



IBM Power Systems™



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Session Number:

## Lab: Introduction to Java™ Programming

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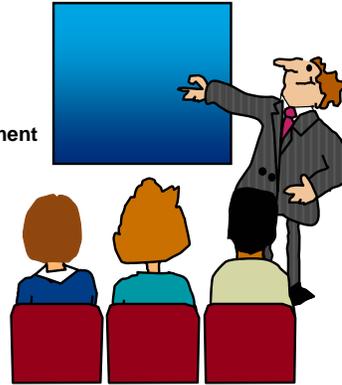
### Agenda

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



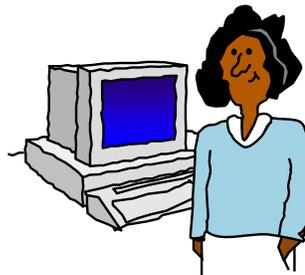
## Buzzwords

- **"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!)



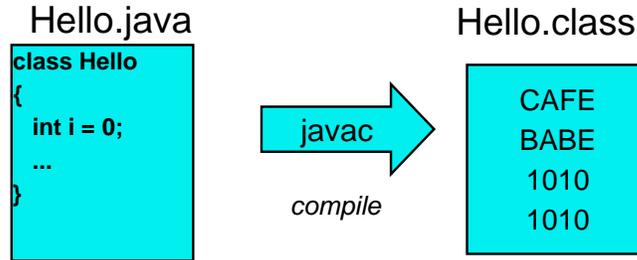
## Buzzwords

- **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)



## 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.)



## Environments: Applications

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



Testing the visual classes			
	Name	Size	Modified
[-] CNOCKLIB			
[-] CC.FILE			
[-] SUSAN.FILE			
[-] SYSCHEKST.FILE			
[-] SYSCOLUMNS.FILE			
[-] SYSCST.FILE			
[-] SYSCSTCOL.FILE			
[-] SYSCSTDEP.FILE			
[-] SYSINDEXES.FILE			
[-] SYSKEYCST.FILE			
[-] SYSKEYS.FILE			
[-] SYSPACKAGE.FILE			
[-] SYSPREFCST.FILE			
[-] SYSTABLES.FILE			
[-] SYSVIEWDEP.FILE			
[-] SYSVIEWS.FILE			
[-] TS.FILE			
[-] TT.FILE			
[+] OSQJRN0012.JRNRCV		61440	Mar 29, 2000 8:01:43 AM
[+] OSQJRN0013.JRNRCV		61440	Apr 6, 2000 6:19:19 PM
[+] OSQJRN0014.JRNRCV		61440	May 12, 2000 9:01:06 AM
[+] OSQJRN0015.JRNRCV		61440	Jun 4, 2000 10:58:21 PM
[+] OSQJRN0016.JRNRCV		61440	Jun 22, 2000 12:13:17 PM
[+] OSQJRN0017.JRNRCV		61440	Jul 11, 2000 7:59:22 PM
[+] OSQJRN0018.JRNRCV		61440	Jul 11, 2000 7:59:22 PM
[+] OSQJRN.JRN		8192	Jul 11, 2000 7:59:22 PM
[+] CC.FILE			Jul 18, 2000 4:02:18 PM
[+] SUSAN.FILE			Jun 22, 2000 9:15:52 AM
[+] SYSCHEKST.FILE			Jun 7, 1999 7:55:00 AM
[+] SYSCOLUMNS.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSCST.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSCSTCOL.FILE			Jun 7, 1999 7:55:00 AM
[+] SYSCSTDEP.FILE			Jun 7, 1999 7:55:00 AM
[+] SYSINDEXES.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSKEYCST.FILE			Jun 7, 1999 7:55:00 AM
[+] SYSKEYS.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSPACKAGE.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSPREFCST.FILE			Jun 7, 1999 7:55:00 AM
[+] SYSTABLES.FILE			Jun 7, 1999 7:54:59 AM
[+] SYSVIEWDEP.FILE			Jun 7, 1999 7:54:59 AM
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[+] TS.FILE			Mar 31, 2000 4:13:34 PM

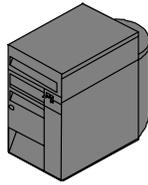


## Environments: Applets

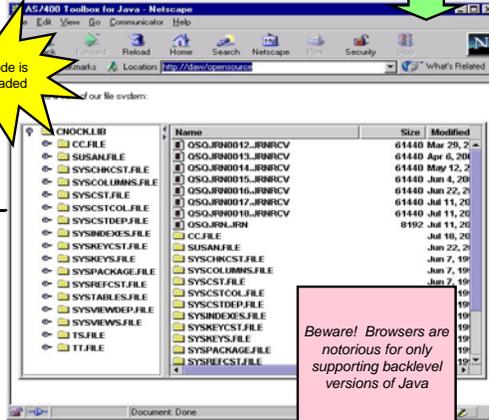
- Program is downloaded as part of a web page, along with text and images
- Runs on local processor, but always within the context of the web browser
- Input and output via GUI
- Extra security measures:
  - ▶ limited file access
  - ▶ limited network access

Java code runs as part of the browser

Java code is downloaded



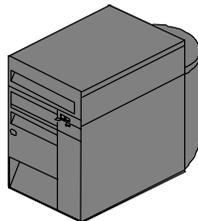
Java != JavaScript



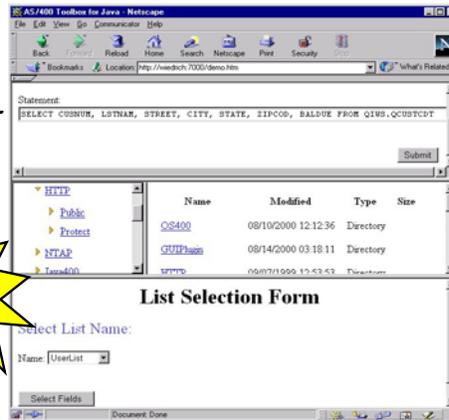
## Environments: Servlets

- 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!**

```

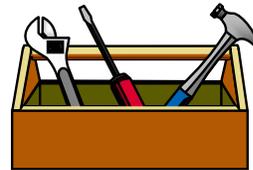
public class HelloWorld
{
    public static void main(String[] args)
    {
        System.out.println("Hello World");
    }
}
                
```

```

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

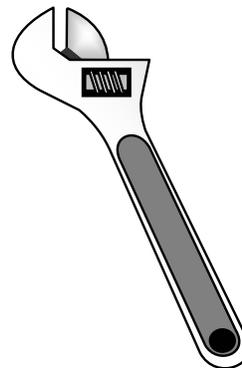
## Development tools

- **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**



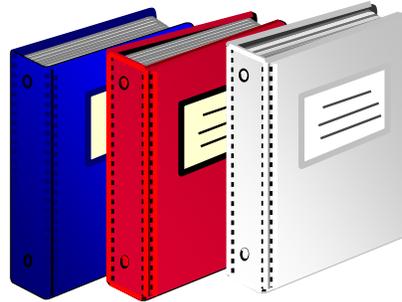
## Development tools

- **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



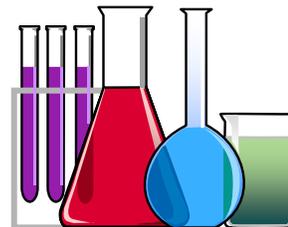
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- [ibm.com/java](http://ibm.com/java)
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- [ibm.com/systems/i/software/toolbox](http://ibm.com/systems/i/software/toolbox)
- [jt400.sourceforge.net](http://jt400.sourceforge.net)



## 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!*



## IBM Certification Testing – Here at COMMON!!

- Where and When ?
  - Delta Island F
  - 8:30 – 5:00 Tuesday and Wednesday
  - 8:30 – 12:00 Thursday
- What's in it for me ?
  - Portable credential
  - Proof that you can "Walk the Talk"
  - Peer and Employer recognition
  - Industry recognition
- How much does it cost ?
  - **NOT** \$190 that you pay at Prometric testing centers
  - **Special Discounted price of \$95 !!**
- What tests are available?
  - System i (of course)
  - 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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