

Second AP\* Edition  
— with GridWorld

# *Java*

# *Methods*

Object-Oriented Programming  
and  
Data Structures

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## Appendix D: EasyReader, EasyWriter, EasySound, EasyDate

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“Easy” classes are intended for novices. They provide a simplified “façade” for more technical Java library solutions for the same tasks. Each of these classes has a simple example of its use in its source file and in the Javadoc documentation.

**Feel free to use and distribute these classes in any way you want.**

The source code is available in the `JM\EasyClasses` folder and the compiled classes are collected in `JM\EasyClasses\EasyClasses.jar`. The Javadoc documentation is in `JM\EasyClasses\EasyClassesDocs.zip`. Unzip and click on `index.html` in the `docs` folder.

### EasyReader and EasyWriter

We have provided `EasyReader` and `EasyWriter` classes to supplement Java’s stream I/O classes. `EasyReader` lets you read numbers, characters, words, and lines of text from the keyboard and from a text file. `EasyWriter` lets you write these data elements into a text file (or append data to an existing file).

`EasyReader` was written before `java.util.Scanner` came into existence in the Java 5.0 release. `EasyReader` is similar to `Scanner`; it is a little easier to use than `Scanner` for reading keyboard input because it provides a no-args constructor that creates an `EasyReader` for reading from `System.in`. `EasyReader` is easier to use for reading from a text file because it has a constructor, `EasyReader(String pathname)`. (`Scanner` also has a constructor that takes one `String` parameter, but it interprets it as a string to be scanned for input.) `EasyReader` has a method for reading one character from the console or from a file; `Scanner` does not.

`EasyWriter` allows you to create or open a text file for writing and write text into it using the `print`, `println`, and `printf` methods. It eliminates exception handling and complicated constructors that use wrapper classes.

To open the standard input stream for reading keyboard input use

```
EasyReader kboard = new EasyReader();
```

`kboard` is the name you give to the input stream (can be anything you like).

To open a text file for reading use

```
EasyReader inputFile = new EasyReader(pathname);
```

`inputFile` is the name you give to the input stream associated with the file (can be anything you like); `pathname` is a `String` that holds the file name or an absolute or relative pathname for the file.

Call the `bad()` method to check the status of the file. It returns `true` if the file is not opened properly or if there is an error or end of file; `false` otherwise. For example:

```
EasyReader inputFile = new EasyReader(pathname);
if (inputFile.bad())
{
    System.err.println("Cannot open " + pathname);
    System.exit(1);
}
```

Examples for reading data from the keyboard or a file:

```
int n = kboard.readInt();           // reads an integer
double x = kboard.readDouble();     // reads a double

char ch = inputFile.readChar();     // reads any character,
// including whitespace
String word = inputFile.readWord(); // reads a contiguous string of
// non-whitespace characters

// Read and process all lines from a file:
String line;
while ((line = inputFile.readLine()) != null)
{
    // process line:
    ...
}
```

Notes:

1. `readInt`, `readDouble`, `readChar`, and `readWord` methods do not consume the end of the line after reading the last item. Call `readLine` to get rid of the tail of the line (even if only the newline character is left) before calling `readLine` on the next line.
2. `readInt` and `readDouble` methods do not verify that the next token holds a valid number and return `0` or `Double.NaN`, respectively, if it doesn't.

Call `inputFile.close()` to close the file.

To open a text file for writing use

```
EasyWriter outputFile = new EasyWriter(pathname);  
or  
EasyWriter outputFile = new EasyWriter(pathname, "app");
```

if you want to append data to an existing file. `outputFile` is the name you give to the output stream associated with the file (can be anything you like); `pathname` is a `String` that holds the file name or an absolute or relative pathname for the file.

Be careful:

**`new EasyWriter(pathname)` wipes out the contents of the file if it already exists.**

Call the `bad()` method, which returns `true` if the attempt to create the file (or to open the file for appending) has failed; `false` otherwise.

Use `print`, `println`, and `printf` methods, the same way as with `System.out`, to write data to a file. For example:

```
outputFile.print("x = ");  
outputFile.println(x);  
or  
outputFile.printf("x = %5.2f\n", x);
```

Call `outputFile.println()` to write a blank line.

Call `outputFile.close()` to close the file.

Note:

If you forget to close the file, some of the data may remain in the output buffer but not written to the file.

## EasySound

This class provides an easy way to load and play a sound clip in a Java application (as opposed to a Java applet). For example:

```
EasySound bells = new EasySound("bells.wav");
...
bells.play();
```

## EasyDate

The `EasyDate` class handles dates in a simple manner. `EasyDate` has a method that adds a number of days to this date, and a method that calculates the number of days from this date to another one. `EasyDate` objects are immutable.

Example:

```
EasyDate today = new EasyDate();
System.out.println("Today is " + today);

EasyDate tomorrow = today.add(1);
EasyDate yesterday = today.add(-1);

int yr = today.getYear();
System.out.println(yr + " is a leap year: true or false? " +
    EasyDate.isLeapYear(yr));

EasyDate myBirthday = new EasyDate(bDayMonth, bDayDay, yr);

if (today.equals(myBirthday))
    System.out.println("Today is my birthday");
else if (yesterday.equals(myBirthday))
    System.out.println("My birthday was yesterday");
else
{
    if (myBirthday.compareTo(today) < 0)
        myBirthday = new EasyDate(bDayMonth, bDayDay, yr + 1);
    System.out.println(today.daysTo(myBirthday) +
        " days are left until my next birthday");
}
```