



IBM Power Systems™



Agenda Key: 403692 – 33LA
Session Number:

Lab: Introduction to Java™ Programming

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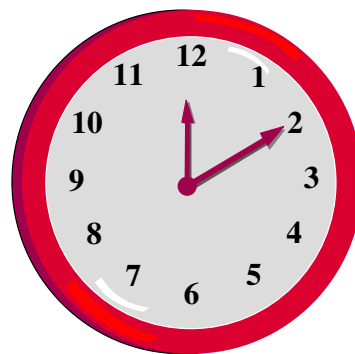
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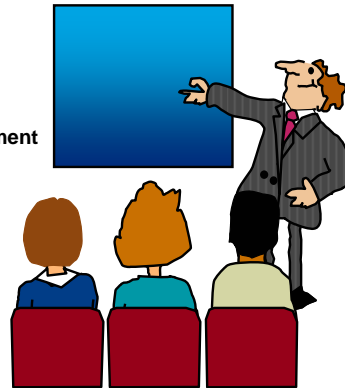
Agenda

- Introduction
- Buzzwords
- Environments
- Program structure
- Syntax
- Development tools
- References
- Lab exercises



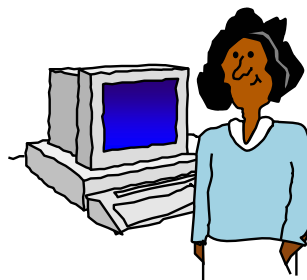
Buzzwords

- **"Simple"**
 - ▶ Syntax is based on C++
 - ▶ Avoids complicated aspects of C++
 - no pointer arithmetic, no memory management
 - ▶ Many reusable objects available
- **Object oriented**
 - ▶ Classes, objects, methods, inheritance
- **Distributed**
 - ▶ TCP/IP, HTTP communication built in
 - ▶ Applet and servlet programming models
 - ▶ "Internet-ready"
 - (it is great for non-Internet apps, too!)



Buzzwords

- **Robust**
 - ▶ Array bounds checking
 - ▶ Automatic garbage collection
- **Secure**
 - ▶ Applet sandbox
 - ▶ Class verifier - prevents "forged" Java code
- **Other built in features**
 - ▶ Threads
 - ▶ Graphical user interface components
 - ▶ Collections
 - ▶ Input/output
 - ▶ Exception handling
 - ▶ Internationalization (national language support)

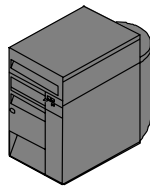


Environments: Applets

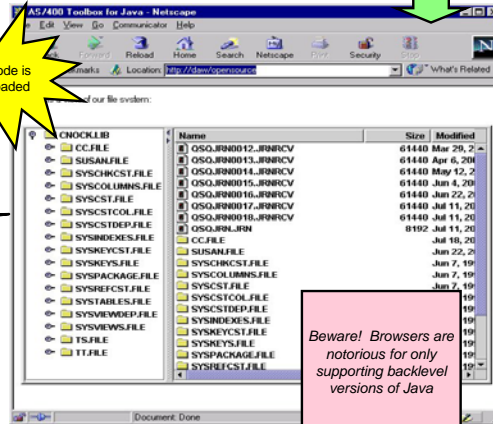
- Program is downloaded as part of a web page, along with text and images
- Runs on local processor, but always within the context of the web browser
- Input and output via GUI
- Extra security measures:
 - limited file access
 - limited network access

Java code runs as part of the browser

Java code is downloaded



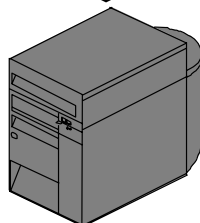
Java != JavaScript



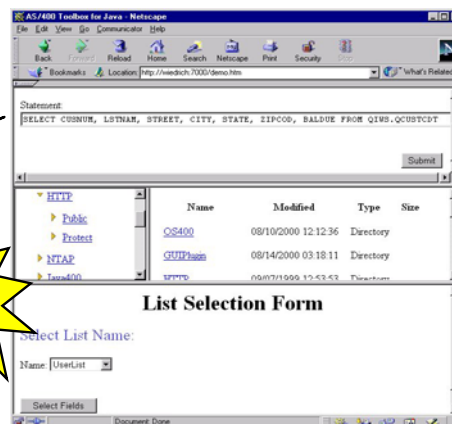
Environments: Servlets

- Runs on web server in response to an HTTP request (e.g. <http://www.mysite.com/info>)
- Output is HTML (not GUI) - the HTML is sent back to the client and presented in the browser

Java code runs as part of the web application server



Only the servlet output is downloaded



Program structure

ReportGenerator.java

Imports instruct the compiler where to find other classes that are used.

A **class** defines the variables and methods for a type of **object**.

A **constructor** is a special method used for initializing an object. Its name matches the class name.

All data and methods are strongly-typed. Java compilers are very strict!

```
import java.util.Date;

public class ReportGenerator
{
    private Date reportDate;
    private String title;

    public ReportGenerator(String theTitle)
    {
        title = theTitle;
        reportDate = new Date(); // The current date and time.
    }

    public void print()
    {
        System.out.println("Report: " + title);
        System.out.println("Generated on: " + reportDate);
        // ... more Java code here ...
    }

    public static void main(String[] args)
    {
        ReportGenerator rg = new ReportGenerator("Marketing expenses");
        rg.print();
    }
}
```

There is usually one **class** per source file. Its name matches the source file name.

A **field** defines the part of the content (data) of the object. A **private field** is usable only within this class. This is called **encapsulation**.

Comments are denoted by // or /* */.

A **method** defines a behavior of the object. It is analogous to a function, procedure, subroutine, etc.

The **main()** method is special - it is the **entry point** for a Java application

Syntax

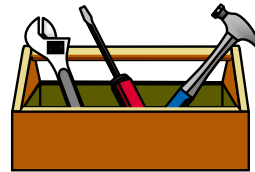
- Everything in Java is case-sensitive
- Java syntax is based on C++
- Whitespace is not significant
 - Use indentation and whitespace to make code readable
- Everything in Java is case-sensitive
- Variable names can be any length
 - Using descriptive names can lead to self-documenting code
 - Can be any Unicode characters (except for a few)
- Java handles all Strings as Unicode
- **Everything in Java is case-sensitive!**

```
public class HelloWorld
{
    public static void main(String[] args)
    {
        System.out.println("Hello World");
    }
}
```

```
public class HelloWorld { public static void main(String[] args) { System.out.println("Hello World"); } }
```

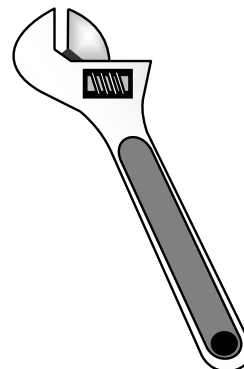
Development tools

- **Java Development Kit (JDK or SDK)** - includes compiler, JVM, debugger, javadoc, appletviewer, etc.
 - ▶ Available from Sun, IBM, others...
 - ▶ **The minimum you need for Java development**
- **Compiler** - compiles source code (.java file) into Java bytecodes (.class file)
 - ▶ Sun: javac
 - ▶ IBM: jikes
- **Jar** - Java archive file
 - ▶ Used for packaging multiple .class files
- **Java Virtual Machine (JVM)** - runs Java bytecodes
 - ▶ Interprets bytecodes and runs as machine instructions
 - ▶ Just-In-Time (JIT) compiler - caches machine instructions
 - ▶ **The minimum you need to run Java programs**



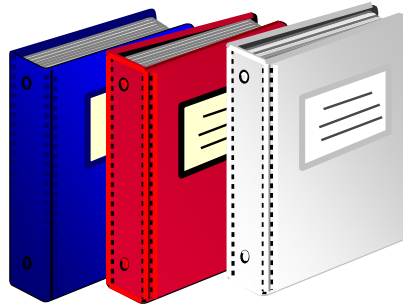
Development tools

- **Integrated development environment (IDE)**
 - ▶ Many available from many vendors (e.g. IBM VisualAge for Java, WSAD, eclipse)
 - ▶ Includes graphical debugger, visual development
- **Toolbox for Java/JOpen**
 - ▶ Building blocks specifically for i5/OS Java programs
 - ▶ Runs on client or server
 - ▶ Open source
 - ▶ Example code is available



References

- java.sun.com
- ibm.com/java
- publib.boulder.ibm.com/infocenter/iseries/v5r4/topic/rzaha/whatitis.htm
- ibm.com/systems/i/software/toolbox
- jt400.sourceforge.net



Lab exercises

- Create and run a simple Java application on Windows
- Run a simple Java application on i5/OS
- Manipulate Java Program Objects
- Create a simple web page
- Create and run a simple Java applet
- Use Qshell on i5/OS
- Create and run a simple Java servlet
- Bonus: Create and run a Java application using an IDE
- Bonus: Create and generate Javadoc™ for a Java class



Please ask questions!

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- 8:30 – 5:00 Tuesday and Wednesday
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➤ What's in it for me ?

- Portable credential
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➤ What tests are available?

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- All "other" System Group platform tests (System p, x, z, and Storage)
- All Software Group tests

Just arrived at **COMMON**

UPDATED

**System Operator
System Administrator
ILE RPG Programmer
certification tests**



See Laura Calley in the
Certification Lab

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