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# Class Templates

Section 16.3

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## Templates

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- Last time we talked about function templates
  - What are they?
- Templates provide a wonderful opportunity for software reusability
- Describe the notion of a class generically, and only specify the data type of data members when the class is instantiated
- To illustrate this, we will use the *stack* data structure

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## Stack

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- A stack is a structure into which we insert items at the top
- Items are retrieved in the reverse order they were placed in
  - LIFO - Last In First Out

new  
is\_empty

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## Class Template Header

```
#ifndef TSTACK1_H
#define TSTACK1_H
template<class T>
class Stack {
public:
    Stack(int = 10);
    ~Stack();
    bool push(const T&);
    bool pop(T&);
    bool isEmpty() const;
    bool isFull() const;
private:
    int size;
    int top;
    T *stackPtr;
};
#endif
```

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## Instantiating the Class

- Since the class was created using templates, it's possible to instantiate it using any data type
  - Create a stack of doubles, ints, characters
- Syntax:
  - `Stack<double> doubleStack(5);`
  - `Stack<int> intStack(5);`
  - `Stack<char> charStack(5);`

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## Another Examples

- Let us create a template class for a generic array

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## Exam Review

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- Function Templates
- Class Templates

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## Summary

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- We covered class templates
- We completed chapter 11

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