x = x + 10;
    int y = 25;
    clrscr();
    printf("Value of x=%d\n", x);
    y = y + 10;
    printf("The value of y=%d\n", y);
    getch();
}

```

Q. Write a program to show the use of Static variable in a function

```

#include <stdio.h>
#include <conio.h>
void Print();
void main()
{
    int i;
    clrscr();
    for(i=1; i<=5; i++)
        Print();
    getch();
}
void Print()
{
}

```

2

(Explain the above code)

Static int x; Main() shows it.

x = x + 1

(column 1)

printf("The value of x = %d", x); → 1, 3, 5, 7, 9

&gt;

(all x are)

(1, 3, 5, 7, 9)

Q. Write a program to show the use of register variable in a function.

Ans

#include &lt;conio.h&gt; = X . Ans

#include &lt;stdio.h&gt; → D. Ans

Void main()

&amp;

→ A. 10 = 10

{

Ans: i(10) : register int i; → D. Ans

clrscr();

(Ans 10)

i = 1;

{

Prints ("welcome");

Ans: 10 → C. Ans

main() { int i; → D. Ans

Prints ("Bye...");

getch();

(other answer is)

→ (Ans 10 shows off)

Ans: 10 → D. Ans

# String

- Q. Write a program to create a string and enter your name in the string and display it
- using scanf, printf function
  - using gets, puts function
  - using getchar, and putchar function

```
(a) #include <stdio.h>
#include <conio.h>
void main()
{
    char str[20];
    clrscr();
    printf("enter your name");
    before space -> scanf("%s", str);
    or read before new line -> scanf("%s\n", str);
    or read before full stop(.) -> scanf("%s[.]", str);
    printf(" your name :- %s", str);
    getch(); // or _getch();
}
```

```
(b) #include <stdio.h>
#include <conio.h>
void main()
{
    char str[20];
    clrscr();
    printf(" enter your name");
    gets(str) -> read all input
    printf(" your name:- ");
}
```

puts(str);

getch();

>

(c) #include <stdio.h>

#include <Conio.h>

void main()

<

char str[20], ch;

int i;

clrscr();

printf("Enter your name");

for(i=0; i<19; i++)

<

ch = getch(); *read one character at a time*

if(ch == 'm')

break;

else {

str[i] = ch; *store character in array str*

if(ch != '\n') i++; *if it's not new line then increment i*

str[i] = '\0'; *form last cell*

printf("Your name.");

for(i=0; str[i] != '\0'; i++)

puts(str[i]); *print one character at a time*  
getch(); *one element at a time*

>

*1. Function puts*

*2. Function getch*

### Array Search

a. write program in array to find frequency of element.

```
#include <stdio.h>
#include <conio.h>
void main()
```

2

```
int arr[10], c = 0, i, S;
```

```
clrscr();
```

```
printf(" enter 10 element in array");
```

```
for (i=0; i<10; i++)
```

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

```
printf(" enter element to search");
```

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

```
for (i=0; i<10; i++)
```

2

```
if (arr[i] == S)
```

```
c++;
```

```
if (c == 0)
```

```
printf(" element not found");
```

else

```
printf(" frequency of %d = %d", S, c);
```

```
getch();
```

2

~~Q. V.T~~ Q. Write program to show the use of  
1) `getchar()`, 2) `getche()`, 3) `getchar`

→ `#include <stdio.h>` // Definition

`#include <conio.h>` // Declaration

(D) `void main()` // Execution

X

`char ch;`

`clrscr();`

`printf("enter a character:");`

(1) `ch = getchar();`

(2) `ch = getche();`

(3) `ch = getchar();`

`printf("In you entered");`

`putchar(ch);`

→ `getchar();`

## Character Handling Function

In C we #include <ctype.h>

1. `isalnum(ch)`: This fn. checks the character ch is an alphabet or digit. It return 0 when any symbol is entered else it return 1 when any alphabet or digit is entered.

2. `isalpha(ch)` ⇒ This function test that ch is alphabet or not.

3. `islower(ch)` ⇒ This fn. test that character ch is lowercase alphabet or not.

4. `isupper(ch)` ⇒ This fn. test that character ch is uppercase alphabet or not.

5. `isdigit(ch)` ⇒ This fn. test that the character (ch) is digit + or not.

6. `isgraph(ch)` ⇒ checks that ch is a printing character or not (except space).

7. `isprint(ch)` ⇒ checks that ch is a printing character or not.

8. `ispunct(ch)` ⇒ checks that the entered character ch punctuation marks or not (., etc.)

(9) `isspace(ch)` ⇒ Checks that the entered character is Space, `\n` or `\t` character.

(10) `isascii(ch)` ⇒ Checks that the entered character is ascii character or not.

(11) `iscntrl(ch)` ⇒ Checks that entered character is control character.

(12) `isxdigit(ch)` ⇒ Checks that the entered character is hexadecimal digit or not (0 to 9) and A to F.

(13) `tolower(ch)` ⇒ Convert the upper case character to lower case.

(14) `toupper(ch)` ⇒ Convert the upper case character to lower case character.

### String handling Function (use `<string.h>` header file).

\* **strlen(str)** :- This function determines the length of a string.

for example, "Str" has length 3 because it has three characters.

- a) write a program to find the length  
of a string using a) without the  
library function b) using library function  
c) without using library function  
d) using a user define function.

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *str;
    int l;
    clrscr();
    printf("enter a string");
    gets(str);
    l = strlen(str);
    printf("length of string = %d", l);
    getch();
}
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char *str;
    int l;
    clrscr();
    printf("enter a string");
    gets(str);
    for(l=0; str[l] != '\0'; l++)
        ;
    printf("length of string = %d", l);
    getch();
}
```

```

<3> #include <stdio.h>
# include <conio.h>
int Strlen1 (char * );
void main ()
{
    char *str;
    int i;
    clrscr();
    printf ("Enter a string");
    gets (str);
    i = Strlen1 (str);
    printf ("length of string = %d", i);
    getch();
}

int Strlen1 (char *s)
{
    int i = 0;
    while (*s != '\0')
        i++;
    return i;
}

```

Q # Strlwr (str) :- This function converts all the uppercase character of a string to the lower case.

Q. Write a program to convert upper case character of a string into lower case :- (Exam 2018)

(a) Using library function

(b) without using library function -

(c) Using user defined function

(a) `#include <stdio.h>` ~~Header file required for I/O~~

`#include <conio.h>` ~~for clearing screen~~

`#include <string.h>` ~~for string functions~~

`Void main()`

~~function to return~~

X

`Char *str;` ~~for string~~

`clrscr();` ~~for clearing screen~~

~~if (str == NULL)~~

~~printf("Enter a string");~~

~~gets(str);~~ ~~for getting string~~

~~strlwr(str);~~ ~~for making string lowercase~~

~~printf("converted String = %.8s", str);~~

~~getch();~~ ~~for waiting~~

X

(P.K. 2003), A.M.I.T. Institute

(b) `#include <stdio.h>`

~~#include <conio.h>~~ ~~for clearing screen~~

`Void main()`

~~((P>>72 && AD<72) && -~~

`Char *str; int i;`

`clrscr();`

~~printf("Enter a string");~~

~~gets(str);~~ ~~for getting string~~

~~for (i = 0; str[i] != '\0'; i++)~~

~~if (str[i] > 64 && str[i] < 91)~~

~~str[i] = str[i] + 32;~~

~~else if (str[i] > 96 && str[i] < 123)~~

~~str[i] = str[i] - 32;~~

~~printf("converted String = %.8s", str);~~

~~getch();~~ ~~for waiting~~

X

~~for (i = 0; str[i] != '\0'; i++)~~

~~if (str[i] > 64 && str[i] < 91)~~

~~str[i] = str[i] + 32;~~

~~else if (str[i] > 96 && str[i] < 123)~~

(c) `#include <stdio.h>`  
`#include <conio.h>`  
`void strwrt(char *);`

`void main()`  
`{`

`char *str;`

`clrscr();`

`printf("Enter a string");`

`gets(str);`

`strwrt(str);`

`printf("converted string = %s",`

`str);`

`getch();`

`}`

`void strwrt(char *s)`

`{`

`int i;`

`for(i=0; s[i]!='\0'; i++)`

`- if (s[i]>64 && s[i]<91)`

`s[i]=s[i]+32;`

`}`

Q. \* `strupr(str);` :- This function converts all the lower case character of string "str" into upper case.

`initial value = 1000`

Q. Write a program to convert all the lower case characters of string to upper case.

(a) Using library function

(b) Without using library function.

(c) Using user define function.

(c) #include <stdio.h>  
# include <conio.h>  
void strrev (char \*);  
void main () {  
char \*str;  
clrscr ();  
printf ("enter a string");  
gets (str);  
strrev (str);  
printf ("converted String = %s", str);  
getch ();  
} // program to convert string  
// enter string  
for (i = 0; str[i] != '\0'; i++)  
if (str[i] > 9688 str[i] < 123)  
str[i] = str[i] - 32;  
}

program to convert string  
(a) #include <stdio.h> void main ()  
# include <conio.h>  
# include <string.h>  
void main () {  
char \*str;  
clrscr ();  
printf ("enter a string");  
gets (str);  
strrev (str);

```
printf("Converted string = %s", S);
getch();
}

```

```
<v> #include <stdio.h>
#include <conio.h>
void main()
{
    char *Str; int i;
    clrscr();
    printf("Enter a string");
    gets(Str);
    for(i=0; Str[i] != '\0'; i++)
        if((Str[i] >= 96 & Str[i] <= 123))
            Str[i] = Str[i] - 32;
    printf("Converted string = %s", Str);
    getch();
}

```

4\* SACPY (Str1, Str2) :- This Function copies Str2 to Str1.

a. write a program to copy one string into another.

(a) using library function

(b) without using library function

(c) with the help of user define function

(Program in page 8) answer

(Ans) program 2nd part

(Ans) wanted

(e) #include <stdio.h>  
 #include <conio.h>  
 #include <string.h> // for strlen function  
 void main ()  
 {  
 char \*STR1, \*STR2;  
 clrscr();  
 printf("Enter a String");  
 gets(STR1);  
 strcpy(STR2, STR1);  
 printf("Copied String = %s", STR2);  
 getch();  
 }

(f) #include <stdio.h>  
 #include <conio.h>  
 void main ()  
 {  
 char \*STR1, \*STR2;  
 int i;  
 clrscr();  
 printf("Enter a string");  
 gets(STR1);  
 for (i=0; STR1[i] != '10'; i++)  
 STR2[i] = STR1[i];  
 STR2[i] = '10';  
 printf("Copied String = %s", STR2);  
 getch();  
 }

(a) Write a program to copy a string from one string to another string.  
 void strcpy (char, char);  
 void main ()

```

  {
    clrscr();
    clrscr ("Enter a string");
    gets(str1);
    clrscr ("Enter");
    clrscr ("Copied String = '%s', %s");
    prints ("Copied String = '%s', %s");
    getch();
  }
  
```

void strcpy (char \*s1, char \*s2)  
 {
 int i;
 for (i = 0; s1[i] != '\0'; i++)
 s2[i] = s1[i];
 s2[i] = '\0';
 }

Q. 5. Write a program to copy m character from string s1 to string s2.

- (a) Write a program to copy m character of string into another string using library function
- (b) without using function
- (c) with the help of user define fn.

(c) `#include <stdio.h>`  
`#include <conio.h>`  
`void *strcpy1 (char *str1, char *str2, int);`  
`void main ()`

X

```
char *str1, *str2;
int n;
clrscr();
printf ("enter a string");
gets (str1);
printf ("How many characters to copy");
scanf ("%d", &n);
strcpy1 (str2, str1, n);
printf ("Copied String = %s", str2);
getch();
```

>

`void strcpy1 (char *str1, char *str2, int)`

X

```
{ int i;
for (i = 0; i < n && str1[i] != '\0'; i++)
    if (str1[i] == '\0' || str1[i] == str2[i])
        str2[i] = str1[i];
    else
        str2[i] = '\0';
}
```

>

(d) `#include <stdio.h>`  
`#include <conio.h>`  
~~`#include <iostream.h>`~~  
`void main ()`

X

```
char *str1, *str2;
int n;
```

```

    clrscr();
    printf(" enter a string");
    gets(str1);
    printf(" no. of character to copy");
    scanf("%d", &n);
    strcpy(str2, str1, n);
    printf(" Copied String = %.8s", str2);
    getch();
    }

```

```

(6) #include <stdio.h>
#include <conio.h>
void main()
{
    char *str1, *str2;
    int n, i;
    clrscr();
    printf(" enter a string");
    gets(str1);
    printf(" no. of character to copy");
    scanf("%d", &n);
    for(i=0; i<n && str1[i] != '\0'; i++)
    {
        str2[i] = str1[i];
        str2[i] = '\0';
    }
    printf(" copied string = %.8s", str2);
    getch();
}

```

6 \* `SACCAT (STR1, STR2)`: -> This Function Appends (or Add) `STR2` to `STR1`.

(C/C++ Only)

- a) Write a program to concatenate one string to another using
  - i) Using Library Function
  - ii) Without using any function
  - iii) With the help of user define function.

(C/C++ Only)

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *STR1, *STR2;
    clrscr();
    printf("Enter 1st String");
    gets(STR1);
    printf("Enter 2nd String");
    gets(STR2);
    if(strlen(STR1) > strlen(STR2))
        SACCAT(STR1, STR2);
    else
        SACCAT(STR2, STR1);
}

char *SACCAT (STR1, STR2)
{
    int i;
    for(i = 0; i < strlen(STR2); i++)
        STR1[i + strlen(STR1)] = STR2[i];
    return STR1;
}
```

```

    cursor();
    printf("Enter 1st String");
    gets(str1);
    printf("Enter 2nd String");
    gets(str2);
    for(i=0; str1[i] != '\0'; i++);
    for(i=0; str2[i] != '\0'; i++)
        str1[i+1] = str2[i];
    str1[i+1] = '\0';
    printf("New String = %.S", str1);
    getch();
}

```

(c)

```

#include <stdio.h>
#include <conio.h>
void strcat1(char *, char *);
void main()
{
    char *str1, *str2;
    cursor();
    printf("Enter 1st String:");
    gets(str1);
    printf("Enter 2nd String");
    gets(str2);
    strcat1(str1, str2);
    printf("New String = %.S", str1);
    getch();
}

```

```

void strcat1(char *s1, char *s2)
{
    int i, j;
    for(i=0; s1[i] != '\0'; i++);
    for(j=0; s2[j] != '\0'; j++);
    for(i=j; s1[i] != '\0'; i++);
    for(j=0; s2[j] != '\0'; j++)
        s1[i+j] = s2[j];
    s1[i+j] = '\0';
}

```

```
for(i=0; s2[i] != '\0'; i++)
    s1[i+1] = s2[i];
```

```
s1[i+1] = s2[i];
```

```
s1[i+1] = '0';
```

```
if('0' >= s2[i+1] & s2[i+1] <= '9')
```

```
{ cout << "Not a number"; }
```

**Output:-** Enter 1st string: Misra

Enter 2nd string: somu

Enter 1st string: Misra

Enter 2nd string: somu

New string = Misra-somu. taken

**Ex** Strncat(str1, str2, m) :- This function concatenates / appends m specified characters of str2 to str1.

strcat = strncat(0)

**b.** Write a program to concatenate specified No. of character of a string into another string.

(a) Using library function : strncat()

(b) Without using any function

(c) With the help of user defined function.

```
#include <stdio.h>
#include <conio.h>
void strncat1(char *, char *, int);
void main()
{
    char *str1, *str2;
    int m;
    clrscr();
    printf("Enter 1st string:");
    gets(str1);
    printf("Enter 2nd string:");
    gets(str2);
    strncat1(str1, str2, m);
}
```

```

    printf("Enter 2nd string");
    gets(str2);
    printf("Enter No. of character
          to be concatenated");
    scanf("%d", &n);
    strcat(str1, str2);
    printf("New string = %s", str1);
    getch();
}

void strcat(char *s1, char *s2, int n)
{
    int i, j;
    for(i=0; s1[i] != '\0'; i++);
    for(i=0, j=n; s2[j] != '\0'; i++, j++)
        s1[i+j] = s2[j];
    s1[i+j] = '\0';
}
    
```

(1) #include <stdio.h>

#include <conio.h>

void main()

```

char *str1, *str2;
int i, m;
if(m>1, m<=100)
    clrscr();
    printf("Enter 1st string");
    gets(str1);
    printf("Enter 2nd string");
    gets(str2);
    printf("Enter No. of character to
          be concatenated");
    scanf("%d", &n);
    
```

```

28) For (i = 0; i < str1[i] != '\0'; i++)
    {
        for (j = 0; j < m && str2[j] != '\0'; j++)
            str1[i+j] = str2[j];
        str1[i+j] = '\0';
    }
    cout << "New string = " << str1;
}

```

```

19) #include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *str1, *str2;
    int i, l, m;
    clrscr();
    printf("Enter first string");
    gets(str1);
    printf("Enter second string");
    gets(str2);
    printf("Enter no. of characters to");
    printf("concatenate");
    scanf("%d", &m);
    if (*str1 <= '\0' || *str2 <= '\0')
        printf("New string = '\0', str1");
    else
        l = strlen(str1);
        if (l + m >= strlen(str2))
            printf("New string = '\0', str1");
        else
            for (i = l; i < l + m; i++)
                str1[i] = str2[i - l];
            str1[l + m] = '\0';
}

```

~~Q) strcmp(str1, str2); This function compares two strings and returns an integer value.~~

~~A) If it returns 0: both string are same~~

(a) If first return true integer then 1st string comes after and 2nd string in dictionary. If false then 2nd string comes after 1st string.

(b) If first return -ve integer then 2nd string comes after 1st string in dictionary.

- Q. Write a program to compare two strings entered by the user of  
 (a) using library function strcmp().  
 (b) without using any function.  
 (c) with the help of user define function.

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char str1[50], str2[50];
    clrscr();
    printf("Enter 1st String");
    gets(str1);
    printf("Enter 2nd String");
    gets(str2);
    if(strcmp(str1, str2) == 0)
        printf("Both strings are same");
    else if(strcmp(str1, str2) > 0)
        printf("1st string comes after 2nd string in dictionary");
    else
        printf("2nd string comes after 1st string in dictionary");
}
```

before and string in dictionary");

} gets();

if (strcmp(str1, str2) < 0)

cout << "1st string is less than 2nd string";

16) #include <iostream>

#include <conio.h>

void main()

{ clrscr(); cout << "Enter 1st string";

char \*str1, \*str2; cin >>

int i; cout << "Enter 2nd string";

printf(" enter 1st string");

if (0 == strcmp(str1, str2))

printf(" both strings are same");

else if (0 < strcmp(str1, str2))

for (i = 0; str1[i] == '0' && str2[i] == '0'; i++);

if (str1[i] != str2[i])

break;

if (0 > strcmp(str1, str2))

printf(" both strings are same");

else if (str1[i] - str2[i] > 0)

printf(" 1st String comes after 2nd string in dictionary");

else

printf(" 1st String comes before

2nd string in dictionary");

gets();

} if (i < 700 && i > 100)

cout << "press any key to exit";

```

{"c} #include <stdio.h>
#include <conio.h>
int strcmp1 (char *, char *);
void main()
{
    char *str1, *str2;
    clrscr();
    printf(" enter 1st string");
    gets(str1);
    printf(" enter 2nd string");
    gets(str2);
    if(strcmp1(str1, str2) == 0)
        printf(" both string are same");
    else if(strcmp1(str1, str2) > 0)
        printf(" 1st string comes after
                and string in dictionary");
    else
        printf(" 1st string comes before
                and string in dictionary");
    getch();
}
int strcmp1 (char *s1, char *s2)
{
    int i;
    for(i=0; s1[i] != '\0' && s2[i] != '\0'; i++)
    {
        if(s1[i] < s2[i])
            return (s1[i] - s2[i]);
        break;
    }
}

```

~~Q. 10.~~ ~~S~~trcmp :- This function compares two strings ignoring the case and return an integer value with following condition.

- (a) If it return 0 both strings are same.
- (b) If positive value is return 1st string comes after and string.
- (c) If negative value is return 1st string comes before and string.

Q. Write a program to compare two strings ignoring the case.

- (a) With the help of library function.
- (b) With the help of user define function.
- (c) Without any function.

(Q. 10. i. & ii.)

(Method 1. Using Library Function)

```
#include <stdio.h>
#include <conio.h>
#include <iostream.h>
#include <string.h>
void main()
{
    clrscr();
    char *str1,*str2;
    cout << "enter 1st String";
    gets(str1);
    cout << "enter 2nd String";
    gets(str2);
    if(strcmp(str1,str2)==0)
        cout << "both string are same";
    else if(strcmp(str1,str2)>0)
        cout << "1st string comes after 2nd string";
    else
        cout << "2nd string comes after 1st string";
}
```

Printf ("1st String comes after  
and string in dictionary");  
else

printf ("1st String comes before  
and string in dictionary");  
getchar();

{b) #include <stdio.h>  
#include <conio.h>

```
int strcmpi(char *, char *);  
void main() {  
    char *str1, *str2;  
    int cursor();  
    printf("Enter 1st String");  
    gets(str1);  
    printf("Enter 2nd String");  
    gets(str2);  
    if (strcmpi(str1, str2) == 0)  
        printf("both strings are same");  
    else if (strcmpi(str1, str2) > 0)  
        printf("1st String comes after and  
        and string in dictionary");  
    else  
        printf("1st String comes before  
        and string in dictionary");  
    getch();  
}
```

if ("1000 > 2000")  
 printf ("1000 is greater than 2000");  
else  
 printf ("2000 is greater than 1000");  
if ("apple > banana")  
 printf ("apple is greater than banana");  
else  
 printf ("banana is greater than apple");

```

    int i;
    for (i = 0; s1[i] != '\0' && s2[i] != '\0'; i++)
        if ((s1[i] == s2[i]) || s1[i] - 32 == s2[i] || s1[i] + 32 == s2[i])
            continue;
        else
            break;
    return (s1[i] - s2[i]);
}

```

(c) #include <stdio.h>

```

#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    printf("enter 1st string");
    gets(str1);
    printf("enter 2nd string");
    gets(str2);
    for (i = 0; str1[i] != '\0' && str2[i] != '\0'; i++)
        if (str1[i] == str2[i] || str1[i] - 32 == str2[i] || str1[i] + 32 == str2[i])
            continue;
        else
            break;
    if (str1[i] - str2[i] == 0)
        printf("both strings are same");
    else
        str1[i] - str2[i] > 0
}

```

`printf("1st string comes after  
2nd string in dictionary");`

`else`

`(f1)`

`= printf("1st string comes before  
2nd string in dictionary");`

`getch();`

`}`

`(10/11/2023)`

`.3219`

`(10/11/2023)`

**10\*** `strcmp()`: This function compares n character of 2 strings from starting without considering the case.

`(10/11/2023, 10/11/2023)`

→ it returns the differences of ascii values of a character at same position in both string.  
If it returns 0 both string are same upto n character otherwise both string are different.

`(10/11/2023, 10/11/2023)`

a. write a program to compare two string ignoring the case conversion values.

(i) using library function.

= write with the help of user define function.

Q. without any function.

(10/11/2023, 10/11/2023)

(a) `#include <iostream>`

`#include <conio.h>`

`#include <string.h>`

`(10/11/2023, 10/11/2023)`

`(Q. 10/11/2023, 10/11/2023)`

```

char *str1, *str2;
int n;
clrscr();
printf(" Enter 1st string :- ");
gets(str1);
printf(" Enter 2nd string :- ");
gets(str2);
printf(" Enter no. of character to be compared");
scanf("./d", &n);
if(strcmpi(str1, str2, n) == 0)
    printf(" both strings are same");
else if(strcmpi(str1, str2, n) > 0)
    printf(" 1st string comes after and string in dictionary");
else
    printf(" 1st string comes before and string in dictionary");

```

(b)

```

#include <stdio.h>
#include <conio.h>
int strcmpi(char *, char *, int);
void main()
{
    char *str1, *str2;
    int n;
    clrscr();
    printf(" Enter 1st string :- ");
    gets(str1);

```

```

printf("enter 2nd string");
gets(str2);
printf("enter no. of character
to be compared");
scanf("%d", &n);
if (strcmp(str1, str2) == 0)
    printf("both strings are same");
else if (strcmp(str1, str2, n) > 0)
    printf("1st string comes after
    and string is in dictionary");
else
    printf("1st string comes before
    and string is in dictionary");
getch();

```

*(Note: In the original image, there is a large red circle drawn over the entire code block, indicating it is a complete program.)*

```

int strcmp(char *s1, char *s2, int n)
{
    for (int i = 0; i < n && s1[i] != '\0' && s2[i] != '\0'; i++)
        if (s1[i] == s2[i] || s1[i] - 32 == s2[i] || s1[i] + 32 == s2[i])
            continue;
        else if (i == n)
            break;
    if (s1[i] == s2[i] || s1[i] - 32 == s2[i] || s1[i] + 32 == s2[i])
        return 0;
    else
        return (s1[i] - s2[i]);
}

```

```

(c) #include <stdio.h>
#include <conio.h>
void main()
{
    char *str1, *str2;
    int n, i;
    clrscr();
    printf("enter 1st string");
    gets(str1);
    printf("enter 2nd string");
    gets(str2);
    printf("enter no. of character to");
    printf("be compared");
    scanf("%d", &n);
    for(i=0; i<n && str1[i] == '10'; i++)
        if(str2[i] != '10') i++;
    if(str1[i] == str2[i] || str1[i]-32 == str2[i])
        continue;
    else
        break;
    if(str1[i] - str2[i] == 0 || str1[i]-32 == str2[i] || str1[i]+32 == str2[i])
        printf("both strings are same");
    else if(str1[i]-str2[i] > 0)
        printf("1st string comes after");
    else
        printf("1st string comes before");
}
    getch();
}

```

**Q1** strcmp (str1, str2, n) :- It compares  $n$  characters of a strings str1 and str2.

- It return an integer value which may be 0, -ve, +ve
- If It returns 0 both strings are same upto  $n$  character
- If It returns a non-zero value there is difference b/w two strings upto  $n$  character.

**Q2** Write a program to compare two strings upto  $n$  character:-

- (a) Using library Function.
- (b) With the help of user define function.
- (c) without using any function.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char *str1, str2;
    int lim;
    clrscr();
    printf("enter 1st string:");
    gets(str1);
    printf("enter 2nd string:");
    gets(str2);
    printf("enter no of character to be compared:");
    scanf("%d", &n);
}
```

```

for (i=0; i<m && str1[i] != '0' &&
     str2[i] != '0'; i++)
    if (str1[i] == str2[i])
        continue;
    else {
        break;
    }
if (i == m)
    i--;
if (str1[i] == str2[i])
    printf("both strings are same");
else if (str1[i] - str2[i] > 0)
    printf("%s comes after %s in 1st string");
else
    printf("1st string comes before
           %s and %s in dictionary");
getchar();

```

```

Q) #include <stdio.h>
#include <conio.h>
int strcmp1 (char *, char *, int);
void main()
{
    char *str1, *str2;
    int n;
    clrscr();
    printf("enter 1st string");
    gets(str1);
    printf("enter 2nd string");
    gets(str2);
    printf("enter no. of character");

```

"to be compared");

scanf("%s,%d", &str1, &n)

if (strcmp(str1, str2, n) == 0)

printf("both strings are same");

else if (strcmp(str1, str2, n) > 0)

printf("1st string comes after  
and 2nd string in dictionary");

else

printf("1st string comes before  
and 2nd string in dictionary");

getch();

int strcmp1(char \*s1, char \*s2, int n)

&

for (i = 0; i < n && s1[i] != '\0' &&

s2[i] != '\0'; i++)

if (s1[i] == s2[i])

continue;

else

break;

if (i == n) return 0;

i++;

(minimum len

return (s1[i] - s2[i]);

> if (s1[i] < s2[i])

i++;

else if (s1[i] > s2[i])

i--;

```

19) #include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *str1, *str2;
    int n;
    clrscr();
    printf("Enter 1st string");
    gets(str1);
    printf("Enter 2nd string");
    gets(str2);
    printf("Enter no. of characters to be compared");
    scanf("%d", &n);
    if(strcmp(str1, str2, n) == 0)
        printf("both strings are same");
    else if(strcmp(str1, str2, n) > 0)
        printf("1st string comes after 2nd string in dictionary");
    else
        printf("1st string before 2nd string in dictionary");
}
    
```

12) Reverse (Str) :- This function reverse the String Str.

- write a program to reverse a string given by the user.
- using library function.

(b) With the help of user define function  
for without any function.

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *Str;
    clrscr();
    printf("Enter a string");
    gets(Str);
    Strrev(Str);
    printf("New string = %s", Str);
    getch();
}
```

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char *Str, temp;
    clrscr();
    printf("Enter a string");
    gets(Str);
    for (i=0; Str[i] != '\0'; i++)
        temp = Str[i];
    for (i=0; i<=i/2; i++)
        Str[i] = Str[i-1];
    Str[i] = temp;
}
```

```
temp = Str[i];
Str[i] = Str[i-1];
Str[i-1] = temp;
> main() returns 0
```

```
printf("New string = %s", str);
```

```
> getch();
```

(c) #include <stdio.h>

#include <conio.h>

```
void strrev(char *);
```

```
- void main()
```

```
>
```

```
char str[80];
```

```
clrscr();
```

```
printf("Enter a string");
```

```
- gets(str);
```

```
strrev(str);
```

```
printf("New string = %s", str);
```

```
- getch();
```

```
>
```

```
void strrev(char *str)
```

```
>
```

```
{ int i, l;
```

```
char temp;
```

```
for (l=0; str[l] != '\0'; l++);
```

```
for (i=0; i<l/2; i++)
```

```
{ temp = str[i];
```

```
str[i] = str[l-i-1];
```

```
str[l-i-1] = temp;
```

```
>
```

```
main();
```

```
getch();
```

```
return 0;
```

```
};
```

13.

`STRCHR(STR, CH)` :- This function searches a character (ch) in the string STR and returns the location of 1st occurrence of character ch in the string.

- (a) write a program to find/search a given character in a string using library function.
- (b) by the help of user define function.
- (c) without any function.

```
#include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char *STR, CH, *PSTR;
    clrscr();
    printf("enter a string");
    gets(STR);
    printf("enter a character to search");
    scanf("%c", &CH);
    PSTR = strchr(STR, CH);
    printf("Character found at %d", PSTR);
    getch();
}
```

(b) #include <stdio.h>  
# include <conio.h>  
char \*strchr (char \*, char);  
void main()  
{
 char \*str, ch, \*ptr;
 clrscr();
 printf("enter a string:");
 gets(str);
 printf("enter a character to search");
 scanf("%c", &ch);
 if (ptr = strchr (str, ch))
 printf("character found at %d", ptr);
 getch();
}

char strchr (char \*str, char ch)

for (i; str != '\0'; str++)
 if (\*str == ch)
 break;

return str;

>

(c) #include <stdio.h>
# include <conio.h>
void main()
{
 char \*str, ch, \*ptr;
 clrscr();
 printf("enter a string");
 gets(str);
 printf("enter a character to search");
}

`scanf("y.c", &ch);`

`printf("Base address of String = %u`

`in ", &str);`

`for (ptr = str; *ptr != '\0'; ptr++)`

`if (*ptr == ch)`

`break;`

`if (*ptr != '\0')`

`printf("Character found at`

`'%u", ptr);`

`else printf("Character not found`

`in the string");`

`getch();`



~~Q.1. Write a program to input the name~~

~~of 10 students. Short these name~~

~~and then display them.~~

~~Q.2. Write a program to read a paragraph  
then count:~~

(a) total no. of characters

(b) upper case alphabet

(c) lower case alphabet

(d) no. of words

(e) no. of sentences

(f) no. of function marks

~~((("Program to calculate string length"))~~

~~((("Program to calculate word count"))~~

~~((("Program to calculate sentence count"))~~

Q. #include <stdio.h>  
 #include <conio.h>  
 #include <ctype.h>  
 void main()

&lt;

char \*str;

int b=0, c=0, d=0, e=0, f=0, i;

clrscr();

printf("Enter paragraph:- ");

gets(str);

for(i=0; str[i]!='\0'; i++)

(X++);

{if(gf(isupper(str[i])))

b++;

else if(islower(str[i]))

d++;

else ifisspace(str[i]);

{c++; f++;}

d++;

else if(str[i]=='.')

i++;

else if(ispunct(str[i]))

f++;

&gt;

printf("Total no. of character=%d", i);

printf("In total no. of uppercase=%d", b);

printf("In total no. of lowercase=%d", c);

printf("In total no. of words=%d", d);

printf("In total no. of sentences=%d", e);

printf("In total no. of punctuation=%d", f);

getch();

&gt;

V.V.T

```

1. #include <stdio.h>
#include <conio.h>
#include <string.h>
void main()
{
    char str[10][25], temp[25];
    int i, j;
    clrscr();
    printf("Enter 10 strings:-\n");
    for (i = 0; i < 10; i++)
    {
        gets(str[i]);
        for (j = 0; j < i; j++)
        {
            if (strcmp(str[i], str[j]) > 0)
                strcpy(temp, str[i]);
            else
                strcpy(str[i], str[j]);
        }
    }
    printf("The strings after sorting the\nstring are :-\n");
    for (i = 0; i < 10; i++)
        puts(str[i]);
    getch();
}
    
```

**Ans :-** ~~1. The strings after sorting the string are :-~~

**2. \*strchr :-** This function locates the first occurrence of the said character in the string strchr(str, ch) in the string str.

- a. Write a program to find the last occurrence of the character in a string:  
 (a) with built-in-function (library fn.)  
 (b) with user-defined function.  
 (c) without any function.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    char *str, ch, *ptr, *ptr1;
    clrscr();
    printf("Enter a String");
    gets(str);
    printf("Enter character to Search");
    scanf("%c", &ch);
    printf("Base address of String = %u\n", str);
    for(ptr = str; *ptr != '\0'; ptr++)
    {
        if (*ptr == ch)
        {
            printf("Character Found at %u", ptr);
            break;
        }
    }
    if (*ptr == '\0')
        printf("Character not found in the String");
}
```

(b) #include <stdio.h>

#include <conio.h>

char \*StringSearch(char \*Str, char);

void main()

{

char \*Str, Cn, \*PTr, \*PTr1;

clrscr();

printf("Enter a String");

gets(Str);

printf("Enter character to Search");

scanf("%c", &Cn);

printf("Base address of String");

= %u", Str);

PTr1 = StringSearch(Str, Cn);

(Condition of Execution if PTr1 != NULL)

if (PTr1 != NULL) printf("Character Found at %u", PTr1);

else else

printf("Character not

Found in the String");

getch();

}

to char \*StringSearch(char \*Str, char)

if (Str == NULL || Cn ==

char \*PTr, \*PTr1 = NULL;

for (PTr = Str; \*PTr != '\0'; PTr++)

if (\*PTr == Cn) { \*PTr1 = Cn }

if (PTr1 == PTr)

return PTr1;

}

(a) `#include < stdio.h >`  
`#include < conio.h >`  
`#include < string.h >`  
`void main()`  
`{`  
 `char *str, ch;`  
 `clrscr();`  
 `printf("Enter a String:-");`  
 `gets(str);`  
 `printf("Enter character to search");`  
 `scanf("%c", &ch);`  
 `printf("Base address of string`  
`(i.e. Address of str = %u)", str);`  
 `if (strchr(str, ch))`  
 `printf("Last occurrence of character is at %u",`  
 `strchr(str, ch) - str);`  
 `else`  
 `printf("Character not found")`  
 `return 0;`

15. `strstr (str1, str2)` :- This Function  
 Locates the FIRST occurrence of  
 sub string str2 in string str1

Q. Write a program to search the  
 first occurrence of a sub string  
 in another string.

- (a) Using library function.
- (b) with the help of user define function
- (c) without any function.

```

(a) #include <stdio.h>
#include <string.h>
#include <conio.h>
void main()
{
    char *STR1, *STR2, *PTR;
    clrscr();
    printf(" enter a string :- ");
    gets(STR1);
    printf(" enter second string :- ");
    gets(STR2);
    printf(" base address of string ");
    printf("%u", STR1);
    PTR = strstr(STR1, STR2);
    if (PTR == NULL)
        printf(" string not found");
    else
        printf(" string found at %u", PTR);
}

```

Pointer is a variable declared  
 - ion method use for store  
 address of any same type  
 variable.

```
#include <stdio.h>
#include <conio.h>
void swap(int *x, int *y);
void main()
{
    int x, y;
    clrscr();
    printf(" enter two no:-");
    scanf("%d %d", &x, &y);
    printf(" before swapping x=%d and y=%d", x, y);
    swap(&x, &y);
    printf(" after swapping x=%d and y=%d", x, y);
    getch();
}
```

void swap(int \*m, int \*n)

```

    int t;
    t = *m;
    *m = *n;
    *n = t;
```

>

## Pointer (\*)

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- \* Pointer is a variable that stores the address of another variable.

```
int n = 0, *p
```

```
float m, *n
```

- \* Here x can store a integer value and \*p can store the address of x, and \*m store the address of m.

- \* The pointer variable is an unsigned integer value. Not fractional.

- \* We must declare the pointer variable in those data type for which it can store address like `int *p` (`int *p`) will only store the address of integer data type variable and `float *n` will only float variable this is due to accessing or dereferencing of the pointer.

- \* Generic pointer is a type of pointer which can be used in all data type and must be declared in global area like `void *ptr` but we can only use this for `*ptr` find the address. we cannot dereference it.

\* benefits:-

- (1) save data
- (2) return multiple values at a time
- (3) can access in another function using the address of variable

QUESTION NO. 3

\* If we increment or decrement the pointer variable then there is a scale factor of data variable.

Ex:- int main() {  
int a = 100; int b = 101;  
int c = 102; int d = 103;

int \*p

for (i = 0;

p++  $\Rightarrow$  ? If p has address  
memory 100 then value of p will be 100

$$p++ \Rightarrow 100 + 4 \times (1) = 104$$

if p = 100, then value of p will be 100

and value of p+1 = 100 + 4  $\times$  (1) = 104

so value for character is will be 101

value of a = 100 and b = 101

\* We can use (\*) symbol for

declaration to the compiler that we

want to create a pointer variable

- Method 1: eg:- int \*p, \*q;

eg:- int \*p, \*q;

Method 2: void main() {  
int a = 100, b = 101, c = 102, d = 103;

int \*p, \*q; p = &a; q = &b;

then p = &a;  $\rightarrow p = 100$  location of a

now we can also access a without using

address like  $\rightarrow p = *p$ . i.e. now

i.e. a will be printed

If we want to store address of a data variable we use  $*P$   
but if we want to store address of a single pointer variable we can increase one (\*) like  $* * m$

For  $m \rightarrow *P$

$*P \rightarrow * * m$

$* * m \rightarrow * * * m$

We can also access the value of  $m$  through

$z = *P$

$z = *( *m )$

$z = *(*(*m))$  all give the same result.

\* Pointer variable cannot be initialize like  $\text{int } *P$

$P = 10 - X$  this is error.

Pointer variable can only initialize with `NULL` or `0`

\* We cannot do any arithmetic operations on pointer variable like add subtract etc.

\* We can only find the difference using pointer but in the same array like  $\text{int } *a$   
 $a[10] - a[5]$