Chapter 14
Exceptions

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CISC 5004 - Programming C++
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Exception Basics

- Programs need to handle errors (such as incorrect input).
- One approach is to add error checking code
  - This can affect readability, and opens up the possibility of inconsistency
- Alternatively, exceptions can be used

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Exception Keywords

- `try`
  - Surrounds normal code and is exited immediately upon a `throw`
- `throw`
  - Within a `try` block, jumps immediately to the end
  - Provides an object of a particular type
  - e.g. `runtime_error` as defined in the `stdexcept` library
- `catch`
  - Immediately follows a try block
  - “Catches” or handles one or more specific types of exceptions
  - Multiple catch blocks can exist to catch different types of exceptions
- Weight example with exceptions
- Some common exception types

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Exceptions with functions

- Can use exceptions within functions
  - If an exception is thrown within a function and not caught there, it can be caught higher up in the function call hierarchy.
  - Example
  - Note: This can be a mixed blessing
    - Requires someone to know what exceptions are thrown, even deep in the call stack
    - An exception could be caught by a lower-down function that you didn’t know about
    - If you don’t catch all exceptions, your program will crash

Multiple Handlers

- As noted, multiple catch blocks can be written to handle different types of exceptions
  - The first matching handler is executed
  - Example
- Common error: A catch block for a base class may catch exceptions of derived classes
  - Always catch derived class exceptions first

Examples

- Number format exception
- Integer division