



CS 113 – Computer Science I

Lecture 16 – Class Design & Arrays of Objects

Tuesday 03/26/2024

Announcements

HW06 Board Game – Due next Thursday 4/4

Midterm II pushed back to Tuesday 4/23

Outline

- Bank Account
- Exceptions
- Reading Files
- Objects and Classes

BankAccount

let's finish BankAccount.java

Exceptions

What is an exception?

What are some exceptions you have encountered?

Exceptions

Handling exceptions

```
try {  
    some code where errors may occur  
} catch (<some exception> <variable>) {  
    some corrective action you could perform  
}
```

Exceptions

Write code to:

1. Initialize an array
2. Ask the user for an input index
3. If the index is out of bounds print “oh no!”
 - a. make sure an exception is not thrown

Exceptions

Write code to:

1. Ask the user for two numbers
2. If the index is out of bounds print “oh no!”
 - a. make sure an exception is not thrown

Files

Files

In Java, the `File` class is used to represent a file or directory path.

```
import java.io.File;
```

<https://docs.oracle.com/javase/8/docs/api/java/io/File.html>

It provides methods to manipulate files and directories, such as creating new files, checking if a file exists, renaming files, deleting files, and so on

Scanners

You can use a scanner to read three things

1. Input from the console (System.in)
2. Input from a file
3. A string

ScannerReview.java

Reading files

Use Scanner class

```
File input = new File("file.txt");  
Scanner sc = new Scanner(input);  
System.out.println(sc.nextLine());
```

Errors

Need to either:

- Write code to **catch** it
 - Deal with the case where the specified file is not found
- Indicate that the method can cause the specific `FileNotFoundException`

Objects and Classes pt 2

Arrays of Objects

Class

A blueprint for a custom data type

A template for how data/information is stored

Contains a set of methods for how to interact/operate on the stored data

Classes and objects

An **object** is an *instance* of a **class**

A concrete occurrence of an object at runtime

```
Scanner sc = new Scanner(System.in);
```

`Scanner` is the class, `sc` is the instance.

Bank Class

Let's review our bank class

this

`this` is a special keyword that refers to the object inside an instance method

Allows us to access other instance variables within an instance method

Access modifiers

Specify the access-level of instance variables/methods

- **public**
 - code outside of the class can access the variable/method
- **private**
 - code outside of the class cannot access the variable/method

Default in java is **public**

In this class, make instance data private

Access Modifiers

Methods also have an access modifier.

Let's create a private method!

Arrays of Objects

Arrays of Objects

Let's incorporate BankAccount into Bank