Definitions
Template parameters
Template specialization

Class templates

Comp Sci 1570 Introduction to C++

Outline

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Class templates

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- Templates are the foundation of generic programming, which involves writing code in a way that is independent of any particular type.
- Generic programming is a style of computer programming in which algorithms are written in terms of types to-be-specified-later that are then instantiated when needed for specific types provided as parameters.
- Templates are a feature of the C++ programming language that allows functions and classes to operate with generic types. This allows a function or class to work on many different data types without being rewritten for each one.

The general form of a template function definition

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General syntax for a Function (review)

```
template <typename type>
ret-type func-name(parameter list)
{
   // body of function
}
```

General syntax for a class

```
template <typename type>
class class-name
{
  //class contents
    .
    .
}
```

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template < parameter-list > declaration

Each parameter in parameter-list may be:

- a non-type template parameter;
  - A value that has an integral type or enumeration
  - A pointer or reference to a class object
  - A pointer or reference to a function
  - A pointer or reference to a class member function
- a type template parameter;
- a template template parameter.

See examples

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- specialization is a definition for a particular type or types that is to be used instead of the general template. Sometimes you might need or want to modify a template to behave differently when instantiated for a particular type; in that case, you can create an explicit specialization.
- Can be either full or partial (in regard to number of parameters being specialized)