SigmaPi Academy

Variables & Data Types:

- A Variable is a place in the computer where we can store any data entered by the user. This data could be anything from integers and decimal numbers to sentences and paragraphs. Every time we write a program we have to use variables to store the data which the user inputs or the data which the program outputs and we do this is done by declaring them, i.e., telling the compiler which is the variable and what is its type.

- The type of data which is stored in these variables cannot be random. The compiler gets to know about this through the data types. This is also declared with the variable, in the following way "datatype variable_Name". We can also declare more than one variable in one go, "data-type variable_Name1, variable_Name2, variable_Name3". Care should be taken while chosing a variable name as it should not start with a number & must not be a keyword.

- There are 5 types of data types that have already been made available to us. They are:

(a) Char - it is the most simple kind of data type. This can store a number, an alphabet, a symbol, but they have to be one in number.

(b) int - Here we can store any integer but not decimal numbers

(c) float - Here also we can store integer numbers but here

decimal numbers
-1.7.

(d) double - It

(e) String - It

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decimal numbers are allowed for example: 10.5, 10.2, -1.7.

(d) double - It is same as float but here there is no limit on the decimal number for example, 10.732, -0.1245.

(e) String - It is a list of characters and is used to store sentences & paragraphs. More about this in a later section.

- There are 3 types of variables:

(a) Local Variable:

All the variables defined inside a function is called a local variable. A function is a list of commands written seperately. Outside the function the variable does not exist.

(b) Global Variable:

If a variable is defined outside a function it is called a global variable. We generally define them in the beginning of the program. If we have more than one function, then a global variable is available to all of them.

(c) Static variable:

The value of a static variable remains constant throughout a program & is defined in the following way, "static datatype variablename = data"

Code:

```
#include<stdio.h>
int z=10; // global variable
void function ()
{
int x= 20; // local variable
static int y= 30; // static variable
x= x+10;
y= y+10;
z=z+10;
printf("%d, %d, %d", x, y, z);
}

int main()
{
z = z +10;
func();
return 0;
}
```

Output:

30, 40, 30.

- We can also make the value of a variable constant by using "const" keyword (more about it towards the end). For example const int a = 5. The difference between using const & static is that we can never change the value of a "const" variable but the value of a static variable can be changed.

Code:

```
#include <stdio.h>
const int x = 10; // constant value.
    static int y = 20;

int main()
{
    x = x + 5;
    y = y - 5;
    printf("%d", x);
    printf("%d", y);
    return 0;
}
```

Output:

It will give an error, which is, error: assignment of read-only variable 'x'. On removing the command x = x + 5; The program returns 15 and now the value stored in y is 15 not 20.

- When we declare, int n;=20, there is a specific limit upto which int can store data. This limit is different for different data types and also varies between different compilers. Whenever we want to use the variable for printing or scanning the user input, we use certain format specifiers which tells the compiler what kind of variable we are printing or scanning. The different format specifiers with the range of storage & memory requirements of different data types on a 32 bit GCC compiler is given in table-1.

- Keywords are certain words which have been given a certain functions. These cannot be used as variable names. In all there are 44 keywords in C which are mentioned in table-2.