

# SNS COLLEGE OF TECHNOLOGY, COIMBATORE –35 (An Autonomous Institution) DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



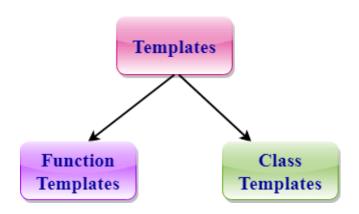
#### **Templates: Introduction**

#### **C++ Templates**

A C++ template is a powerful feature added to C++. It allows you to define the generic classes and generic functions and thus provides support for generic programming. Generic programming is a technique where generic types are used as parameters in algorithms so that they can work for a variety of data types.

#### Templates can be represented in two ways:

- Function templates
- Class templates



#### **Function Templates:**

We can define a template for a function. For example, if we have an add() function, we can create versions of the add function for adding the int, float or double type values.

#### **Class Template:**

We can define a template for a class. For example, a class template can be created for the array class that can accept the array of various types such as int array, float array or double array.

#### **Function Template**

- Generic functions use the concept of a function template. Generic functions define a set of operations that can be applied to the various types of data.
- The type of the data that the function will operate on depends on the type of the data passed as a parameter.
- For example, Quick sorting algorithm is implemented using a generic function, it can be implemented to an array of integers or array of floats.
- A Generic function is created by using the keyword template. The template defines what function will do.

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19CST251 & Object Oriented Programming using C++



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Syntax of Function Template

template < class Ttype> ret\_type func\_name(parameter\_list)

```
    {
    2. // body of function.
    3. }
```

Where **Ttype**: It is a placeholder name for a data type used by the function. It is used within the function definition. It is only a placeholder that the compiler will automatically replace this placeholder with the actual data type.

class: A class keyword is used to specify a generic type in a template declaration.

## Let's see a simple example of a function template:

```
#include <iostream>
using namespace std;
template<class T> T add(T &a,T &b)
{
  T result = a+b;
  return result:
}
int main()
ł
 int i = 2;
 int j = 3;
 float m = 2.3;
 float n = 1.2;
 cout<<"Addition of i and j is :"<<add(i,j);
 cout << '\n';
 cout<<"Addition of m and n is :"<<add(m,n);
 return 0;
}
```

## **Output:**

Addition of i and j is :5 Addition of m and n is :3.5