**Problem:**

1. Write logical expressions that tests whether a given character variable ***c*** is

* lower case letter
* upper case letter
* digit
* white space (includes space, tab, new line)

**Code :**

#include <stdio.h>

#include <ctype.h>

int main() {

    char c;

    printf("Enter a character: ");

    scanf("%c", &c);

    if (isupper(c)) {

        printf("The character is an uppercase letter\n");

    } else if (islower(c)) {

        printf("The character is a lowercase letter\n");

    } else if (isdigit(c)) {

        printf("The character is a digit\n");

    } else if (isspace(c)) {

        printf("The character is a white space character\n");

    } else {

        printf("The character is not uppercase, lowercase, digit, or white space\n");

    }

    return 0;

}

**Explanation :**

The program includes two standard C library headers: <stdio.h> (for Standard input and output functions) and <ctype.h> (for character handling functions).

The main function is the entry point of the program.

A variable named c of type char is declared. This variable will store the character entered by the user.

The printf() function is used to display a prompt to the user, asking them to enter a character.

The scanf() function is used to read a character from the user and store it in the variable c.

The program uses if-else-if statements to determine the type of the character entered by the user.

The isupper() library function is used to check if the entered character is an uppercase letter. If it is true, the program prints a message the character is an uppercase letter.

If the character is not an uppercase letter, the program uses the islower() function to check if it's a lowercase letter. If it is true, the program prints a message the character is a lowercase letter.

If the character is neither an uppercase letter nor a lowercase letter, the program uses the isdigit() function to check if it's a digit. If it is true, the program prints a message the character is a digit.

If the character is not an uppercase letter, lowercase letter, or digit, the program uses the isspace() function to check if it's a white space character (includes space, tab, new line) . If it is, the program prints a message indicating that the character is a white space character.

If the character doesn't fall into any of the above categories, it prints a message The character is not uppercase, lowercase, digit, or white space.

The program ends by using return 0 to indicate successful execution and exit.

1. Write a program to print the numbers between 1 and 10, along with an indication of whether each is even or odd, like this:

1 is odd

2 is even

3 is odd

#include <stdio.h>

#include <ctype.h>

int main() {

   int i;

   for(i=1;i<=10;i++){

    if(i%2==0)

        printf("%d is Even\n",i);

    else

        printf("%d is odd\n",i);

   }

    return 0;

}

1. Write a ***square()*** function and use it to print the squares of the numbers 1-10:

1 1

2 4

3 9

4 16

...

9 81

10 100

#include<stdio.h>

#include<conio.h>

int main(){

    int sq,i;

    for(i=1;i<=10;i++){

        sq = square(i);

        printf("\nSquare of %d is = %d ",i,sq);

    }

    return 0;

}

int square(int num){

    return num\*num;

}

1. Write a function to compute the factorial of a number, and use it to print the factorials of the numbers 1-7.

#include <stdio.h>

#include <conio.h>

int main()

{

    int i;

    for (i = 1; i <= 7; i++)

    {

    printf("\nfactorial of %d is = %d ", i, factorial(i));

    }

    return 0;

}

int factorial(int num)

{

    int j, fact = 1;

    for (j = 1; j <= num; j++)

    {

        fact \*= j;

    }

    return fact;

}

1. Write a C program that calculates the HCF and LCM of two numbers.

#include <stdio.h>

#include <ctype.h>

int main() {

    int num1 , num2 , i ,hcf ,lcm ;

    printf("Enter two positive integer : ");

    scanf("%d %d",&num1,&num2);

    if(num1>num2){

        for(i=1;i<=num1;i++){

            if((num1%i==0) && (num2%i==0)){

                hcf = i;

            }

        }

    }

    else if(num1<num2){

          for(i=1;i<=num2;i++){

            if((num1%i==0) && (num2%i==0)){

                hcf = i;

            }

        }

    }

    else{

        hcf = num1;

    }

    lcm = (num1 \* num2) / hcf ;

    printf("GCD = %d\nLCM = %d",hcf,lcm);

    return 0;

}

1. Write a C program to display and find the sum of the series 1+11+111+....111 up to ***n.*** For e.g., if n=4, the series is: 1+11+111+1111. Take the value of 'n' as input from the user.

#include <stdio.h>

int main() {

    int n;

    printf("Enter the value of n: ");

    scanf("%d", &n);

    int term = 1;

    int sum = 0;

    printf("Series: ");

    for (int i = 0; i < n; i++) {

        printf("%d", term);

        sum += term;

        if (i != n - 1) {

            printf(" + ");

        }

        term = term \* 10 + 1;

    }

    printf("\nSum of the series: %d\n", sum);

    return 0;

}

1. Write a C program that reads a positive integer ***n*** and then prints the following pattern

\*\*\*\*\*\*\*\*\*

\_\*\*\*\*\*\*\*\*

\_\_\*\*\*\*\*\*\*

\_\_\_\*\*\*\*\*\*

\_\_\_\_\*\*\*\*\*

\_\_\_\_\_\*\*\*\*

\_\_\_\_\_\_\*\*\*

\_\_\_\_\_\_\_\*\*

\_\_\_\_\_\_\_\_\*

where ***n*** is the number of lines.

#include<stdio.h>

int main(){

    int i,j,n;

    printf("Enter the value of n : ");

    scanf("%d",&n);

    i=0;

    while(i<n){

            j=0;

            while(j<i){

            printf(" ");

            j++;

        }

        j=0;

        while(j<n-i){

            printf("\*");

            j++;

        }

        printf("\n");

        i++;

    }

    return 0;

}

1. Write a C program to find the reverse of an integer number.

#include <stdio.h>

int main() {

    int num, reversedNum = 0;

    printf("Enter an integer number: ");

    scanf("%d", &num);

    while (num != 0) {

        int digit = num % 10;

        reversedNum = reversedNum \* 10 + digit;

        num /= 10;

    }

    printf("Reverse of the number: %d\n", reversedNum);

    return 0;

}

1. Write a C program to input ***n*** numbers in an array, calculate the sum of all even numbers and all odd numbers in the array and print the larger sum.

**Example:**

If the array contains the following elements:

2, 3, 3, 5, 4, 8, 7, 11, 2

The sum of all even elements is 2+4+8+2=16

Sum of all odd elements is 3+3+5+7+11=29

Therefore, the output should be 29.

#include<stdio.h>

int main(){

    int evenSum , oddSum,n,i,max;

    printf("Enter the value of n : ");

    scanf("%d",&n);

    int num[n];

    evenSum = 0;

    oddSum = 0;

    i=0;

    while(i<n){

        printf("\nEnter number %d : ",i+1);

        scanf("%d",&num[i]);

        if(num[i]%2==0){

            evenSum +=num[i];

        }

        else{

            oddSum +=num[i];

        }

        i++;

    }

    if(evenSum>oddSum){

    max = evenSum;

    }

    else{

    max = oddSum;

    }

    printf("\nodd sum is : %d ",oddSum);

    printf("\neven sum is : %d ",evenSum);

    printf("\nlarger sum is : %d ",max);

    return 0;

}

1. Write a C program to print the following pattern:

a) 1 b) 1

1 2 2 2

1 2 3 3 3 3

1 2 3 4 4 4 4 4

1 2 3 4 5 5 5 5 5 5

#include<stdio.h>

int main(){

    int i,j,n;

    printf("Enter the value of n : ");

    scanf("%d",&n);

    i=1;

    while(i<=n){

        j=1;

        while(j<=i){

            printf("%d ",i);

            j++;

        }

        printf("\n");

        i++;

    }

    return 0;

}

#include<stdio.h>

int main(){

    int i,j,n;

    printf("Enter the value of n : ");

    scanf("%d",&n);

    i=1;

    while(i<=n){

        j=1;

        while(j<=i){

            printf("%d ",j);

            j++;

        }

        printf("\n");

        i++;

    }

    return 0;

}