C Language

C Language is a procedural programming language designed as a system programming language to design operating systems or for compiler development. It was developed by Dennis Ritchie in 1972. It has simple set of keywords and a clean style which makes it easy for beginners.

Syntax:

A typical C program looks like as given below: -

```
1. #include<stdio.h>
2. main()
3. {
4.   int a,b;
5.   scanf("%d%d",&a,&b);
6.   printf("\n Sum is = %d",(a+b));
7.   return 0;
8. }
```

First comes header files which are declared in the same way as in C++ by using the #include.

Then you start with main () function and the whole syntax seems similar to that of C++ since C++ is a superset of C.

Note: You cannot use bits/stdc++.h header file in C. It is exclusive to C++.

The main difference in syntax comes while taking input and giving output.

Taking Input:

To take input we use scanf function. It is a keyword which is used to do the same work as cin from C++. It takes input from user but syntax is a little different here.

scanf (“%d %f”, &a, &b);

Here first you need to write %d or %f depending upon which data type you are taking input. If taking multiple inputs, just write %d or %f or whatever multiple times. Then after using comma write the name of variable preceded by an ampersand (&) symbol. multiple variables are separated by comma.

Giving Output:

To print something on screen, we have to use printf function. It is a keyword which functions in same way as cout but syntax is a little different here.

printf (“The output is %d and %f, a, b);

Here first write anything to be directly printed under double quotation marks and wherever you need to put the value of variables, there you need to put %d or %f or anything else to

denote that the values of variables will take its place. Then you need to write variable names in order separated by comma.

Note: Don't use ampersand symbol in printf. Its only for scanf.

Some common Format Specifiers in C

int	%d
long	%ld
double	%lf
float	%f
char	%c
long double	%Lf
unsigned int	%u
short int	%hd

Note: Rest all things regarding C is same as in C++ so please refer to C++ section. Vectors are not a part of C.

Let's move to practice some simple questions since in C++ we were dealing with good level questions only so for beginners first start with these questions both for C and C++ (in fact any language as questions can be same but just you need to write same code in different language). So, let's begin:

1) Write a program to take two numbers from user and print their sum.

Solution:

```
1.  #include<stdio.h>
2.  main()
3.  {
4.    int a,b;
5.    scanf("%d%d",&a,&b);
6.    printf("\n Sum is = %d",(a+b));
7.    return 0;
8.  }
```

2) Write a program to take to take three numbers from the user and find out and print the maximum among three.

Solution:

```
1.  main()
2.  {
3.    int a, b, c;
```

```
4.    scanf("%d%d%d",&a,&b,&c);
5.    if(a>b && a>c)
6.      printf("\n%d",a);
7.    else if(b>a && b>c)
8.      printf("\n %d",b);
9.    else
10.     printf("\n %d",c);
11.   return 0;
12. }
```

3) Write a program to take any number from user and print its multiplication table.

e.g.: 2 * 4 = 8

Solution:

```
1.  main()
2.  {
3.    int n;
4.    scanf("%d",&n);
5.    for(int i=0;i<=10;i++)
6.    {
7.      printf("\n%d * %d = %d",n, i, (n*i));
8.    }
9.    return 0;
10. }
```

4) Write a program to print the pattern:

1

2 3

4 5 6

7 8 9 10

Solution:

```
1.  main()
2.  {
3.    int number=1;
4.   for(int i = 1; i <= rows; i++)
5.      {
6.          for(int j = 1; j <= i; ++j)
7.          {
8.              printf("%d ",number);
9.              ++number;
10.         }
11.         printf("\n");
12.     }
13.
14.   return 0;
15. }
```

5) Write a program to input your name. Print the following pattern with your name.

e.g.: Input: SHUBHAM

Output:

S

SH

SHU

SHUB

SHUBH

SHUBHA

SHUBHAM

Solution:

```
1.  #include<stdio.h>
2.  main()
3.  {
4.    string str;
5.    scanf("%s",&str);
6.    for(int i=0;i<str.length();i++)
7.    {
8.      for(int j=0;j<=i;j++)
9.      {
10.       printf("%c",str[j]);
11.     }
12.     printf("\n");
13.   }
14.   return 0;
15. }
```

6) Write a program to take any number as input. Print the Fibonacci series up to that many terms.

e.g.: 1 1 2 3 5 8 13 21 ….

Solution:

```
1.  #include <stdio.h>
2.  int main() {
3.      int i, n, t1 = 0, t2 = 1, nextTerm;
4.      printf("Enter the number of terms: ");
5.      scanf("%d", &n);
6.      printf("Fibonacci Series: ");
7.      for (i = 1; i <= n; ++i) {
8.          printf("%d, ", t1);
9.          nextTerm = t1 + t2;
10.         t1 = t2;
11.         t2 = nextTerm;
```

```
    }
    return 0;
}
```

7) Write a program to print the following pattern:

1 4 27 16 125 36 343 64 …. Up to n terms. Take n from user.

Solution:

```
main()
{
  int n;
  scanf("%d",&n);
  for(int i=1;i<=n;i++)
  {
    if(i%2==0)
      printf("%d ",i*i);
    else
      printf("%d ",(i*i*i));
  }
  return 0;
}
```

8) Write a program to take an array of numbers which indicates the marks of 5 students. Your task is to print the grades for respective marks he scored. Create character array of grades which stores grades in same order as of marks.

Conditions:

- Marks>=90 -> Grade - A
- Marks<90 and Marks>=75 -> Grade – B
- Marks<75 and Marks>=55 -> Grade – C
- Marks<55 and Marks>=40 -> Grade – D
- Marks<40 and Marks>=20 -> Grade – E
- Marks<20 -> Grade – F

e.g.:

Input: 45 12 78 91 58

Output: D F B A C

9) Write a program to take a number as input and check it whether it is prime or not.

Solution:

```c
#include <stdio.h>
#incude<math.h>
int main() {
    int n, i, flag = 0;
    printf("Enter a positive integer: ");
    scanf("%d", &n);
    for (i = 2; i <= sqrt(n); ++i) {
        // condition for non-prime
        if (n % i == 0) {
            flag = 1;
            break;
        }
    }
    if (n == 1) {
        printf("1 is neither prime nor composite.");
    }
    else {
        if (flag == 0)
            printf("%d is a prime number.", n);
        else
            printf("%d is not a prime number.", n);
    }
    return 0;
}
```

10) Write a program to take any number as input and display all its factors.

11) Write a program to take a string input. Print the number of uppercase letters, lowercase letters and numbers in string.

Solution:

```c
#include<stdio.h>
main()
{
  string str;
  int uc=0,lc=0,d=0;
  scanf("%s",&str);
  //typecasting is done to get ascii code of each character
  for(int i=0;i<str.length();i++)
  {
    if((int)str[i]>=65 && (int)str[i]<=90) // checking whether upper case
      uc++;
    if((int)str[i]>=97 && (int)str[i]<=122) //checking for lower case
      lc++;
    if((int)str[i]>=48 && (int)str[i]<=57) // checking for digits
      d++;
  }
  printf("\n Upper case = %d",uc);
  printf("\n Lower Case = %d",lc);
  printf("\n Digits = %d",d);
  return 0;
}
```

12) Write a program to take principal amount, time, rate of interest as input and print simple interest.

13) Write a program to take a string input. Count number of vowels in the string.

14) Write a program to input a number. Reverse the number and print it.

e.g.:

Input: 67145

Output: 54176

Now, for more easy questions practice move to Java section and solve those problems in C language, and for tougher and more challenging questions move to C++ section made by me.

For, more challenging questions, move to Practice More section and try to solve them. Those questions are for your own practice so solutions are not provided in that section.

But if you have any doubts regarding the questions or in solution, do contact us.

Rate our App on Play Store - https://play.google.com/store/apps/details?id=com.skcoding.lrnprog