

Homework 13: Exceptions

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CS 32 Spring '22

Due: 5/25 12:30pm

Name & Perm #:

Homework buddy (leave blank if you worked alone):

Reading: PS 16.1, 16.2

1

1. (4 pts) C++ has a mechanism for throwing exceptions. Many other languages have this feature as well. One interesting way that exception handling varies from one language to another is what type of “thing” can be thrown. Java, for example, has a class called `Exception` (specifically, `java.lang.Exception`). The only things you can “throw” in Java are objects of type `Exception` (or of types that are derived via inheritance from `Exception`). What is the case for C++ - i.e., what kind of value can be thrown in C++?

2. (4 pts) In both C++ and Java, programmers often create special classes for programmer-defined Exceptions. For example, for a project that is doing analysis of word occurrences on Subreddits of the site `reddit.com`, you might create a `NoSuchSubreddit` exception for the case where the program is trying to access a Subreddit that does not exist.

In Java, if you want to look at the code and find out whether a particular class is being used as an exception, it is easy: you see whether it inherits from `java.lang.Exception` either directly or indirectly. In C++ what do you look for in the code to indicate whether a particular class is used as an exception?

2

The author of PS makes the point that *exception classes can be trivial*. We also had some trivial exception classes in the lecture.

1. (2 pts) Illustrate this point by declaring a complete class specification for a C++ NoSuchStudent exception. You should have no difficulty confining your answer to the tiny space given here:
2. (4 pts) Slightly more subtle is this: if the class specification is so trivial, what good it is? Why even declare such a class at all? Be very specific and precise in your answer, but keep it short. (Note: This one actually may require some thought - the answer is not just "lying there" in the book waiting to be found. You will have to really read, digest, and think about the material a bit. Learning may take place. Don't worry - this is a perfectly normal reaction, and any pain you experience will subside.)

3

A standard "Hello World" type example for exception handling is *divide by zero*.

1. (2 pts) Write C++ code that creates a (trivial) class for a DivideByZero exception.
2. (8 pts) Using that class, write the a C++ function named `rationalAsDouble` that takes two arguments: **int** numerator, and **int** denominator and returns a **double**. It converts these two integers as a fraction into a double. The function should throw a `DivideByZero` exception if the denominator is zero.