

Objectives

- Wrap up Enumerated Types
- Comparators
- Jar Files
- Standard Error
- Language Comparison

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Review

- What is the Collections Framework made up of?
- What are some benefits of the Collections Framework?
- What is an Enumerated Type (enum)?
 - What is it good for?

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Designing the Playing Card Class

- State?
 - How to represent?
- API?

Implement:
`boolean sameSuit(Card c)`
`int getRummyValue()`

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COMPARATORS

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Alternative Sorting

- What if object is `Comparable` but does not sort the way you want?
 - Special case
 - Don't want to change class
 - Don't have access to class
 - Example: want to sort strings so capital and lowercase letters are the same
- Use `Comparator` interface

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Comparator<T> Interface

- Declares two methods:
 - `int compare(T o1, T o2)`
 - Compare two objects and return a value as if we called `o1.compareTo(o2)`
 - `boolean equals(Object other)` ← Have default from `Object`
 - Check if this `Comparator` equals other
- Overloaded versions of `sort` in Arrays and Collections
 - Arrays: `void sort(Object[] array, Comparator c)`
 - Collections: `void sort(Collection col, Comparator c)` `EmployeeNameComparator.java`

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JAR FILES

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Jar (Java Archive) Files

- Archives of Java files
- Package code into a neat bundle to distribute
 - Easier, faster to download
 - Easier for others to use
- jar** command: create, view, and extract Jar files
 - Works similarly to **tar**
 - `jar cf myapplication.jar *.class`

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Jar/Tar Commands

- Common options:

Option/Operations	Meaning
f	The name of the archive file
c	Create an archive file
x	Extract the archive file
v	Verbose
z	Zip (compress)
t	Table of contents (list contents)

- Common use:

- `jar cfz archive.jar.gz arch_directory`
- `jar xfz archive.jar.gz`

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Jar file: Metadata

- Jar file includes a special metadata file with the path `META-INF/MANIFEST.MF`
 - Say how Jar file is used
 - jar** creates a default metadata file, if not specified

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Jar file: Metadata

- Example metadata file that allows you to execute the JAR with java

```
Manifest-Version: 1.0
Main-Class: MyApplication
```

Note the newline

- To create the jar file:

```
jar cmf myManifest myapplication.jar *.class
```

Specifying the metadata file

- Run it using java

```
java -jar myapplication.jar
```

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Creating Jar Files in Eclipse

- Export → Java → Jar
 - Options to create a MANIFEST.MF file
 - Options to include source files or only class files
- Can submit assignments this way
 - Must include source files

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Using Jars

- Add jar files to CLASSPATH to use classes in jar file
- Example: adding a jar file to the current classpath variable (\$CLASSPATH)

```
CLASSPATH=$CLASSPATH:myapplication.jar
echo $CLASSPATH
```

← Current value of CLASSPATH

In Eclipse, you need to "Configure Build Path"

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Importing Jar Files into Eclipse

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STANDARD ERROR

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Standard Streams

- Preconnected streams

➤ Standard Out: *stdout*

➤ Standard In: *stdin*

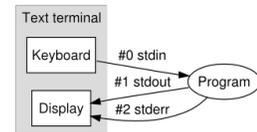
➤ *Standard Error: stderr*

- For error messages and diagnostics
- In Java: `System.err`

- Benefits of two output streams

➤ Redirect to different places

- Example: separate log files for info and for errors
- Look at some web logs



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Redirecting Output

- Recall earlier this semester

```
> java OlympicScore > score.out
```

➤ Redirected *stdout* to `score.out`

➤ *stderr* would still go to terminal

- To redirect *stderr* to file as well

```
> java OlympicScore >& score.out
```

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LANGUAGE COMPARISON

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Language Comparison

Java

Python

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For Wednesday

- Assignment 8: Streams and Collections
- Moving towards general software development...

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