JAVA LIBRARY CLASSES

CITS1001

Main concepts to be covered

- Using library classes: String, Math, Color
- Reading documentation

- Java 7 API
  http://www.csse.uwa.edu.au/programming/jdk-1.7/api/
(see menu link from cits1001 web page)

Slides Source: Objects First with Java - A Practical Introduction using BlueJ, © David J. Barnes, Michael Kölling

The Java class library

- Thousands of classes.
- Tens of thousands of methods.
- Many useful classes that make life much easier.
- Library classes are often inter-related.
- Arranged into packages.

Hint: using code completion

- The BlueJ editor supports lookup of methods
- Use Ctrl-space after a method-call dot to bring up a list of available methods
- Use *Return* to select a highlighted method

- Use code completion to help you remember method names of library classes

Code completion in BlueJ
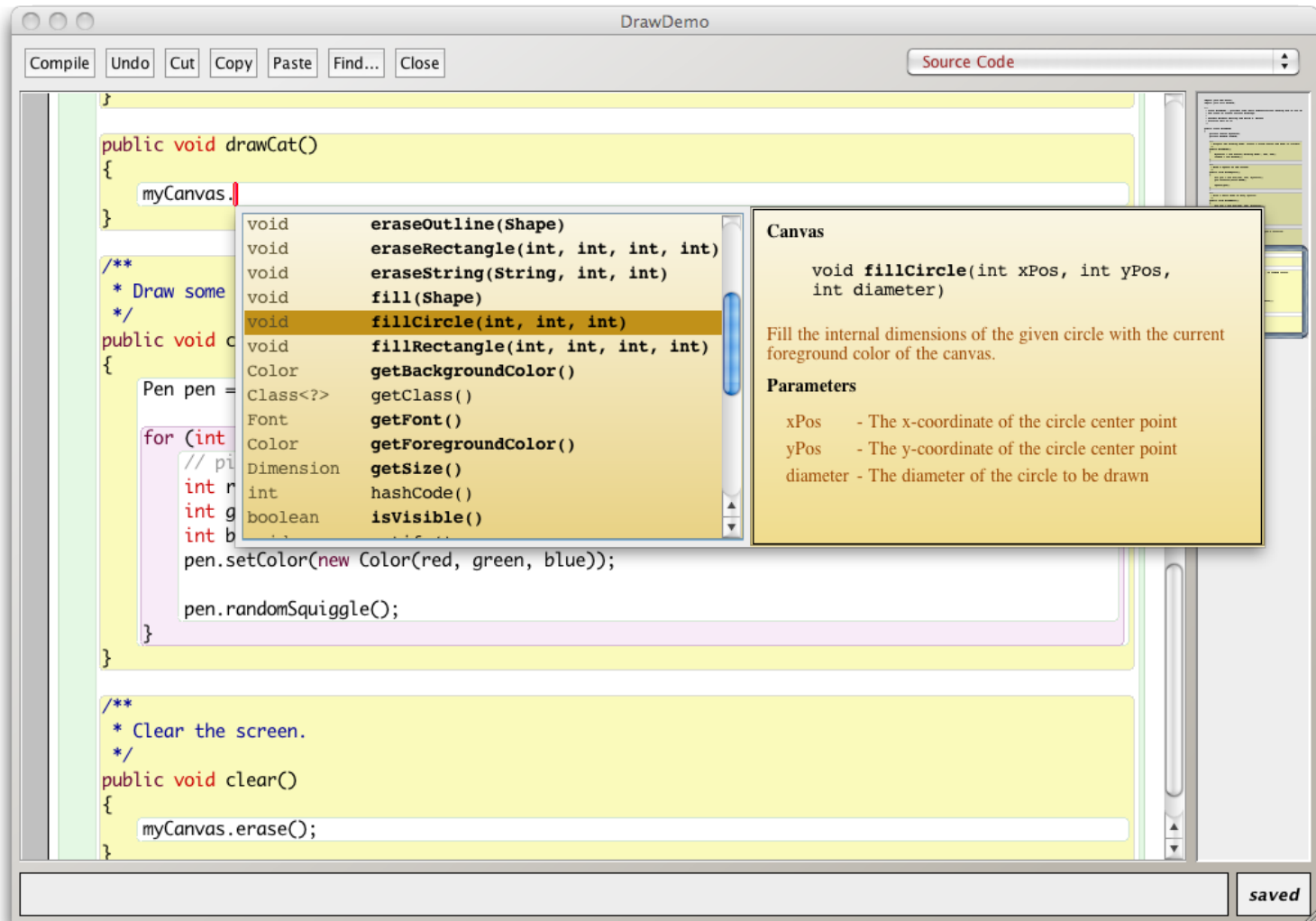
STRING LIBRARY

String Library

- Methods for creating and manipulating Strings of characters

- String greeting = "hello world!";

- String output = "hello " + name + ", you have " + points;

- More details later in the unit

Documentation for startsWith

```
startsWith
```

```
public boolean startsWith(String prefix)
```

Tests if this string starts with the specified prefix.

Parameters:

`prefix` - the prefix.

Returns:

true if the …; **false** otherwise

Methods from `String`

- `contains`
- `endsWith`
- `indexOf`
- `charAt`
- `substring`
- `toUpperCase toLowerCase`
- `Trim`
- More about Strings in Lecture 13

MATH LIBRARY

Using the class `Math`

- Whenever you need a mathematical function, it will (probably) be the in the class `Math`
- `java.lang.Math` (can be referred to just as `Math`)
- For example, Java does not have a power operator, but it is available in `Math`

```
public static double circleArea(double radius) {

  double area = 3.14159 * Math.pow(radius,2);

  return area;

}
```

Aside: Why is this is poor quality code?

Math.random()

```
public static double random()
```

Returns a double value with a positive sign, greater than or equal to 0.0 and less than 1.0

Try it in the BlueJ codePad

Example

```
boolean isheads =
    (Math.random() < 0.5);
```

Math Constants

- Class variables are often used to provide access to *constants* – values that are frequently *used* but not changed
- Constants can be numerical values
  - `Math.PI`
  - `Math.E`

```
public static double circleArea(double radius) {

  double area = Math.PI * Math.pow(radius,2);

  return area;

}
```

Utility Classes

- A class like `Math` that contains only static methods is sometimes called a utility class, because it just provides "utility" methods for use in other classes

- There is no point in ever creating an object of the class `Math` because it can never do anything that the existing methods cannot do

- In fact it has been made impossible to create an object of the class `Math`!
  - this is done by giving a dummy constructor, but making it `private`

COLOR LIBRARY

Constant Objects: Colours

- import java.awt.Color; (before the class header)

- The class `java.awt.Color` makes available a number of "pre-constructed" objects

    ```
    Color.RED

    Color.BLUE

    …

    Color.BLACK
    ```

- You can use these colours without having to construct them from scratch

Review

- Java has an extensive class library.
- A good programmer must be familiar with the library.
- The documentation tells us what we need to know to use a class (its interface).
- Use BlueJ's code completion: type Ctrl-space after a method-call dot to bring up a list of available methods