Exception Handling in C++
D & D Chapter 17

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Key Concepts

- Exceptions
- Exception handling
- `try` block
- `catch` handler
- `Keyword` `throw`
- Fault-tolerant programs
What is an Exception?

- A *signal* that a problem has occurred during program execution that requires special processing
- Exceptions should only occur during “exceptional” circumstances
- C++ provides a mechanism for handling exceptions so that programs don’t just “crash” or stop executing, without a chance to recover
What is Exception Handling?

- A process for detecting and resolving exceptions
- C++ exception handling is built on three keywords
  - try
  - catch
  - throw
When to Use Exception Handling?

- Exception handling processes *synchronous* errors, which occur when a statement in the program executes.
- Exception handling does *not* process *asynchronous* events that may happen independent of program flow.
try Block

- Contains code that might generate an exception
catch Handler

- Executes as a result of an exception
- The correct handler is “activated” when a match occurs between the type of exception thrown and type of parameter for the handler
- An exception parameter should always be declared as a reference to the type of exception in the handler
Keyword *throw*

- When an unexpected circumstance occurs, an exception is generated by keyword *throw*.
Standard Library Exception Classes and Hierarchy (I)

- p. 775, Deitel & Deitel, *C++ How To Program, 10th Ed.*

![Diagram of exception classes hierarchy]

*Fig. 17.10* Some of the Standard Library exception classes.
We can write classes, which are derived from the standard library exception classes (Note: the standard exception classes are located in `<stdexcept>`)

- class DivideByZeroException : public runtime_error
Dividing-by-zero Example

- Provided in class
Fault-tolerant Programs

- Programs that can satisfy most, if not all, requirements, even if faults or exceptions occur.
- These programs handle faults or exceptions gracefully, which provides a level of robustness.
Summary

- Exception handling provides a mechanism for building robust and fault-tolerant programs.
References