Namespaces in C++

Consider a situation, when we have two persons with the same name, Zara, in the same class. Whenever we need to differentiate them definitely, we would have to use some additional information along with their name, like either the area, if they live in different area or their mother’s or father’s name, etc.

Same situation can arise in your C++ applications. For example, you might be writing some code that has a function called xyz() and there is another library available which is also having same function xyz(). Now the compiler has no way of knowing which version of xyz() function you are referring to within your code.

A **namespace** is designed to overcome this difficulty and is used as additional information to differentiate similar functions, classes, variables etc. with the same name available in different libraries. Using namespace, you can define the context in which names are defined. In essence, a namespace defines a scope.

## **Defining a Namespace**

A namespace definition begins with the keyword **namespace** followed by the namespace name as follows −

namespace namespace\_name {

 // code declarations

}

To call the namespace-enabled version of either function or variable, prepend (::) the namespace name as follows −

name::code; // code could be variable or function.

Let us see how namespace scope the entities including variable and functions:

#include <iostream>

using namespace std;

// first name space

namespace first\_space {

 void func() {

 cout << "Inside first\_space" << endl;

 }

}

// second name space

namespace second\_space {

 void func() {

 cout << "Inside second\_space" << endl;

 }

}

int main () {

 // Calls function from first name space.

 first\_space::func();

 // Calls function from second name space.

 second\_space::func();

 return 0;

}

If we compile and run above code, this would produce the following result:

Inside first\_space

Inside second\_space

## **The using directive**

You can also avoid prepending of namespaces with the **using namespace** directive. This directive tells the compiler that the subsequent code is making use of names in the specified namespace. The namespace is thus implied for the following code −

#include <iostream>

using namespace std;

// first name space

namespace first\_space {

 void func() {

 cout << "Inside first\_space" << endl;

 }

}

// second name space

namespace second\_space {

 void func() {

 cout << "Inside second\_space" << endl;

 }

}

using namespace first\_space;

int main () {

 // This calls function from first name space.

 func();

 return 0;

}

If we compile and run above code, this would produce the following result:

Inside first\_space

The ‘using’ directive can also be used to refer to a particular item within a namespace. For example, if the only part of the std namespace that you intend to use is cout, you can refer to it as follows:

using std::cout;

Subsequent code can refer to cout without prepending the namespace, but other items in the **std**namespace will still need to be explicit as follows −

#include <iostream>

using std::cout;

int main () {

 cout << "std::endl is used with std!" << std::endl;

 return 0;

}

If we compile and run above code, this would produce the following result:

std::endl is used with std!

Names introduced in a **using** directive obey normal scope rules. The name is visible from the point of the **using** directive to the end of the scope in which the directive is found. Entities with the same name defined in an outer scope are hidden.

## **Discontiguous Namespaces**

A namespace can be defined in several parts and so a namespace is made up of the sum of its separately defined parts. The separate parts of a namespace can be spread over multiple files.

So, if one part of the namespace requires a name defined in another file, that name must still be declared. Writing a following namespace definition either defines a new namespace or adds new elements to an existing one −

namespace namespace\_name {

 // code declarations

}

## **Nested Namespaces**

Namespaces can be nested where you can define one namespace inside another name space as follows:

namespace namespace\_name1 {

 // code declarations

 namespace namespace\_name2 {

 // code declarations

 }

}

You can access members of nested namespace by using resolution operators as follows:

// to access members of namespace\_name2

using namespace namespace\_name1::namespace\_name2;

// to access members of namespace:name1

using namespace namespace\_name1;

In the above statements if you are using namespace\_name1, then it will make elements of namespace\_name2 available in the scope as follows:

#include <iostream>

using namespace std;

// first name space

namespace first\_space {

 void func() {

 cout << "Inside first\_space" << endl;

 }

 // second name space

 namespace second\_space {

 void func() {

 cout << "Inside second\_space" << endl;

 }

 }

}

using namespace first\_space::second\_space;

int main () {

 // This calls function from second name space.

 func();

 return 0;

}

If we compile and run above code, this would produce the following result:

Inside second\_space