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)
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

```java
public void drawCat()
{
    myCanvas.
    void erasureOutline(Shape)
    void eraseRectangle(int, int, int, int)
    void eraseString(String, int, int)
    void fillShape()
    void fillCircle(int, int, int)
    void fillRectangle(int, int, int, int)
    Color getBackgroundColor()
    void getFont()
    void getForegroundColor()
    Dimension getSize()
    int hashCode()
    boolean isVisible()
    pen.setColor(new Color(red, green, blue));
    pen.randomSquiggle();
}
/**
 * Draw something
 */
public void draw()
{
    Pen pen =
    for (int i = 0; i < promoter; i++)
        int d =
        pen.setColor(new Color(red, green, blue));
    pen.randomSquiggle();
}
/**
 * Clear the screen.
 */
public void clear()
{
    myCanvas.erase();
}
```

**Canvas**

```java
void fillCircle(int xPos, int yPos, int diameter)
```

Fill the internal dimensions of the given circle with the current foreground color of the canvas.

**Parameters**

- `xPos` - The x-coordinate of the circle center point
- `yPos` - The y-coordinate of the circle center point
- `diameter` - The diameter of the circle to be drawn
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`

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

Tests if this string starts with the specified prefix.

**Parameters:**
- `prefix` - the prefix.

**Returns:**
- `true` if the string starts with the prefix; `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

```java
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

```java
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