Initial and If Structure

ram that can calculate the sum and average of three numbers

n the radius of a circle. Find the area, circumference of it. (*U*
nstant).

n the area and height of a triangle. Find out the base of trian

ee values of three lines; Find out the area of it.

ram to compute the roots of a quadratic equation $ax^2 + bx +$

nditions.

is only one root, if a =0 (x = -c/b).

are no real roots, if b^2-4ac is negative.

here are no real roots.

maximum of two numbers using if structure.

maximum of three numbers using only if structure.

ram that convert temperature to from Fahrenheit to Celsius a

ram that can say the Askey value of a key of keyboard.

ram that can say whether it is Character, digit or functional k

ram that can test whether a number is Odd or Even.

am that can test whether it is divisible by 5 or not.

ram that can test a year whether it is leaper or not.

ram that can test a number whether it is negative or positive.

ram that can say the name of weekdays by receiving 1 to 7. U
nt and (ii) Switch Statement.

ram that can say the name of Month by receiving 1 to 12. Us
nt and (ii) Switch Statement.

ram that can convert an upper case letter to lower case letter

ram that will obtain the length and width of a rectangle from
area and perimeter.

nditional operator find out the maximum of two numbers.

nditional operator find out the maximum of three numbers.

Loop Structure

programs by using three loops and user defines function

es 1 2 3 4 5 . . . . . . **N** Where **N** will be given through keybo

es N, N-1, N-2, ….. 3, 2, 1 Where **N** will come through keyb

numbers among **1** and **N** in ascending order.

n numbers among **1** and **N** in descending order.

ogram to find the number of and sum of all integers greater tl
t are divisible by 9.

ogram to find the number of and sum of all integers greater tl
t are divisible by 7.

factorial of a number N. Where N will come from key board

summation of the series $\sum_1^N x$ Where N will come from key

owing half pyramid.

….*N*
ll come from keyboard.

er whether it is prime number or non prime number.

oonacci series up to N Where N will be given through the key

owing full pyramid.

```
        1
      1   2
     1  2   3
   1   2   3   4
 1   2   3   4   5
   ………………………
 ………………………………
```

1 2 3 4 5 6 7……. .N
ll come from keyboard.

ng the value of N the output will be as follows.

1
2 = 3
2 + 3 = 6
2 + 3 + 4 = 10

+3 +4 +5+ …….+ N = $\sum_1^N x$

ng the value of N the output will be as follows.

Corresponding output
1 = 1
*1 * 2 = 2*
*1 * 2 * 3 = 6*
*1 * 2 * 3 * 4 = 24*
*1 *2 *3 *4 *5* ……. * N =* $\sum_1^N x$

value of sinx, cosx, tanx, cots, secx, cosecx Where the value
to take the degree value from key board.

value of the series of e^x, e^{-x}, $\log(1+x)$, $\log(1-x)$,

he prime numbers in number **N** Where **N** will be given throu

Corresponding output
1 2 3 5 7 11 13 17
1 2 3 5 7 11 13 17 23 29 31 37 41 43 47
1 2 3 5 7 11 13 17 23 29 31 37 41 43 47 ……

ram that can reverse an integer number.

Output
32

321
984

ecimal numbers into binary number

Output
101
110
111

ors of an integer number.

Output
1 2 4 5 10 20
1 2 3 5 6 10 15
1 2 5 10 25 50

teger number **N** into two parts **n1** and **n2** in such a way so th
es prime number and the sum of **n1** and **n2** is equal to **N.**

Output
(1, 19), (3, 17), (7, 13)
(3, 47), (7, 43), (13, 37)
(1, 59), (7, 53), (17, 43), (19, 41), (23, 37), (29, 31)

Do the following string operation

g or line and count the total number of character or length of

ank space of the string which will be given through keyboar

tal number of vowels and consonant of a string.

g or line and print it in the reverse order.

ing in the reverse case.

ring and place it into the third string.

at the end of other string.

o strings and say the lager of it.

ing into upper case letter.

ing into lower case letter.

first character of all words in a string into capital or upper ca

last character of all words in a string into capital or upper cas

the vowels into capital or upper case letter of a string.

the consonant into capital or upper case letter of a string.

the vowels into small or lower case letter of a string.

the consonant into small or lower case letter of a string.

first character of all words in a string into small or lower lett

last character of all words in a string into small or lower case

ition of a specific character of a string.

ition of a specific word of a string.

rst character of a string.

rst word of a string.

of a string.

ord in a string.

Solve the following array problem

m and average of an array element.

ximum or minimum value of an array element.

cific number of an array element and say its position if it is f

rst element of an array element.

cific number of an array element.

n and average of a two dimensional array element.

sum of border element of a two dimensional array.

sum of diagonal element of a squire matrix or squire two di

trixes.

matrixes.

ecific number of an array element.

element in the first position of an array.

element in a specific position in an array where the position
n through the key board.

element before a specific element in an array where the spec
ough a keyboard.

in ascending and descending order by using the following m

bubble sort.
sort.
ntial sort.
sort.

y search method, search a number from a linear array.

ram that can merge two sorted arrays into a one sorted array.

ram that can store and print array of structure which holds th
i) name (iii) marks. Here data type can be chosen by user.

em number 11 to 17 for the case of array of structure.

roblem 1 to 19 using user define function passing parameter

If_else
&
Switch

Solved by,

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# 2309058

1.Write a program that can calculate the sum and average of three numbers.

Answer:

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

int main() {
    float a, b, c, sum, average;

    printf("Enter first number: ");
    scanf("%f", & a);

    printf("Enter second number: ");
    scanf("%f", & b);

    printf("Enter third number: ");
    scanf("%f", & c);

    sum = a + b + c;
    average = sum / 3;

    printf("\nSum = %.2f\n", sum);
    printf("Average = %.2f\n", average);

    return 0;
}
```

2.There is given the radius of a circle. Find the area, circumference of it.

(Use π as a symbolic constant).

Answer:

```
#include <stdio.h>
#include <conio.h>
#define PI 3.1416   //this is symbolic constant for π

int main() {
        float r, area, circumference;

        printf("Enter the radius of the circle= ");
        scanf("%f", & r);

        area = PI * r * r;
        circumference = 2 * PI * r;
        printf("Area of the circle is = %.2f\n", area);
        printf("Circumference of the circle is = %.2f\n", circumference);

    return 0;
}
```

3.There is given the area and height of a triangle. Find out the base of triangle.

Answer:

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

int main() {
        float area, height, base;

        printf("Enter the area of the triangle= ");
        scanf("%f", & area);

        printf("Enter the height of the triangle= ");
        scanf("%f", & height);

        base = (2 * area) / height;

        printf("The base of the triangle is = %.2f\n", base);

        return 0;
}
```

4.There are three values of three lines of a triangle; Find out the area of it.

Answer:

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

int main() {
        float a, b, c, s, area;

        printf("Enter first side of the triangle= ");
        scanf("%f", & a);
        printf("Enter second side of the triangle= ");
        scanf("%f", & b);
        printf("Enter third side of the triangle= ");
        scanf("%f", & c);

        if((a + b > c) && (a + c > b) && (b + c > a))
        {
            s = (a + b + c) / 2;  //অর্ধ-পরিসীমা
            area = sqrt(s * (s - a) * (s - b) * (s - c));

            printf("The area of the triangle = %.2f\n", area);
        }
        else {
            printf("the values will not form a triangle.\n");
        }

      return 0;
}
```

05. Write a program to compute the roots of a quadratic equation $ax^2+bx+c=0$ use following conditions.

(i) There is only one root, if a =0 (x = -c/b).

(ii) There are no real roots, if b2-4ac is negative.

Otherwise, there are no real roots.

Answer:

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
int main() {
        float a,b,c,d, x1, x2; // d = discriminant

        printf("Enter coefficient of x^2 (a)= ");
        scanf("%f", & a);
        printf("Enter coefficient of x (b)= ");
        scanf("%f", & b);
        printf("Enter constant (c)= ");
        scanf("%f", & c);

        if (a == 0) {
            if (b == 0) {
                printf("No solution.\n");
            }
            else {
                x1 = -c / b;
                printf("Only one Root: x = %.2f\n", x1);
            }
        }
        else {
            d = b*b - 4*a*c;

            if (d < 0){
                printf("No real roots. imaginary number.\n");
            }
            else {
                x1 = (-b + sqrt(d)) / (2*a);
                x2 = (-b - sqrt(d)) / (2*a);
                printf("Two real roots:\nx1 = %.2f\nx2 = %.2f\n", x1, x2);
            }
        }
        return 0;
}
```

06. Find out the maximum of two numbers using if structure.

Answer:

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

int main()
{
        int a, b;

        printf("Enter first number: ");
        scanf("%d", & a);
        printf("Enter second number: ");
        scanf("%d", & b);

        if (a > b) {
            printf("Maximum = %d\n", a);
        }
        else {
            printf("Maximum = %d\n", b);
        }

        return 0;
}
```

07. Find out the maximum of three numbers using only if structure.

Answer:

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

int main() {
        int a, b, c, max;

        printf("Enter first number= ");
        scanf("%d", & a);
        printf("Enter second number= ");
        scanf("%d", & b);
        printf("Enter third number= ");
        scanf("%d", & c);

        max = a;

        if (b > max) {
            max = b;
        }

        if (c > max) {
            max = c;
        }

        printf("Maximum number is = %d\n", max);

        return 0;
}
```

08. Write a program that convert temperature to from Fahrenheit to Celsius and vice versa.

Answer:

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

int main() {
    float a, c, f, convert;

    printf("Choose conversion type:\n");
    printf("1. Celsius to Fahrenheit\n");
    printf("2. Fahrenheit to Celsius\n");
    printf("Enter your choice (1 or 2)= ");
    scanf("%f", & a);

    if (a == 1) {
        printf("Enter temperature in Celsius: ");
        scanf("%f", & c);
        f = ((c * 9)/5) + 32;
        printf("Temperature in Fahrenheit= %.2f\n", f);
    }

    if (a == 2) {
        printf("Enter temperature in Fahrenheit= ");
        scanf("%f", & f);
        c = ((f - 32)/9)* 5;

        printf("Temperature in Celsius: %.2f\n", c);
    }

    else {
        printf("Invalid choice !!\n");
    }
    return 0;
}
```

09. Write a program that can say the Askey(ASCII) value of a key of keyboard.

Answer:

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

int main() {
        char ch;

        printf("Enter a key= ");
        scanf("%c", &ch);

        printf("You pressed '%c' and its ASCII value is= %d \n", ch, ch);

        return 0;
}
```

10. Write a program that can say whether it is Character, digit or functional key.

Answer:

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

int main() {
        char ch;

        printf("Press a key= ");
        scanf(" %c", &ch);

        if (ch >= 'A' && ch <= 'Z') {
            printf("It is an Uppercase Character.\n");
        }
        else if (ch >= 'a' && ch <= 'z') {
            printf("It is a Lowercase Character.\n");
        }
        else if (ch >= '0' && ch <= '9') {
            printf("It is a Digit.\n");
        }
        else {
            printf("It is a Functional(special) Key.\n");
        }
    return 0;
}
```

11. Write a program that can test whether a number is Odd or Even.

Answer:

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

int main() {
        int a;

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

        if (a % 2 == 0) {
            printf("%d is Even number.\n", a);
        } else {
            printf("%d is Odd number.\n", a);
        }

        return 0;
}
```

12. Write a program that can test whether it is divisible by 5 or not.

Answer:

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

int main() {
        int a;

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

        if (a % 5 == 0) {
            printf("%d is divisible by 5.\n", a);
        } else {
            printf("%d is not divisible by 5.\n", a);
        }

        return 0;
}
```

13. Write a program that can test a year whether it is leap year or not.

Answer:

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

int main() {
        int yr;

        printf("Enter a year: ");
        scanf("%d", & yr);

        if ((yr % 400 == 0) || ((yr % 4 == 0) && (yr % 100 != 0))) {
            printf("%d is a Leap year.\n", yr);
        }
        else {
            printf("%d is not a Leap year.\n", yr);
        }
        return 0;
}
```

14. Write a program that can test a number whether it is negative or positive.

Answer:

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

int main() {
        int a;

        printf("Enter a numaber: ");
        scanf("%d", &a);

        if (a > 0) {
            printf("%d is Positive.\n", a);
        }
        else if (a < 0) {
            printf("%d is Negative.\n", a);
        }
        else {
            printf("The numaber is Zero.\n");
        }

        return 0;
}
```

15. Write a program that can say the name of weekdays by receiving 1 to 7. Using (i) If-then-else statement and (ii) Switch Statement.

Answer:

(i) if_else

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

int main() {
        int a;

        printf("Enter a number (1-7)= ");
        scanf("%d", & a);

        if (a == 1) {
            printf("It is Sunday\n");
        }
        else if (a == 2) {
            printf("It is Monday\n");
        }
        else if (a == 3) {
            printf("It is Tuesday\n");
        }
        else if (a == 4) {
            printf("It is Wednesday\n");
        }
        else if (a == 5) {
            printf("It is Thursday\n");
        }
        else if (a == 6) {
            printf("It is Friday\n");
        }
        else if (a == 7) {
            printf("It is Saturday\n");
        }
        else {
            printf("Invalid input !! Please enter a number from 1 to 7.\n");
        }

        return 0;
}
```

(ii) switch

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

int main() {
        int a;

        printf("Enter a number (1-7)= ");
        scanf("%d", &a);

        switch(a) {
                case 1:  printf("It is Sunday\n");
                        break;
                case 2:  printf("It is Monday\n");
                        break;
                case 3:  printf("It is Tuesday\n");
                        break;
                case 4:  printf("It is Wednesday\n");
                        break;
                case 5:  printf("It is Thursday\n");
                        break;
                case 6:  printf("It is Friday\n");
                        break;
                case 7:  printf("It is Saturday\n");
                        break;
                default: printf("Invalid input !! Please enter a number from 1 to
7.\n");
        }

        return 0;
}
```

16. Write a program that can say the name of Month by receiving 1 to 12. Using (i) If-then-else statement and (ii) Switch Statement.

Answer:

(i) if_else

```
#include <stdio.h>
#include <conio.h>
int main() {
        int a;

        printf("Enter month number (1-12): ");
        scanf("%d", &a);

        if (a == 1)
            printf("January\n");
        else if (a == 2)
            printf("It is February\n");
        else if (a == 3)
            printf("It is March\n");
        else if (a == 4)
            printf("It is April\n");
        else if (a == 5)
            printf("It is May\n");
        else if (a == 6)
            printf("It is June\n");
        else if (a == 7)
            printf("It is July\n");
        else if (a == 8)
            printf("It is August\n");
        else if (a == 9)
            printf("It is September\n");
        else if (a == 10)
            printf("It is October\n");
        else if (a == 11)
            printf("It is November\n");
        else if (a == 12)
            printf("December\n");
        else
            printf("Invalid number\n");

        return 0;
}
```

(ii) switch

```
#include <stdio.h>
#include <conio.h>
int main() {
        int month;

        printf("Enter month number (1-12): ");
        scanf("%d", &month);

        switch (month) {
            case 1:  printf("January\n");
                        break;
            case 2:  printf("February\n");
                        break;
            case 3:  printf("March\n");
                        break;
            case 4:  printf("April\n");
                        break;
            case 5:  printf("May\n");
                        break;
            case 6:  printf("June\n");
                        break;
            case 7:  printf("July\n");
                        break;
            case 8:  printf("August\n");
                        break;
            case 9:  printf("September\n");
                        break;
            case 10: printf("October\n");
                        break;
            case 11: printf("November\n");
                        break;
            case 12: printf("December\n");
                        break;
            default: printf("Invalid number.\n");
        }

        return 0;
}
```

17. Write a program that can convert an upper case letter to lower case letter and vice versa.

Answer:

```
#include <stdio.h>
#include <conio.h>
int main() {
        char ch;

        printf("Enter a letter= ");
        scanf(" %c", &ch);

        if (ch >= 'A' && ch <= 'Z') {
            ch = ch + 32;   // uppercase to lowercase
        }
        else if (ch >= 'a' && ch <= 'z') {
            ch = ch - 32;   // lowercase to uppercase
        }

        printf("Converted= %c\n", ch);
        return 0;
}
```

18. Write a program that will obtain the length and width of a rectangle from the user and compute its area and perimeter.

Answer:

```c
#include <stdio.h>

int main() {
        float length, width, area, perimeter;

        printf("Enter the length of the rectangle= ");
        scanf("%f", & length);

        printf("Enter the width of the rectangle= ");
        scanf("%f", & width);

        area = length * width;
        perimeter = 2 * (length + width);

        printf("Area of the rectangle = %.2f\n", area);
        printf("Perimeter of the rectangle = %.2f\n", perimeter);

        return 0;
}
```

19. Using the conditional operator find out the maximum of two numbers.

Answer:

```c
#include <stdio.h>
#include <conio.h>
int main() {
        int a, b, max;

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

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

        max = (a > b) ? a : b;

        printf("Maximum number is: %d\n", max);

        return 0;
}
```

20. Using the conditional operator find out the maximum of three numbers.

Answer:

```c
#include <stdio.h>
#include <conio.h>
int main() {
        int a, b, c, max;

        printf("Enter first number= ");
        scanf("%d", & a);
        printf("Enter second number= ");
        scanf("%d", & b);
        printf("Enter third number= ");
        scanf("%d", & c);

        max = (a > b) ? a : b;

        max = (max > c) ? max : c;

        printf("Maximum number is= %d\n", max);

        return 0;
}
```

LoopS problems

Here i solved every problem using while loop only

u can use for / do-while

totally depends on your comfort

1. Print the series 1 2 3 4 5 . . . . n Where n will be given through keyboard.

Answer:

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

int main(){

        int i,n;
        printf("enter n= ");
        scanf("%d", & n);

        i=1;
        while(i<=n){
            printf("%4d",i);
            i++;
        }

        return 0;
}
```

2. Print the series n, n-1, n-2,....,3, 2, 1 Where n will come through keyboard.

Answer:

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

int main(){
        int n, i;

        printf("Enter the value of n= ");
        scanf("%d", & n);

        i = n;
        printf("Series= ");
        while(i >= 1){
            printf("%d ", i);
            i--;
        }
        printf("\n");

        return 0;
}
```

3. Print all odd numbers among 1 and n in ascending order.

Answer:

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

int main(){
        int n, i = 1;

        printf("Enter the value of n= ");
        scanf("%d", & n);

        printf("odd numbers from 1 to %d is= ", n);
        while(n >= i){
            if(i % 2 != 0){
                printf("%d", i);
            }
            else{
                printf(", ");
            }
            i++;
        }
        printf("\n");

        return 0;
}
```

4. Print all even numbers among 1 and n in descending order.

Answer:

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

int main(){
        int n;
        printf("Enter a number= ");
        scanf("%d", & n);

        int i = n;
        printf("even numbers from %d to 1 is= ", n);
        while(i >= 1){
            if(i % 2 == 0){
                printf("%d", i);
            }
            else{
                printf(", ");
            }
            i--;
        }

        return 0;
}
```

5. Write a C program to find the number of and sum of all integers greater than 50 and less than 300 that are divisible by 9.

Answer:

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

int main(){
        int i=51, count=0, sum=0;

        printf("Numbers greater than 50 and less than 300 that
divisible by 9=\n");
        while(i < 300){
            if(i % 9 == 0){
                printf("%d, ", i);
                count++;
                sum = sum + i;
            }
            i++;
        }

        printf("\n\nnumber of integers= %d", count);
        printf("\nSum om integers= %d\n", sum);

        return 0;
}
```

6. Write a C program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.

Answer:

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

int main(){
        int i=101, count=0, sum=0;

        printf("Numbers greater than 100 and less than 200 that are divisible by 7= \n");

        while(i < 200){
            if(i % 7 == 0){
                printf("%d, ", i);
                sum =sum + i;
                count++;
            }
            i++;
        }

        printf("\n\nnumber of integers= %d", count);
        printf("\nSum of integers= %d\n", sum);

        return 0;
}
```

7. find out the factorial of a number N. where N will come from keyboard.

Answer:

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

int main(){
        int n, i, fact;

        printf("Enter a number= ");
        scanf("%d", &n);

        fact = 1;
        i=1;
        while(i <= n){
            fact = fact * i;
            i++;
        }

        printf("Factorial = %d", fact);

        return 0;
}
```

8. Find out the summation of the series ∑1^n x . Where n will come from keyboard.

Answer:

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

int main(){
        int n, i=1, sum=0;

        printf("Enter the value of n= ");
        scanf("%d", &n);

        printf("the series is= ");

        while(i <= n){
            printf("%d", i);
            sum += i;
            if(i < n){
                printf("+");
            }
            i++;
        }
        printf("\nsummation is= %d", sum);

        return 0;
}
```

9. Print the following half pyramid.

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

…………

……………

1 2 3 4 5 6 7….n

Where n will come from keyboard.

Answer:

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

int main(){
        int n, i, j;

        printf("Enter the value of n= ");
        scanf("%d", & n);

        i=1;
        while(n >= i){
            j = 1;
            while(j <= i){
                printf("%4d", j);
                j++;
            }
            printf("\n");
            i++;
        }

        return 0;
}
```

10. Test a number whether it is prime number or non-prime number.

Answer:

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

int main(){
        int n, i=1, count =0;

        printf("Enter a number= ");
        scanf("%d", & n);

        while(i <= n){
            if(n % i == 0){
                count++;
            }
            i++;
        }

        if(count == 2){
            printf("%d is a Prime number\n", n);
        }
        else{
            printf("%d is a Non-Prime number\n", n);
        }

        return 0;
}
```

11. Write the Fibonacci series up to n Where n will be given through the keyboard.

Answer:

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

int main() {
        int n, a, b, c;

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

        a = 0;
        b = 1;

        printf("Fibonacci series up to %d= \n", n);
        while(a <= n){
            printf("%d ", a);
            c = a + b;
            a = b;
            b = c;
        }

        return 0;
}
```

12. Print the following full pyramid.

```
         1
        1 2
       1 2 3
      1 2 3 4
     1 2 3 4 5
      ……………………
    ………….……………
   1 2 3 4 5 6 7……...n
```

Where n will come from keyboard.

Answer:

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

int main(){
        int n, i, j, k;

        printf("Enter the value of n= ");
        scanf("%d", & n);

        i=1;
        while(n >= i){

            j = 1;
            while(j <= (n-i)){
                printf(" ");
                j++;
            }

            k = 1;
            while(k <= i){
                printf("%d ", k);
                k++;
            }

            printf("\n");
            i++;
        }
        return 0;
}
```

13. After receiving the value of N the output will be as follows.

1. 1 = 1

2. 1 + 2 = 3

3. 1 + 2 + 3 = 6

4. 1 + 2 + 3 + 4 = 10

.

.

N. 1 +2 +3 +4 +5+....+ N = sum

Answer:

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

int main(){
        int N, i, j, sum;

        printf("Enter the value of N= ");
        scanf("%d", & N);

        i=1;
        while(i <= N){
            sum = 0;
            j = 1;
            while(j <= i){
                printf("%d", j);
                sum += j;
                if(j < i){
                    printf(" + ");
                }
                j++;
            }

            printf(" = %d\n", sum);
            i++;
        }

        return 0;
}
```

14. After receiving the value of N the output will be as follows.
1. 1 = 1

2. 1 * 2 = 2

3. 1 * 2 * 3 = 6

4. 1 * 2 * 3 * 4 = 24

.

.

N. 1 *2 *3 *4 *5*....* N = prod

Answer:

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

int main(){
        int n, i, j;
        long prod = 1;

        printf("Enter value of N= ");
        scanf("%d", & n);

        i=1;
        while(i <= n){
            prod = prod * i;
            j = 1;
            while(j <= i){
                printf("%d", j);
                if(j < i){
                    printf(" * ");
                }
                j++;
            }
            printf(" = %ld\n", prod);

            i++;
        }
        return 0;
}
```

15. Find out the value of sinx, cosx, tanx, cots, secx, cosecx Where the value of x is in radian, but you have to take the degree value from key board.

Answer:

```c
#include <stdio.h>
#include <conio.h>
#include <math.h>
#define PI 3.14159265359

int main(){
        float degree, radian;

        printf("Enter angle in degree= ");
        scanf("%f", & degree);

        radian = degree * (PI / 180);

        if((int)degree % 180 == 0){
            printf("sin(%.3f rad) = %.2f\n", radian, sin(radian));
            printf("cos(%.3f rad) = %.2f\n", radian, cos(radian));
            printf("tan(%.3f rad) = %.2f\n", radian, tan(radian));
            printf("cot(%.3f rad) = Undefined\n", radian);
            printf("sec(%.3f rad) = %.2f\n", radian, 1/cos(radian));
            printf("cosec(%.3f rad) = Undefined\n",radian);
        }
        else if((int)degree % 90 == 0){
            printf("sin(%.3f rad) = %.2f\n", radian, sin(radian));
            printf("cos(%.3f rad) = %.2f\n", radian, cos(radian));
            printf("tan(%.3f rad) = Undefined\n", radian);
            printf("cot(%.3f rad) = %.2f\n", radian, 1/tan(radian));
            printf("sec(%.3f rad) = Undefined\n", radian);
            printf("cosec(%.3f rad) = %.2f\n",radian, 1/sin(radian));
        }
        else{
            printf("sin(%.3f rad) = %.2f\n", radian, sin(radian));
            printf("cos(%.3f rad) = %.2f\n", radian, cos(radian));
            printf("tan(%.3f rad) = %.2f\n", radian, tan(radian));
            printf("cot(%.3f rad) = %.2f\n", radian, 1/tan(radian));
            printf("sec(%.3f rad) = %.2f\n", radian, 1/cos(radian));
            printf("cosec(%.3f rad) = %.2f\n",radian, 1/sin(radian));
        }

        return 0;

}
```

16. Calculate the value of the series of e^x , e^-x , log(1+x) , log(1-x)

Answer:

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

int main(){
    int x;

    printf("Enter the value of x= ");
    scanf("%d", & x);

    printf("e^%d = %.4f\n", x, exp(x));
    printf("e^(-%d) = %.4f\n", x, exp(-x));

    if((1+x) > 0){
        printf("log(1 + %d) = %.4f\n", x, log(1 + x));
    }
    else{
        printf("log(1 + %d) is undefined (cz negative)\n", x);
    }

    if((1-x)> 0){
        printf("log(1 - %d) = %.4f\n", x, log(1 - x));
    }
    else{
        printf("log(1 - %d) is undefined (cz negative)\n", x);
    }

    return 0;
}
```

17. Find the all the prime numbers in number n Where n will be given through key board.

Answer:

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

int main(){
        int n, i, j, count;

        printf("Enter a number= ");
        scanf("%d", & n);

        printf("Prime numbers are= ", n);
        i=2;
        while(n >= i){
            count=0;
            j=1;
            while(j <= i){
                if(i % j == 0){
                    count++;
                }
                j++;
            }
            if(count == 2){
                printf("%d, ", i);
            }
            i++;
        }
        return 0;
}
```

18. Write a program that can reverse an integer number.

input: 26, output: 62

input: 856, output: 658

input: 14730, output: 03741

Answer:

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

int main(){
        int n, reversed=0, remainder;

        printf("Enter an integer= ");
        scanf("%d", &n);

        while(n != 0){
            remainder = n % 10;
            reversed = (reversed*10) + remainder;
            n = n/10;
        }

        printf("Reversed number = %d\n", reversed);

        return 0;
}
```

19. Convert a decimal numbers into binary number.

input: 5, output: 101

input: 6, output: 110

input: 7, output: 111

Answer:

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

int main(){
        int a, arr[50],i;

        printf("Enter a decimal number= ");
        scanf("%d", & a);

        i=0;
        while(a>0){
            arr[i] = a % 2;
            a = a/2;
            i++;
        }

        printf("binary form= ");
        while(i>0){
            i--;
            printf("%d",arr[i]);
        }
        return 0;
}
```

20. Find the factors of an integer number.

input: 20, output: 1,2,4,5,10,20

input: 25, output: 1,5,25

input: 30, output: 1,2,3,5,6,10,15,30

Answer:

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

int main(){
        int a, i=1;

        printf("Enter an integer= ");
        scanf("%d", & a);

        printf("Factors of %d are= ", a);
        while (a >= i) {
            if (a % i == 0) {
                printf("%d, ", i);
            }
            i++;
        }
        return 0;
}
```

21. Divide an integer number n into two parts n1 and n2 in such a way so that the n1 and n2 are themselves prime number and the sum of n1 and n2 is equal to n.

Input:20, output:(1, 19), (3, 17), (7, 13)

Input:50, output:(3, 47), (7, 43), (13, 37), (19, 31)

Input:60, output:(1, 59), (7, 53), (13,47), (17, 43), (19, 41), (23, 37), (29, 31)

Answer:

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

int main(){
        int n, n1, n2, count, counter, i, j;
        printf("Enter n= ");
        scanf("%d", & n);

        n1 = 1;
        while(n1 <= n/2){
            n2 = n - n1;

            i=1, count=0;
            while(i <= n1){
                if (n1 % i == 0){
                    count++;
                }
                i++;
            }

            j=1, counter=0;
            while(j <= n2){
                if(n2 % j == 0){
                    counter++;
                }
                j++;
            }

            if(((count == 2)||(n1 == 1)) && ((counter == 2)||(n2 == 1))){
                printf("(%d, %d), ", n1, n2);
            }
            n1 ++;
        }

        // here 1 is treated as prime..
        return 0;
}
```

ArraY

```c
// 01. Calculate sum and average of an array element.

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

int main(){

    int arr[100], n, i;
    float sum=0, avg;
    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i=0; i<n; i++){
        printf("enter number= ");
        scanf("%d", & arr[i]);

        sum = sum + arr[i];
    }

    avg = sum/n;

    printf("\nSum = %.2f\n", sum);
    printf("Average = %.2f", avg);

    return 0;
}
```

```c
// 02. Find the maximum or minimum value of an array element.

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

int main() {
    int arr[100], n, i, max, min;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", & arr[i]);
    }

    max = arr[0];
    min = arr[0];

    for(i=1; i<n; i++){
        if(arr[i] > max) {
            max = arr[i];
        }
        if(arr[i] < min) {
            min = arr[i];
        }
    }

    printf("\nmaximum value is= %d\n", max);
    printf("minimum value is= %d\n", min);

    return 0;
}
```

```
// 03. Search a specific number of an array element and say its
position if it is found.

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

int main() {
    int arr[100], n, i, number, found=0;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", & arr[i]);
    }

    printf("\nenter number to search= ");
    scanf("%d", & number);

    for(i=0; i<n; i++){
        if( arr[i] == number ) {
            printf("Number found at position %d\n", i+1);
            found = 1;
            break;
        }
    }

    if(found == 0) {
        printf("Number not found\n");
    }

    return 0;
}
```

```c
// 04. Delete the first element of an array element.

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

int main() {
    int arr[100], n, i;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", & arr[i]);
    }

    printf("\noriginal array: ");
    for(i=0; i<n; i++){
        printf("%d, ", arr[i]);
    }

    for(i=0; i<(n-1); i++){
        arr[i] = arr[i+1];
    }
    n--;

    printf("\n\nafter deleting first element: ");
    for(i=0; i<n; i++){
        printf("%d, ", arr[i]);
    }

    return 0;
}
```

```c
// 05. Delete a specific number of an array element.

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

int main() {
    int n, arr[100], new_arr[100], i, j = 0, del;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i = 0; i < n; i++) {
        printf("Enter number = ");
        scanf("%d", & arr[i]);
    }

    printf("\noriginal array: ");
    for(i=0; i<n; i++) {
        printf("%d  ", arr[i]);
    }

    printf("\n\nenter number to delete = ");
    scanf("%d", &del);

    for(i = 0; i < n; i++) {
        if(arr[i] != del) {
            new_arr[j] = arr[i];
            j++;
        }
    }

    printf("\nAfter deleting: ");
    for(i = 0; i < j; i++) {
        printf("%d  ", new_arr[i]);
    }

    return 0;
}
```

```c
// 06. Find the sum and average of a 2D (two dimensional) array
element(matrix).

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

int main() {
    int row, col, i, j;
    float avg, sum=0;

    printf("enter how many rows u want=  ");
    scanf("%d", & row);
    printf("enter how many coloumns u want= ");
    scanf("%d", & col);

    int arr[row][col];

    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            printf("Enter number= ");
            scanf("%d", & arr[i][j]);
            sum =sum + arr[i][j];
        }
    }

    avg = sum / (row*col);

    printf("\nSum of all elements = %.2f\n", sum);
    printf("Average of elements = %.2f\n", avg);

    return 0;
}
```

```c
// 07. Calculate the sum of border element of a 2D (two
dimensional) array.

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

int main() {
    int row, col, i, j, sum=0;

    printf("enter how many rows u want= ");
    scanf("%d", & row);
    printf("enter how many columns u want= ");
    scanf("%d", & col);

    int arr[row][col];

    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            printf("enter number= ");
            scanf("%d", &arr[i][j]);
        }
    }

    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            if(i==0 || i==(row-1) || j==0 || j==(col-1)) {
                sum = sum + arr[i][j];
            }
        }
    }
    printf("sum of border elements = %d\n", sum);

    return 0;
}


/*08. Calculate the sum of primary and secondary diagonal element
of
```

```
       a square matrix or square 2D (two dimensional) array.
*/

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

int main() {
    int n, i, j, sum_1=0, sum_2=0;

    printf("enter the size of square matrix = ");
    scanf("%d", & n);

    int arr[n][n];

    for(i=0; i<n; i++){
        for(j=0; j<n; j++) {
            printf("enter number = ");
            scanf("%d", & arr[i][j]);
        }
    }

    for (i = 0; i<n; i++){
        for(j=0; j<n; j++){
            if(i==j){
                sum_1 = sum_1 + arr[i][j];
            }
        }
    }

    for (i=0, j=(n-1); i<n && j>=0; i++, j--) {
        sum_2 = sum_2 + arr[i][j];                   //  if (i +
j == n - 1)
    }

    printf("\nsum of primary diagonal = %d", sum_1);
    printf("\nsum of secondary diagonal = %d\n", sum_2);

    return 0;
}
```

```c
// 09. Add two matrixes.

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

int main() {
    int a[50][50], b[50][50], sum[50][50];
    int row1, col1, row2, col2, i, j;

    printf("enter how many rows u want= ");
    scanf("%d", & row1);
    printf("enter how many columns u want= ");
    scanf("%d", & col1);

    printf("Enter elements of first matrix:\n");
    for (i = 0; i<row1; i++) {
        for (j = 0; j<col1; j++) {
            printf("enter number= ");
            scanf("%d", & a[i][j]);
        }
    }

    printf("enter how many rows u want= ");
    scanf("%d", & row2);
    printf("enter how many columns u want= ");
    scanf("%d", & col2);

    printf("Enter elements of second matrix:\n");
    for (i = 0; i<row2; i++) {
        for (j = 0; j<col2; j++) {
            printf("enter number= ");
            scanf("%d", & b[i][j]);
        }
    }

    if (row1==row2 && col1==col2) {
        printf("\nSum of the two matrices:\n");
        for (i = 0; i<row1; i++) {
            for (j = 0; j<col1; j++) {
                sum[i][j] = a[i][j] + b[i][j];
                printf("%d ", sum[i][j]);
            }
            printf("\n");
        }
    }
    else {
        printf("\nmatrix addition impossible!!.\n");
    }

    return 0;
}
```

```
// 10. Multiply two matrixes.

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

int main() {
    int a[50][50], b[50][50], result[50][50];
    int row1, col1, row2, col2, i, j, k;

    printf("enter how many rows u want for 1st maatrix= ");
    scanf("%d", & row1);
    printf("enter how many columns u want for 1st matrix= ");
    scanf("%d", & col1);

    printf("enter how many rows u want for 2nd matrix= ");
    scanf("%d", & row2);
    printf("enter how many columns u want for 2nd matrix= ");
    scanf("%d", & col2);

    if (col1 != row2) {
        printf("\nmatrix multiplication not possible.\n");
        return 0;
    }

    printf("enter numbers for first matrix:\n");
    for (i = 0; i < row1; i++) {
        for (j = 0; j < col1; j++) {
            printf("enter numbr = ");
            scanf("%d", & a[i][j]);
        }
    }
    printf("\nEnter elements of second matrix:\n");
    for (i = 0; i < row2; i++) {
        for (j = 0; j < col2; j++) {
            printf("enter number = ");
            scanf("%d", & b[i][j]);
        }
    }

    for (i=0; i<row1; i++) {
        for (j=0; j<col2; j++) {
            result[i][j] = 0;
        }
    }

    for (i = 0; i < row1; i++) {
        for (j = 0; j < col2; j++) {
            for (k = 0; k < col1; k++) {
                result[i][j] = result[i][j] + (a[i][k] * b[k][j]);
            }
        }
    }

    printf("Result: \n");
    for(i = 0; i < row1; i++) {
        for (j = 0; j < col2; j++) {
            printf("%d  ", result[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

```c
// 11. Replace a specific number of an array element.

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

int main() {
    int arr[100], n, i, num, new_num, pos = -1;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i = 0; i < n; i++) {
        printf("enter number = ");
        scanf("%d", & arr[i]);
    }

    printf("Enter the number you want to replace= ");
    scanf("%d", & num);

    for(i = 0; i < n; i++) {
        if(arr[i] == num) {
            pos = i;
            break;
        }
    }

    if(pos == -1) {
        printf("Number not found!!.\n");
    }
    else {
        printf("Enter new number = ");
        scanf("%d", & new_num);
        arr[pos] = new_num;

        printf("after replacement: ");
        for(i = 0; i < n; i++) {
            printf("%d  ", arr[i]);
        }
        printf("\n");
    }

    return 0;
}
```

```
// 12. Insert a new element in the first position of an array.

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

int main() {
    int arr[100], n, i, new_num;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    for (i = 0; i < n; i++) {
        printf("eneter number = ");
        scanf("%d", &arr[i]);
    }

    printf("Enter the number u want to add in first position: ");
    scanf("%d", & new_num);

    for (i=n; i>=1; i--) {
        arr[i] = arr[i-1];
    }

    arr[0] = new_num;

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

```c
//13. Insert a new element in a specific position in an array where the
//     position and new element will be given through the key board.

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

int main() {
    int arr[100], n, new_num, pos, i;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i = 0; i < n; i++) {
        printf("enter number = ");
        scanf("%d", & arr[i]);
    }

    printf("\nEnter new number = ");
    scanf("%d", & new_num);
    printf("Enter position = ");
    scanf("%d", & pos);

    for(i = n; i >= pos; i--) {
        arr[i] = arr[i-1];
    }

    arr[pos] = new_num;
    n++;

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

```c
// 14. Insert a new element before a specific element in an array where the
//      specific element will be given through a keyboard.
#include <stdio.h>
#include <conio.h>

int main() {
    int arr[100], n, i, new_num, specific, pos = -1;

    printf("enter how many numbers u want= ");
    scanf("%d", & n);

    for(i = 0; i < n; i++) {
        printf("enter number = ");
        scanf("%d", & arr[i]);
    }

    printf("\nenter new number = ");
    scanf("%d", & new_num);

    printf("enter specific num (before u want to add new num): ");
    scanf("%d", & specific);

    for(i = 0; i < n; i++) {
        if(arr[i] == specific) {
            pos = i;
            break;
        }
    }
    if(pos == -1) {
        printf("specific element not found.\n");
    }
    else {
        for(i = n; i > pos; i--) {
            arr[i] = arr[i-1];
        }
        arr[pos] = new_num;
        n++;

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

```c
// 15. Sort an array in ascending and descending order by using the
following method.
//     (i) Using bubble sort.

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

int main() {
    int n, arr[100], i, j, temp;
    printf("enter how many numbers u want = ");
    scanf("%d", & n);

    for(i = 0; i < n; i++){
        printf("enter number = ");
        scanf("%d", & arr[i]);
    }

    for(i = 0; i < (n-1); i++) {         // Ascending order
        for(j = 0; j < (n-1-i); j++) {
            if(arr[j] > arr[j+1]) {
                temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }
    printf("\nascending order: ");
    for(i = 0; i < n; i++){
        printf("%d  ", arr[i]);
    }

    for(i = 0; i < (n-1); i++) {        // Descending order
        for(j = 0; j < (n-1-i); j++) {
            if(arr[j] < arr[j+1]) {
                temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }
    printf("\ndescending order: ");
    for(i = 0; i < n; i++) {
        printf("%d  ", arr[i]);
    }
    return 0;
}
```

```c
// 15. Sort an array in ascending and descending order by using the
following method.
//       (ii)usning Linear sort
#include <stdio.h>
#include <conio.h>

int main() {
    int n, arr[100], i, j, temp;
    printf("enter how many numbers u want = ");
    scanf("%d", & n);

    for(i = 0; i < n; i++){
        printf("enter number = ");
        scanf("%d", & arr[i]);
    }

    for(i = 0; i < (n-1); i++) {     // Ascending
        for(j = (i+1); j < n; j++) {
            if(arr[i] > arr[j]) {
                temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }

    printf("\nascending order: ");
    for(i = 0; i < n; i++){
        printf("%d  ", arr[i]);
    }

    for(i = 0; i < (n-1); i++) {       // Descending
        for(j = (i+1); j < n; j++) {
            if(arr[i] < arr[j]) {
                temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }
    printf("\ndescending order: ");
    for(i = 0; i < n; i++){
        printf("%d  ", arr[i]);
    }
    return 0;
}
```

```c
// 15. Sort an array in ascending and descending order by using the
following method.
//      (iii) Sequential Sort (Selection Sort)

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

int main() {
    int n, arr[100], copy[100], i, j, min_index, temp;
    printf("Enter how many numbers you want = ");
    scanf("%d", &n);

    for(i = 0; i < n; i++) {
        printf("Enter number = ");
        scanf("%d", &arr[i]);
        copy[i] = arr[i];
    }

    for(i = 0; i < n - 1; i++) {    // Ascending order
        min_index = i;
        for(j = i + 1; j < n; j++) {
            if(arr[j] < arr[min_index]) {
                min_index = j;
            }
        }
        temp = arr[i];
        arr[i] = arr[min_index];
        arr[min_index] = temp;
    }

    printf("\nAscending order: ");
    for(i = 0; i < n; i++) {
        printf("%d  ", arr[i]);
    }

    for(i = 0; i < n - 1; i++) {    // Descending order
        min_index = i;
        for(j = i + 1; j < n; j++) {
            if(copy[j] > copy[min_index]) {
                min_index = j;
            }
        }
        temp = copy[i];
        copy[i] = copy[min_index];
        copy[min_index] = temp;
    }
    printf("\nDescending order: ");
    for(i = 0; i < n; i++) {
        printf("%d  ", copy[i]);
    }
    return 0;
}
```

```c
// 15. Sort an array in ascending and descending order by using the
following method.
//      (iv) Merge sort

#include <stdio.h>
#include <conio.h>
int main() {
    int n, a[100], temp[100];
    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    for (int i = 0; i < n; i++) {
        printf("Enter number %d: ", i + 1);
        scanf("%d", &a[i]);
    }

    int size, left, mid, right, i, j, k;

    // ---------------- ASCENDING ORDER ----------------
    for (size = 1; size < n; size = size * 2) {
        for (left = 0; left < n - 1; left = left + 2 * size) {
            mid = left + size - 1;

            if (mid >= n - 1)
                break; // no right part left

            right = left + 2 * size - 1;
            if (right >= n)
                right = n - 1;
            i = left;
            j = mid + 1;
            k = left;

            while (i <= mid && j <= right) {
                if (a[i] <= a[j]) {
                    temp[k] = a[i];
                    i++;
                } else {
                    temp[k] = a[j];
                    j++;
                }
                k++;
            }

            // Copy remaining elements
            while (i <= mid) {
                temp[k++] = a[i++];
            }
            while (j <= right) {
                temp[k++] = a[j++];
            }

            // Copy back to main array
            for (int p = left; p <= right; p++) {
                a[p] = temp[p];
            }
        }
    }

    printf("\nAscending order: ");
    for (i = 0; i < n; i++) {
        printf("%d ", a[i]);
    }

    // ---------------- DESCENDING ORDER ----------------
    for (size = 1; size < n; size = size * 2) {
        for (left = 0; left < n - 1; left = left + 2 * size) {
            mid = left + size - 1;

            if (mid >= n - 1)
                break;

            right = left + 2 * size - 1;
            if (right >= n)
                right = n - 1;
            i = left;
            j = mid + 1;
            k = left;

            while (i <= mid && j <= right) {
                if (a[i] >= a[j]) {  // change sign for descending
                    temp[k] = a[i];
                    i++;
                } else {
                    temp[k] = a[j];
                    j++;
                }
                k++;
            }

            while (i <= mid) {
                temp[k++] = a[i++];
            }
            while (j <= right) {
                temp[k++] = a[j++];
            }

            for (int p = left; p <= right; p++) {
                a[p] = temp[p];
            }
        }
    }

    printf("\nDescending order: ");
    for (i = 0; i < n; i++) {
        printf("%d ", a[i]);
    }

    return 0;
}
```

```
// 16. Using Binary search method, search a number from a linear array.


#include <stdio.h>
int main() {
    int n, i, j, temp, key, a[100];
    int low, high, mid, found = 0;

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

    for(i = 0; i < n; i++) {
        printf("Enter number = ");
        scanf("%d", & a[i]);
    }

    // Sort the array in ascending order (Bubble Sort)
    for(i = 0; i < n - 1; i++) {
        for(j = 0; j < n - 1 - i; j++) {
            if(a[j] > a[j + 1]) {
                temp = a[j];
                a[j] = a[j + 1];
                a[j + 1] = temp;
            }
        }
    }

    printf("\nSorted array (ascending order): ");
    for(i = 0; i < n; i++) {
        printf("%d ", a[i]);
    }
    printf("\n");

    printf("Enter number to search: ");
    scanf("%d", &key);

    // Binary search
    low = 0;
    high = n - 1;
    while(low <= high) {
        mid = (low + high) / 2;

        if(a[mid] == key) {
            found = 1;
            break;
        }
        else if(a[mid] < key) {
            low = mid + 1;
        }
        else {
            high = mid - 1;
        }
    }

    if(found)
        printf("found at position %d.\n", mid + 1);
    else
        printf("not found in the array.\n", key);

    return 0;
}
```

```c
// 17. Write a program that can merge two sorted arrays into a one sorted
array.


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

int main() {
    int a[100], b[100], c[200];
    int n1, n2, i, j, k;

    printf("enter how many numbers u want in 1st array = ");
    scanf("%d", & n1);
    for(i = 0; i < n1; i++){
        printf("Enter number = ");
        scanf("%d", & a[i]);
    }

    printf("\nenter how many numbers u want in 2nd array = ");
    scanf("%d", &n2);
    for(i = 0; i < n2; i++){
        printf("Enter number = ");
        scanf("%d", & b[i]);
    }

    i = j = k = 0;
// .......merge two sorted arrays........
    while(i < n1 && j < n2) {
        if(a[i] < b[j])
            c[k++] = a[i++];
        else
            c[k++] = b[j++];
    }

//........copy remaining elements........
    while(i < n1)
        c[k++] = a[i++];
    while(j < n2)
        c[k++] = b[j++];

    printf("\nMerged sorted array:\n");
    for(i = 0; i < k; i++)
        printf("%d ", c[i]);

    return 0;
}
```

```c
// 18 Write a program that can store and print array of structure which
holds three
//  fields like the (i) roll (ii) name (iii) marks. Here data type can be
chosen by user.


#include <stdio.h>
int main() {
    int n, i;

    printf("How many students? = ");
    scanf("%d", & n);

    struct Student {
        int roll;
        char name[50];
        float marks;
    }
    students[n]; // array of structures

    for(i = 0; i < n; i++) {
        printf("\nStudent %d:\n", i + 1);
        printf("Enter roll: ");
        scanf("%d", &students[i].roll);
        printf("Enter name: ");
        scanf("%s", students[i].name); // no space in name for simplicity
        printf("Enter marks: ");
        scanf("%f", &students[i].marks);
    }

    printf("\nStudent Details:\n");
    for(i = 0; i < n; i++) {
        printf("Roll: %d, Name: %s, Marks: %.2f\n", students[i].roll,
students[i].name, students[i].marks);
    }

    return 0;
}
```

ArraY

with

Function

```c
// 01. Calculate sum and average of an array element.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++){
        printf("enter number= ");
        scanf("%d", &arr[i]);
    }
}

float calculateSum(int arr[], int n) {
    float sum = 0;
    int i;
    for(i=0; i<n; i++){
        sum = sum + arr[i];
    }
    return sum;
}

float calculateAverage(float sum, int n) {
    return sum/n;
}

void displayResults(float sum, float avg) {
    printf("\nSum = %.2f\n", sum);
    printf("Average = %.2f", avg);
}

int main(){
    int arr[100], n;
    float sum, avg;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);
    sum = calculateSum(arr, n);
    avg = calculateAverage(sum, n);
    displayResults(sum, avg);

    return 0;
}
```

```c
// 02. Find the maximum or minimum value of an array element.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", &arr[i]);
    }
}

int findMax(int arr[], int n) {
    int max = arr[0];
    int i;
    for(i=1; i<n; i++){
        if(arr[i] > max) {
            max = arr[i];
        }
    }
    return max;
}

int findMin(int arr[], int n) {
    int min = arr[0];
    int i;
    for(i=1; i<n; i++){
        if(arr[i] < min) {
            min = arr[i];
        }
    }
    return min;
}

void displayResults(int max, int min) {
    printf("\nmaximum value is= %d\n", max);
    printf("minimum value is= %d\n", min);
}

int main() {
    int arr[100], n, max, min;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);
    inputArray(arr, n);
    max = findMax(arr, n);
    min = findMin(arr, n);
    displayResults(max, min);

    return 0;
}
```

```
// 03. Search a specific number of an array element and say its position if
it is found.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", &arr[i]);
    }
}

int searchNumber(int arr[], int n, int number) {
    int i;
    for(i=0; i<n; i++){
        if(arr[i] == number) {
            return i+1;
        }
    }
    return -1;
}

void displayResult(int position) {
    if(position == -1) {
        printf("Number not found\n");
    }
    else {
        printf("Number found at position %d\n", position);
    }
}
```

```c
int main() {
    int arr[100], n, number, position;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("\nenter number to search= ");
    scanf("%d", &number);

    position = searchNumber(arr, n, number);
    displayResult(position);

    return 0;
}
```

```c
// 04. Delete the first element of an array element.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++){
        printf("Enter number= ");
        scanf("%d", &arr[i]);
    }
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++){
        printf("%d, ", arr[i]);
    }
}

int delete_First_Element(int arr[], int n) {
    int i;
    for(i=0; i<(n-1); i++){
        arr[i] = arr[i+1];
    }
    return n-1;
}

int main() {
    int arr[100], n;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("\noriginal array: ");
    displayArray(arr, n);

    n = delete_First_Element(arr, n);

    printf("\n\nafter deleting first element: ");
    displayArray(arr, n);

    return 0;
}
```

```c
// 05. Delete a specific number of an array element.

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

void inputArray(int arr[], int n) {
    int i;
    for(i = 0; i < n; i++) {
        printf("Enter number = ");
        scanf("%d", &arr[i]);
    }
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("%d  ", arr[i]);
    }
}

int deleteNumber(int arr[], int new_arr[], int n, int del) {
    int i, j = 0;
    for(i = 0; i < n; i++) {
        if(arr[i] != del) {
            new_arr[j] = arr[i];
            j++;
        }
    }
    return j;
}

int main() {
    int n, arr[100], new_arr[100], del, new_size;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("\noriginal array: ");
    displayArray(arr, n);

    printf("\n\nenter number to delete = ");
    scanf("%d", &del);

    new_size = deleteNumber(arr, new_arr, n, del);
    printf("\nAfter deleting: ");
    displayArray(new_arr, new_size);

    return 0;
}
```

```
// 06. Find the sum and average of a 2D (two dimensional) array
element(matrix).


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

void inputMatrix(int arr[][100], int row, int col) {
    int i, j;
    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            printf("Enter number= ");
            scanf("%d", &arr[i][j]);
        }
    }
}

float calculateSum(int arr[][100], int row, int col) {
    float sum = 0;
    int i, j;
    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            sum = sum + arr[i][j];
        }
    }
    return sum;
}
```

```c
float calculateAverage(float sum, int row, int col) {
    return sum / (row * col);
}

void displayResults(float sum, float avg) {
    printf("\nSum of all elements = %.2f\n", sum);
    printf("Average of elements = %.2f\n", avg);
}

int main() {
    int row, col, arr[100][100];
    float avg, sum;

    printf("enter how many rows u want=  ");
    scanf("%d", &row);
    printf("enter how many coloumns u want= ");
    scanf("%d", &col);

    inputMatrix(arr, row, col);
    sum = calculateSum(arr, row, col);
    avg = calculateAverage(sum, row, col);
    displayResults(sum, avg);

    return 0;
}
```

```c
// 07. Calculate the sum of border element of a 2D (two dimensional) array.

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

void inputMatrix(int arr[][100], int row, int col) {
    int i, j;
    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            printf("enter number= ");
            scanf("%d", &arr[i][j]);
        }
    }
}

int calculateBorderSum(int arr[][100], int row, int col) {
    int sum = 0;
    int i, j;
    for(i=0; i<row; i++){
        for(j=0; j<col; j++){
            if(i==0 || i==(row-1) || j==0 || j==(col-1)) {
                sum = sum + arr[i][j];
            }
        }
    }
    return sum;
}

void displayResult(int sum) {
    printf("sum of border elements = %d\n", sum);
}

int main() {
    int row, col, arr[100][100], sum;

    printf("enter how many rows u want= ");
    scanf("%d", &row);
    printf("enter how many columns u want= ");
    scanf("%d", &col);

    inputMatrix(arr, row, col);
    sum = calculateBorderSum(arr, row, col);
    displayResult(sum);

    return 0;
}
```

```c
/*08. Calculate the sum of primary and secondary diagonal element of
       a square matrix or square 2D (two dimensional) array.
*/

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

void inputMatrix(int arr[][100], int n) {
    int i, j;
    for(i=0; i<n; i++){
        for(j=0; j<n; j++) {
            printf("enter number = ");
            scanf("%d", &arr[i][j]);
        }
    }
}

int calculatePrimaryDiagonalSum(int arr[][100], int n) {
    int sum = 0;
    int i, j;
    for(i=0; i<n; i++){
        for(j=0; j<n; j++){
            if(i==j){
                sum = sum + arr[i][j];
            }
        }
    }
    return sum;
}

int calculateSecondaryDiagonalSum(int arr[][100], int n) {
    int sum = 0;
    int i, j;
    for(i=0, j=(n-1); i<n && j>=0; i++, j--) {
        sum = sum + arr[i][j];
    }
    return sum;
}

void displayResults(int sum1, int sum2) {
    printf("\nsum of primary diagonal = %d", sum1);
    printf("\nsum of secondary diagonal = %d\n", sum2);
}

int main() {
    int n, arr[100][100], sum_1, sum_2;
    printf("enter the size of square matrix = ");
    scanf("%d", &n);

    inputMatrix(arr, n);
    sum_1 = calculatePrimaryDiagonalSum(arr, n);
    sum_2 = calculateSecondaryDiagonalSum(arr, n);
    displayResults(sum_1, sum_2);

    return 0;
}
```

```c
// 09. Add two matrixes.

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

void inputMatrix(int arr[][50], int row, int col, char name[]) {
    int i, j;
    printf("Enter elements of %s matrix:\n", name);
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            printf("enter number= ");
            scanf("%d", &arr[i][j]);
        }
    }
}

void addMatrices(int a[][50], int b[][50], int sum[][50], int row, int col)
{
    int i, j;
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            sum[i][j] = a[i][j] + b[i][j];
        }
    }
}

void displayMatrix(int arr[][50], int row, int col) {
    int i, j;
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            printf("%d ", arr[i][j]);
        }
        printf("\n");
    }
}

int main() {
    int a[50][50], b[50][50], sum[50][50];
    int row1, col1, row2, col2;

    printf("enter how many rows u want= ");
    scanf("%d", &row1);
    printf("enter how many columns u want= ");
    scanf("%d", &col1);

    inputMatrix(a, row1, col1, "first");
    printf("enter how many rows u want= ");
    scanf("%d", &row2);
    printf("enter how many columns u want= ");
    scanf("%d", &col2);

    inputMatrix(b, row2, col2, "second");

    if(row1==row2 && col1==col2) {
        printf("\nSum of the two matrices:\n");

        addMatrices(a, b, sum, row1, col1);

        displayMatrix(sum, row1, col1);
    }
    else {
        printf("\nmatrix addition impossible!!.\n");
    }

    return 0;
}
```

```
// 10. Multiply two matrixes.

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

void inputMatrix(int arr[][50], int row, int col, char name[]) {
    int i, j;
    printf("enter numbers for %s matrix:\n", name);
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            printf("enter numbr = ");
            scanf("%d", &arr[i][j]);
        }
    }
}

void initializeMatrix(int arr[][50], int row, int col) {
    int i, j;
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            arr[i][j] = 0;
        }
    }
}

void multiplyMatrices(int a[][50], int b[][50], int result[][50], int row1,
int col1, int col2) {
    int i, j, k;
    for(i=0; i<row1; i++) {
        for(j=0; j<col2; j++) {
            for(k=0; k<col1; k++) {
                result[i][j] = result[i][j] + (a[i][k] * b[k][j]);
            }
        }
    }
}

void displayMatrix(int arr[][50], int row, int col) {
    int i, j;
    for(i=0; i<row; i++) {
        for(j=0; j<col; j++) {
            printf("%d  ", arr[i][j]);
        }
        printf("\n");
    }
}
```

```
int main() {
    int a[50][50], b[50][50], result[50][50];
    int row1, col1, row2, col2;

    printf("enter how many rows u want for 1st maatrix= ");
    scanf("%d", &row1);
    printf("enter how many columns u want for 1st matrix= ");
    scanf("%d", &col1);

    printf("enter how many rows u want for 2nd matrix= ");
    scanf("%d", &row2);
    printf("enter how many columns u want for 2nd matrix= ");
    scanf("%d", &col2);

    if(col1 != row2) {
        printf("\nmatrix multiplication not possible.\n");
        return 0;
    }

    inputMatrix (a, row1, col1, "first");

    inputMatrix (b, row2, col2, "second");

    initializeMatrix (result, row1, col2);

    multiplyMatrices(a, b, result, row1, col1, col2);

    printf("Result: \n");
    displayMatrix(result, row1, col2);

    return 0;
}
```

```c
// 11. Replace a specific number of an array element.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("enter number = ");
        scanf("%d", &arr[i]);
    }
}

int findPosition(int arr[], int n, int num) {
    int i;
    for(i=0; i<n; i++) {
        if(arr[i] == num) {
            return i;
        }
    }
    return -1;
}

void replaceElement(int arr[], int pos, int new_num) {
    arr[pos] = new_num;
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("%d  ", arr[i]);
    }
    printf("\n");
}

int main() {
    int arr[100], n, num, new_num, pos;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("Enter the number you want to replace= ");
    scanf("%d", &num);
    pos = findPosition(arr, n, num);

    if(pos == -1) {
        printf("Number not found!!.\n");
    }
    else {
        printf("Enter new number = ");
        scanf("%d", &new_num);
        replaceElement(arr, pos, new_num);

        printf("after replacement: ");
        displayArray(arr, n);
    }

    return 0;
}
```

```c
// 12. Insert a new element in the first position of an array.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("eneter number = ");
        scanf("%d", &arr[i]);
    }
}

void insertAtFirst(int arr[], int n, int new_num) {
    int i;
    for(i=n; i>=1; i--) {
        arr[i] = arr[i-1];
    }
    arr[0] = new_num;
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<=n; i++) {
        printf("%d  ", arr[i]);
    }
}

int main() {
    int arr[100], n, new_num;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("Enter the number u want to add in first position: ");
    scanf("%d", &new_num);

    insertAtFirst(arr, n, new_num);

    printf("\nNew array: ");
    displayArray(arr, n);

    return 0;
}
```

```
//13. Insert a new element in a specific position in an array where the
//     position and new element will be given through the key board.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("enter number = ");
        scanf("%d", &arr[i]);
    }
}

void insertAtPosition(int arr[], int n, int new_num, int pos) {
    int i;
    for(i=n; i>=pos; i--) {
        arr[i] = arr[i-1];
    }
    arr[pos] = new_num;
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("%d ", arr[i]);
    }
}

int main() {
    int arr[100], n, new_num, pos;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("\nEnter new number = ");
    scanf("%d", &new_num);
    printf("Enter position = ");
    scanf("%d", &pos);

    insertAtPosition(arr, n, new_num, pos);
    n++;

    printf("\nnew array: ");
```

```c
    displayArray(arr, n);

    return 0;
}



// 14. Insert a new element before a specific element in an array where the
//      specific element will be given through a keyboard.

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

void inputArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("enter number = ");
        scanf("%d", &arr[i]);
    }
}

int findPosition(int arr[], int n, int specific) {
    int i;
    for(i=0; i<n; i++) {
        if(arr[i] == specific) {
            return i;
        }
    }
    return -1;
}

void insertBeforeElement(int arr[], int n, int pos, int new_num) {
    int i;
    for(i=n; i>pos; i--) {
        arr[i] = arr[i-1];
    }
    arr[pos] = new_num;
}

void displayArray(int arr[], int n) {
    int i;
    for(i=0; i<n; i++) {
        printf("%d ", arr[i]);
    }
    printf("\n");
}
```

```c
int main() {
    int arr[100], n, new_num, specific, pos;

    printf("enter how many numbers u want= ");
    scanf("%d", &n);

    inputArray(arr, n);

    printf("\nenter new number = ");
    scanf("%d", &new_num);

    printf("enter specific num (before u want to add new num): ");
    scanf("%d", &specific);

    pos = findPosition(arr, n, specific);

    if(pos == -1) {
        printf("specific element not found.\n");
    }
    else {
        insertBeforeElement(arr, n, pos, new_num);
        n++;

        printf("\nnew array:\n");
        displayArray(arr, n);
    }

    return 0;
}
```

Strings

```c
// 1. count the total number of character or length of the string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i, count = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

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

    printf("Length of string: %d\n", count);

    return 0;
}
```

```c
// 2. Delete the blank space of the string which will be given through
keyboard.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100], result[100];
    int i, j = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] != ' ') {
            result[j] = str[i];
            j++;
        }
    }
    result[j] = '\0';

    printf("String without spaces: %s\n", result);
    return 0;
}
```

```
// 3. Count the total number of vowels and consonant of a string.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i, vowels = 0, consonants = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if((str[i] >= 'a' && str[i] <= 'z') || (str[i] >= 'A' && str[i] <=
'Z')) {
            if(str[i] == 'a' || str[i] == 'e' || str[i] == 'i' || str[i] ==
'o' || str[i] == 'u' ||
               str[i] == 'A' || str[i] == 'E' || str[i] == 'I' || str[i] ==
'O' || str[i] == 'U') {
                vowels++;
            } else {
                consonants++;
            }
        }
    }

    printf("Vowels: %d\n", vowels);
    printf("Consonants: %d\n", consonants);

    return 0;
}
```

```c
//4. Read a string or line and print it in the reverse order.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i, len = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

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

    printf("Reversed string: ");
    for(i = len - 1; i >= 0; i--) {
        printf("%c", str[i]);
    }
    printf("\n");

    return 0;
}
```

```c
//5. Convert a string in the reverse case.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] >= 'a' && str[i] <= 'z') {
            str[i] = str[i] - 32;
        } else if(str[i] >= 'A' && str[i] <= 'Z') {
            str[i] = str[i] + 32;
        }
    }

    printf("Reversed case: %s\n", str);

    return 0;
}
```

```c
//6. Add a two string and place it into the third string.

#include <stdio.h>
#include <string.h>

int main() {
    char str1[100], str2[100], str3[200];
    int i, j;

    printf("Enter first string: ");
    fgets(str1, sizeof(str1), stdin);
    str1[strcspn(str1, "\n")] = '\0';

    printf("Enter second string: ");
    fgets(str2, sizeof(str2), stdin);
    str2[strcspn(str2, "\n")] = '\0';

    for(i = 0; str1[i] != '\0'; i++) {
        str3[i] = str1[i];
    }

    for(j = 0; str2[j] != '\0'; j++) {
        str3[i] = str2[j];
        i++;
    }
    str3[i] = '\0';

    printf("Combined string: %s\n", str3);

    return 0;
}
```

```
// 7. Add a string at the end of other string.

#include <stdio.h>
#include <string.h>

int main() {
    char str1[100], str2[100];
    int i, j;

    printf("Enter first string: ");
    fgets(str1, sizeof(str1), stdin);
    str1[strcspn(str1, "\n")] = '\0';

    printf("Enter second string: ");
    fgets(str2, sizeof(str2), stdin);
    str2[strcspn(str2, "\n")] = '\0';

    for(i = 0; str1[i] != '\0'; i++);

    for(j = 0; str2[j] != '\0'; j++) {
        str1[i] = str2[j];
        i++;
    }
    str1[i] = '\0';

    printf("Result: %s\n", str1);

    return 0;
}
```

```
// 8. Compare two strings and say the larger of it.

#include <stdio.h>
#include <string.h>

int main() {
    char str1[100], str2[100];
    int i = 0;

    printf("Enter first string: ");
    fgets(str1, sizeof(str1), stdin);
    str1[strcspn(str1, "\n")] = '\0';

    printf("Enter second string: ");
    fgets(str2, sizeof(str2), stdin);
    str2[strcspn(str2, "\n")] = '\0';

    while(str1[i] != '\0' && str2[i] != '\0') {
        if(str1[i] > str2[i]) {
            printf("First string is larger\n");
            return 0;
        } else if(str1[i] < str2[i]) {
            printf("Second string is larger\n");
            return 0;
        }
        i++;
    }

    if(str1[i] == '\0' && str2[i] == '\0') {
        printf("Both strings are equal\n");
    } else if(str1[i] == '\0') {
        printf("Second string is larger\n");
    } else {
        printf("First string is larger\n");
    }

    return 0;
}
```

```c
// 9. Convert a string into upper case letter.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] >= 'a' && str[i] <= 'z') {
            str[i] = str[i] - 32;
        }
    }

    printf("Uppercase: %s\n", str);

    return 0;
}
```

```c
// 10. Convert a string into lower case letter.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] >= 'A' && str[i] <= 'Z') {
            str[i] = str[i] + 32;
        }
    }

    printf("Lowercase: %s\n", str);

    return 0;
}
```

```c
// 11. Convert the first character of all words in a string into capital or upper case letter.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    if(str[0] >= 'a' && str[0] <= 'z') {
        str[0] = str[0] - 32;
    }

    for(i = 1; str[i] != '\0'; i++) {
        if(str[i-1] == ' ' && str[i] >= 'a' && str[i] <= 'z') {
            str[i] = str[i] - 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 12. Convert the last character of all words in a string into
capital or upper case letter.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if((str[i+1] == ' ' || str[i+1] == '\0') && str[i] >= 'a'
&& str[i] <= 'z') {
            str[i] = str[i] - 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 13. Convert only the vowels into capital or upper case letter
of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] == 'a' || str[i] == 'e' || str[i] == 'i' ||
str[i] == 'o' || str[i] == 'u') {
            str[i] = str[i] - 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 14. Convert only the consonant into capital or upper case letter of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] >= 'a' && str[i] <= 'z') {
            if(str[i] != 'a' && str[i] != 'e' && str[i] != 'i' && str[i] != 'o' && str[i] != 'u') {
                str[i] = str[i] - 32;
            }
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 15. Convert only the vowels into small or lower case letter of
a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] == 'A' || str[i] == 'E' || str[i] == 'I' ||
str[i] == 'O' || str[i] == 'U') {
            str[i] = str[i] + 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 16. Convert only the consonant into small or lower case letter
of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] >= 'A' && str[i] <= 'Z') {
            if(str[i] != 'A' && str[i] != 'E' && str[i] != 'I' &&
str[i] != 'O' && str[i] != 'U') {
                str[i] = str[i] + 32;
            }
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 17. Convert the first character of all words in a string into small or lower letter.


#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    if(str[0] >= 'A' && str[0] <= 'Z') {
        str[0] = str[0] + 32;
    }

    for(i = 1; str[i] != '\0'; i++) {
        if(str[i-1] == ' ' && str[i] >= 'A' && str[i] <= 'Z') {
            str[i] = str[i] + 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 18. Convert the last character of all words in a string into small or lower case letter.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        if((str[i+1] == ' ' || str[i+1] == '\0') && str[i] >= 'A' && str[i] <= 'Z') {
            str[i] = str[i] + 32;
        }
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```
// 19. Find the position of a specific character of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100], ch;
    int i, found = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    printf("Enter character to find: ");
    scanf("%c", &ch);

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] == ch) {
            printf("Character '%c' found at position: %d\n", ch,
i);
            found = 1;
            break;
        }
    }

    if(!found) {
        printf("Character not found\n");
    }

    return 0;
}
```

```c
// 20. Find the position of a specific word of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100], word[50];
    int i, j, found = 0, position;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    printf("Enter word to find: ");
    scanf("%s", word);

    for(i = 0; str[i] != '\0'; i++) {
        j = 0;
        position = i;
        while(str[i] == word[j] && word[j] != '\0') {
            i++;
            j++;
        }
        if(word[j] == '\0' && (str[i] == ' ' || str[i] == '\0'))
{
            printf("Word found at position: %d\n", position);
            found = 1;
            break;
        }
        i = position;
    }

    if(!found) {
        printf("Word not found\n");
    }

    return 0;
}
```

```c
// 21. Delete the first character of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    for(i = 0; str[i] != '\0'; i++) {
        str[i] = str[i+1];
    }

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 22. Delete the first word of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100];
    int i = 0, j;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    while(str[i] != ' ' && str[i] != '\0') {
        i++;
    }

    if(str[i] == ' ') {
        i++;
    }

    for(j = 0; str[i] != '\0'; i++, j++) {
        str[j] = str[i];
    }
    str[j] = '\0';

    printf("Result: %s\n", str);

    return 0;
}
```

```c
// 23. Find a word of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100], word[50];
    int i, j, found = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    printf("Enter word to find: ");
    scanf("%s", word);

    for(i = 0; str[i] != '\0'; i++) {
        j = 0;
        int temp = i;
        while(str[i] == word[j] && word[j] != '\0') {
            i++;
            j++;
        }
        if(word[j] == '\0' && (str[i] == ' ' || str[i] == '\0'))
{
            printf("Word found\n");
            found = 1;
            break;
        }
        i = temp;
    }

    if(!found) {
        printf("Word not found\n");
    }

    return 0;
}
```

```c
// 24. Replace a word in a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[200], old[50], new[50], result[200];
    int i, j, k, found = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    printf("Enter word to replace: ");
    scanf("%s", old);

    printf("Enter new word: ");
    scanf("%s", new);

    i = 0;
    k = 0;

    while(str[i] != '\0') {
        j = 0;
        int temp = i;

        while(str[i] == old[j] && old[j] != '\0') {
            i++;
            j++;
        }

        if(old[j] == '\0' && (str[i] == ' ' || str[i] == '\0')) {
            for(j = 0; new[j] != '\0'; j++) {
                result[k++] = new[j];
            }
            found = 1;
        } else {
            i = temp;
            result[k++] = str[i++];
        }
    }
    result[k] = '\0';

    printf("Result: %s\n", result);

    return 0;
}
```

```
// 25. the frequency of a specific character of a string.

#include <stdio.h>
#include <string.h>

int main() {
    char str[100], ch;
    int i, count = 0;

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = '\0';

    printf("Enter character to count: ");
    scanf("%c", &ch);

    for(i = 0; str[i] != '\0'; i++) {
        if(str[i] == ch) {
            count++;
        }
    }

    printf("Frequency of '%c': %d\n", ch, count);

    return 0;
}
```