# C++ Identifiers

C++ identifiers in a program are used to refer to the name of the variables, functions, arrays, or other user-defined data types created by the programmer. They are the basic requirement of any language. Every language has its own rules for naming the identifiers.

In short, we can say that the C++ identifiers represent the essential elements in a program which are given below:

- **Constants**
- **Variables**
- **Functions**
- **Labels**
- **Defined data types**

**Some naming rules are common in both C and C++. They are as follows:**

- Only alphabetic characters, digits, and underscores are allowed.
- The identifier name cannot start with a digit, i.e., the first letter should be alphabetical. After the first letter, we can use letters, digits, or underscores.
- In C++, uppercase and lowercase letters are distinct. Therefore, we can say that C++ identifiers are case-sensitive.
- A declared keyword cannot be used as a variable name.

**For example,** suppose we have two identifiers, named as 'FirstName', and 'Firstname'. Both the identifiers will be different as the letter 'N' in the first case in uppercase while lowercase in second. Therefore, it proves that identifiers are case-sensitive.

## Valid Identifiers

**The following are the examples of valid identifiers are:**

```
Result
Test2
_sum
power
```

## Invalid Identifiers

**The following are the examples of invalid identifiers:**

```
Sum-1   // containing special character '-'.
2data   // the first letter is a digit.
break   // use of a keyword.
```

> Note: Identifiers cannot be used as the keywords. It may not conflict with the keywords, but it is highly recommended that the keywords should not be used as the identifier name. You should always use a consistent way to name the identifiers so that your code will be more readable and maintainable.

The major difference between C and C++ is the limit on the length of the name of the variable. ANSI C considers only the first 32 characters in a name while ANSI C++ imposes no limit on the length of the name.

Constants are the identifiers that refer to the fixed value, which do not change during the execution of a program. Both C and C++ support various kinds of literal constants, and they do have any memory location. For example, 123, 12.34, 037, 0X2, etc. are the literal constants.

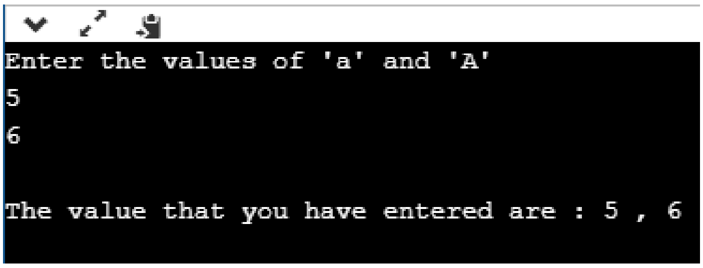
**Let's look at a simple example to understand the concept of identifiers.**

```
#include <iostream>
using namespace std;
int main()
{
   int a;
   int A;
   cout<<"Enter the values of 'a' and 'A'";
   cin>>a;
   cin>>A;
   cout<<"\nThe values that you have entered are : "<<a<<" , "<<A;
```

```
    return 0;
}
```

In the above code, we declare two variables 'a' and 'A'. Both the letters are same but they will behave as different identifiers. As we know that the identifiers are the case-sensitive so both the identifiers will have different memory locations.

**Output**



```
Enter the values of 'a' and 'A'
5
6

The value that you have entered are : 5 , 6
```

## What are the keywords?

Keywords are the reserved words that have a special meaning to the compiler. They are reserved for a special purpose, which cannot be used as the identifiers. For example, 'for', 'break', 'while', 'if', 'else', etc. are the predefined words where predefined words are those words whose meaning is already known by the compiler. Whereas, the identifiers are the names which are defined by the programmer to the program elements such as variables, functions, arrays, objects, classes.

**Differences between Identifiers and Keywords**

**The following is the list of differences between identifiers and keywords:**

| Identifiers | Keywords |
|---|---|
| Identifiers are the names defined by the programmer to the basic elements of a program. | Keywords are the reserved words whose meaning is known by the compiler. |
| It is used to identify the name of the variable. | It is used to specify the type of entity. |

| | |
|---|---|
| It can consist of letters, digits, and underscore. | It contains only letters. |
| It can use both lowercase and uppercase letters. | It uses only lowercase letters. |
| No special character can be used except the underscore. | It cannot contain any special character. |
| The starting letter of identifiers can be lowercase, uppercase or underscore. | It can be started only with the lowercase letter. |
| It can be classified as internal and external identifiers. | It cannot be further classified. |
| Examples are test, result, sum, power, etc. | Examples are 'for', 'if', 'else', 'break', etc. |

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