**CHAPTER 7**

TEMPLATES & STL

Templates

\*\* Templates are the foundation of generic programming, which involves writing code in a way that is independent of any particular type.

\*\* A template is a blueprint or formula for creating a generic class or a function. The library containers like iterators and algorithms are examples of generic programming and have been developed using template concept.

\*\* There is a single definition of each container, such as vector, but we can define many different kinds of vectors for example, vector

or vector <string>

\*\* You can use templates to define functions as well as classes

**Standard Template Library (STL)**

\*\* STL is a set of general purpose templatized classes (data structures) & functions that could be used as a standard for storing & processing of data.

\*\* STL has three components:

1. Containers: used to store data.

2. Algorithms: procedures/functions used to process data stored in container.

3. Iterators: objects like pointers used to point any element of a container or to iterate through a container.

***[ Note by -Jannatul Ferdous Umama(Bristy)]***

**Container**

\*\* Containers are of three types

♣ Sequence container:Vector, list, deque.

♣ Associative container: map, multimap, set, multiset.

♣ Derived container: priority-queue, stack, queue.

\*\* General Theory of Operation

♣ Functions provided by sequence container: insert, erase, push\_back, pop\_back, begin, end. push\_front,pop\_front these two can done only by list & deque.

♣ Functions provided by associative container: insert, erase, begin, end,find.

**Vector**

\*\* Vectors are sequence containers representing arrays that can change in size.

\*\* Just like arrays, vectors use contiguous storage locations for their elements, which means that their elements can also be accessed using offsets on regular pointers to its elements, and just as efficiently as in arrays. But unlike arrays, their size can change dynamically, with their storage being handled automatically by the container.

***[ Note by -Jannatul Ferdous Umama(Bristy)]***