

Agenda Key: 33LA
Session Number: 403692

Lab: Introduction to Java™

Jeff Lee

© Copyright IBM Corporation, 2009. All Rights Reserved.
This publication may refer to products that are not currently available in your country. IBM makes no commitment to make available any products referred to herein.

Java related sessions



Basic Java

Mon 9:30 - 22MD A Java Introduction to Object-Oriented Programming (OOP)

Mon 3:30 - 26MJ Debugging the New Java ***New Session***

Tues 8:00 - 31CD Java 101: Basic Syntax and Structure

Tues 11:00 - 33LA LAB: Introduction to Java ***LAB***

Web 9:30 - 42CD The Future of Java on IBM i

Java Toolbox

Tues 2:00 - 35CB Introducing the IBM Toolbox for Java

Wed 8:00 - 41LA LAB: IBM Toolbox for Java ***LAB***

Thur 9:30 - 52CC IBM Toolbox for Java: Advanced

Advanced Java related topics

Mon 11:00 - 23MH Introduction to XML Processing with Java

Tues 3:30 - 36MG Java Application Performance Analysis and Tuning on IBM i

Wed 2:00 - 45CD Using the JVM Tools Interface (JVMTI)

Thur 12:30 - 54CB Multi-Threaded Programming Using Java

Thur 2:00 - 55MH Java Stored Procedures and Java User-Defined Functions



Agenda

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



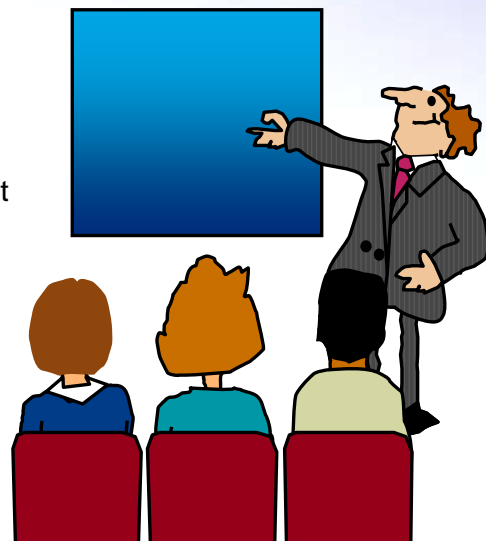
THE NEW POWER EQUATION

3

© 2009 IBM Corporation

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!)



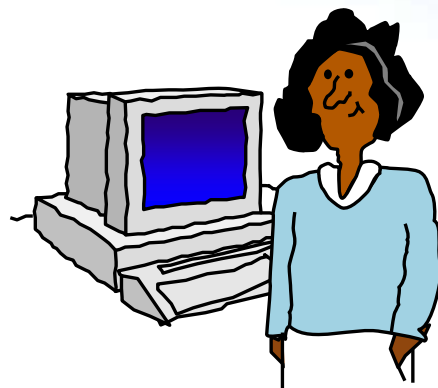
THE NEW POWER EQUATION

4

© 2009 IBM Corporation

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)



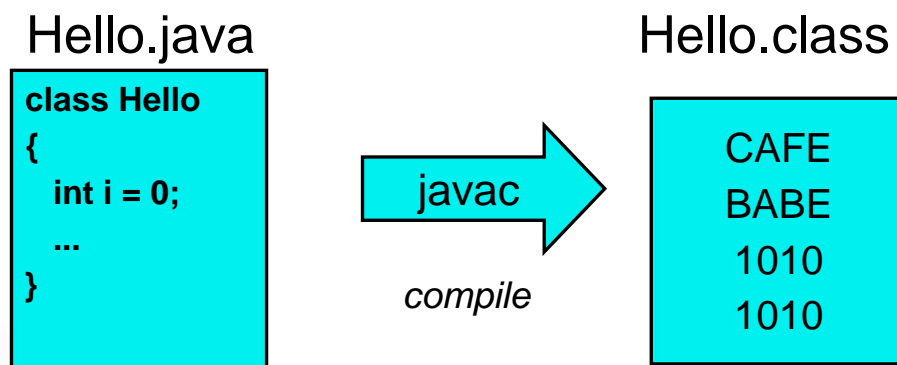
THE NEW POWER EQUATION

5

© 2009 IBM Corporation

Buzzwords

- Portable
 - Source code (.java file) edited and compiled on any platform
 - Compiled bytecodes (.class file) run on any platform
 - All aspects of pure Java are portable (GUI, threads, networking, I/O, etc.)



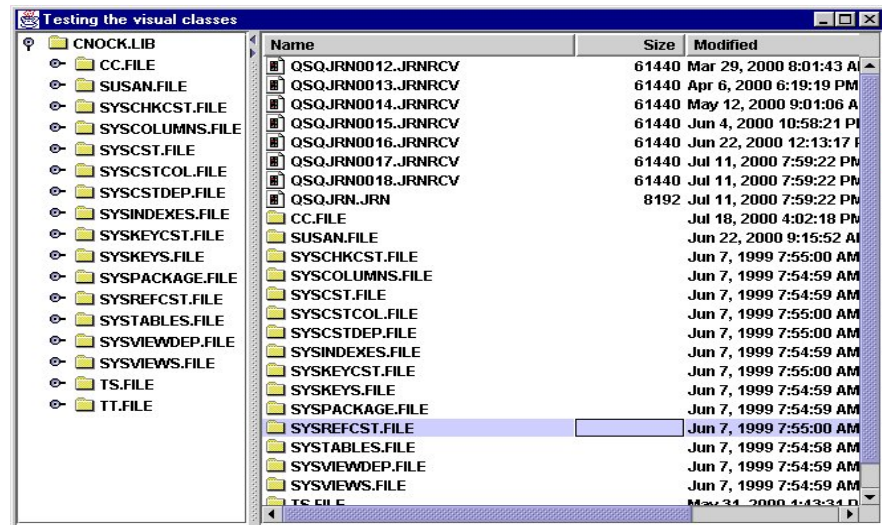
THE NEW POWER EQUATION

6

© 2009 IBM Corporation

Environments: Applications

- Program is loaded from local or network storage
- Runs on local processor
- Can do just about anything!



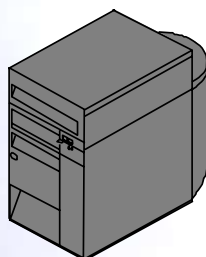
THE NEW POWER EQUATION

7

© 2009 IBM Corporation

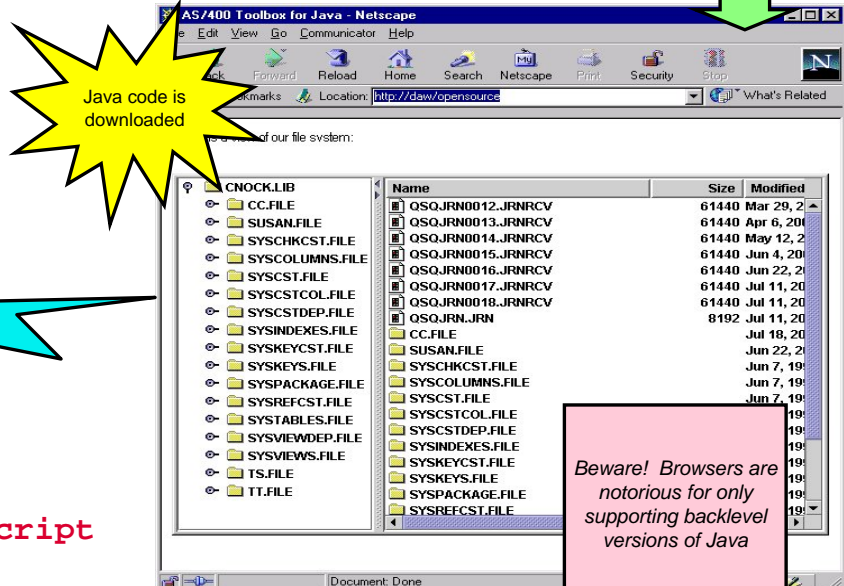
Environments: Applets

- 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 != JavaScript

THE NEW POWER EQUATION

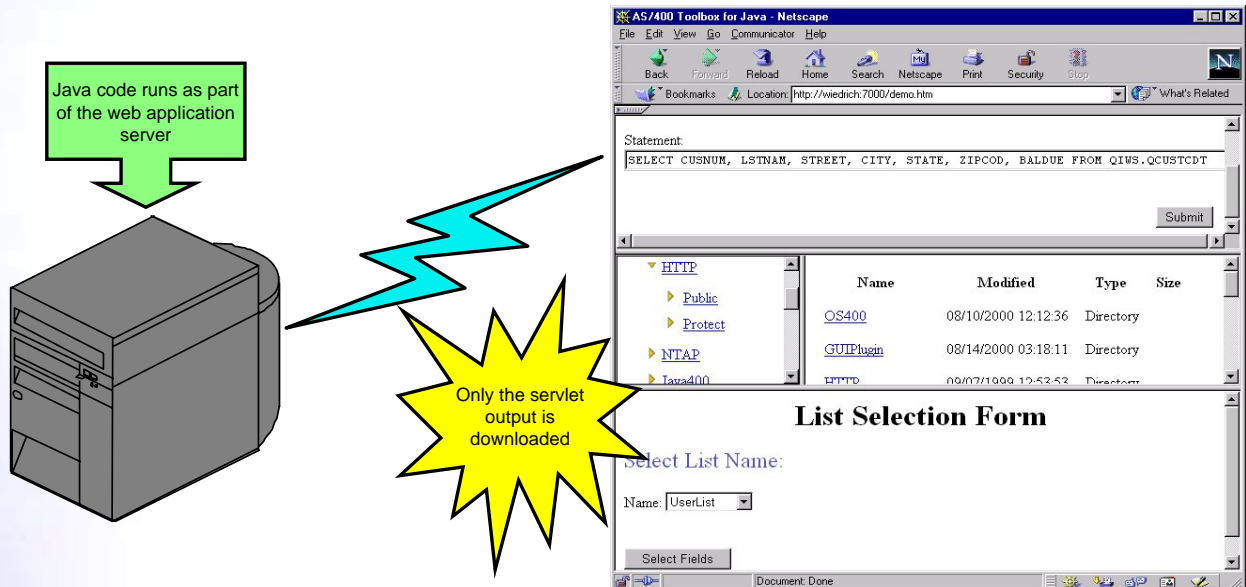


8

© 2009 IBM Corporation

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



THE NEW POWER EQUATION

9

© 2009 IBM Corporation

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

THE NEW POWER EQUATION

10

© 2009 IBM Corporation

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"); } }
```

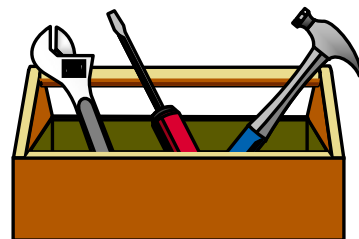
THE NEW POWER EQUATION

11

© 2009 IBM Corporation

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**



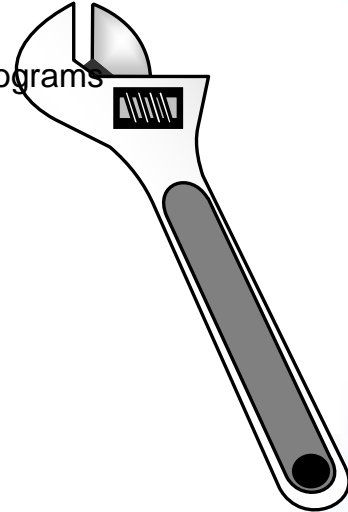
THE NEW POWER EQUATION

12

© 2009 IBM Corporation

Development tools

- Integrated development environment (IDE)
 - Many available from many vendors (e.g. Rational, WebSphere, Eclipse)
 - Includes graphical debugger, visual development
- Toolbox for Java/JTOpen
 - Building blocks specifically for IBM i-oriented Java programs
 - Runs on client or server
 - Open source
 - Example code is available



THE NEW POWER EQUATION

13

© 2009 IBM Corporation

That's it!

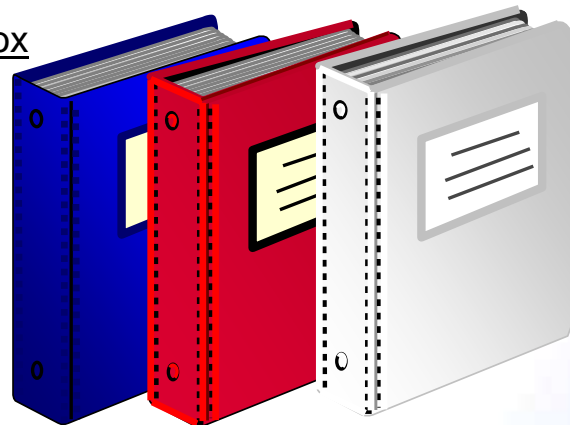
THE NEW POWER EQUATION

14

© 2009 IBM Corporation

References

- java.sun.com
- www.ibm.com/java
- publib.boulder.ibm.com/infocenter/systems/scope/i5os/topic/rzahg/rzahgjava.htm
- www.ibm.com/systems/i/software/toolbox
- sourceforge.net/projects/jt400



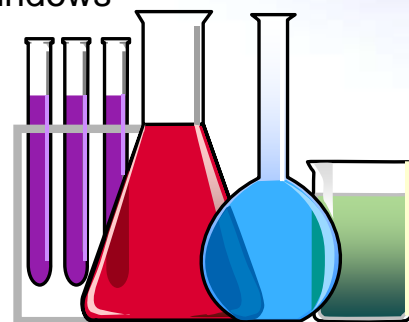
THE NEW POWER EQUATION

15

© 2009 IBM Corporation

Lab exercises

- Create and run a simple Java application on Windows
- Run a simple Java application on IBM i
- Manipulate Java Program Objects
- Create a simple web page
- Create and run a simple Java applet
- Use Qshell on IBM i
- 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!

THE NEW POWER EQUATION

16

© 2009 IBM Corporation

Questions

THE NEW POWER EQUATION

17

© 2009 IBM Corporation

Java related sessions

Basic Java

Mon 9:30 - 22MD A Java Introduction to Object-Oriented Programming (OOP)

Mon 3:30 - 26MJ Debugging the New Java ***New Session***

Tues 8:00 - 31CD Java 101: Basic Syntax and Structure

Tues 11:00 - 33LA LAB: Introduction to Java ***LAB***

Web 9:30 - 42CD The Future of Java on IBM i

Java Toolbox

Tues 2:00 - 35CB Introducing the IBM Toolbox for Java

Wed 8:00 - 41LA LAB: IBM Toolbox for Java ***LAB***

Thur 9:30 - 52CC IBM Toolbox for Java: Advanced

Advanced Java related topics

Mon 11:00 - 23MH Introduction to XML Processing with Java

Tues 3:30 - 36MG Java Application Performance Analysis and Tuning on IBM i

Wed 2:00 - 45CD Using the JVM Tools Interface (JVMTI)

Thur 12:30 - 54CB Multi-Threaded Programming Using Java

Thur 2:00 - 55MH Java Stored Procedures and Java User-Defined Functions



THE NEW POWER EQUATION

18

© 2009 IBM Corporation

Trademarks and Disclaimers

© IBM Corporation 1994-2009. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

Trademarks of International Business Machines Corporation in the United States, other countries, or both can be found on the World Wide Web at <http://www.ibm.com/legal/copytrade.shtml>.

Adobe, Acrobat, PostScript and all Adobe-based trademarks are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Cell Broadband Engine and Cell/B.E. are trademarks of Sony Computer Entertainment, Inc., in the United States, other countries, or both and are used under license therefrom.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Information is provided "AS IS" without warranty of any kind.

The customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Some information addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Prices are suggested U.S. list prices and are subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

THE NEW POWER EQUATION