EXHIBITS

EXHIBIT 1

James Gosling

[redacted] [redacted]
[redacted] [redacted]

[redacted]

Canadian citizen, US resident alien
Married, 2 daughters

Experience

1984-present **SUN MICROSYSTEMS MOUNTAIN VIEW, CA**

1995- **VP & Fellow, JavaSoft.** Technical and business guidance of the Java efforts at sun. Duties were fairly evenly split between business strategy, technical review and public presentations & evangelization.

1994 **Lead Architect, LiveOak project, Sun Labs.** Leading the engineering team in the application of FirstPerson technology to the internet. This was launched as the HotJava browser and Java programming language.

1992-1994 **Chief Scientist, FirstPerson Inc.** Lead design team to produce software for the consumer electronics market, particularly focused on the set-top and interactive television solutions. Effort included developing a runtime for set-tops and content development and preparation tools.

1990-1992 **Lead Architect, Green project, Sun Labs.** Investigated software requirements, designed, implemented and demonstrated prototype of a consumer electronics software platform. Oversaw all software development including the guidance of a 12 person team. Personally implemented a compiler for a safe, multi-threaded, distributed, object-oriented programming language (related to C++) named Oak. Very positive customer response lead to the formation of FirstPerson Inc.

1990 **Lead Architect, Imagination project, Entry Systems Division.** Produced an object-oriented document-centered user interface toolkit.

1988-1990 **Chairman of the Display Architecture Committee.** Chartered with rationalizing the company's software and hardware graphics products. The goal was to achieve coherence between hardware and software, and compatibility from generation to generation while providing state of the art technology. This committee became the prototype for Sun's architecture review process.

1984-1989 **Lead Architect, Window Systems, Software Products Division.** Designed and implemented the Networked Extensible Window System (NeWS), a distributed window system based on PostScript. The PostScript language was used as the basis for interprocess communication, allowing computation to migrate from the client to the server. This included writing a complete PostScript clone and guiding the Folio hinted font scaling technology. The combination of the PostScript clone and the font scaling technology enabled Sun to create software to drive inexpensive printers using the CPU power of the desktop, thus instigating sun's printing business.

1983-1984 **IBM T.J.Watson Research Center**

Member of Technical Staff Designed and implemented the Andrew window system (the first distributed window system) and the Andrew user-interface toolkit (the first document based object oriented toolkit)

Education

1983 **PhD & MSc, Computer Science, Carnegie-Mellon University** Thesis: "The Algebraic Manipulation of Constraints". Designed and implemented an editor for drawings where arbitrary arithmetic assertions could be made about properties of the drawing. As edits were made, the implications of the assertions were automatically propagated to other parts of the drawing. Rather than using the traditional brute-force numerical methods, the thesis focused on the use of symbolic algebra to transform problem regions in the constraint graph.

- Produced a highly optimizing compiler for a Very Long Instruction Word CPU.
- Produced a multiprocessor version of Unix.
- For Herminet Inc. Designed and implemented an intelligent mail handling system. This eventually became the MHS system from Action Technologies.
- Designed and implemented Emacs for Unix. Currently sold by Unipress Inc. It eventually became GNU Emacs.
- For Honeywell Inc. Designed and implemented a Pascal compiler for Multics

1977 BS (Honors) in Computer Science, the University of Calgary

- For the Department of Computer Science: System manager for a moderately large timesharing system; programming assistant for a number of research projects; lecturer.
- For the Department of Physics: Produced a number of large pieces of software to collect, analyze and present photographic data from the ISIS II satellite.

Publications

"The Java Programming Language", 1996, Addison Wesley (with Ken Arnold)
"The Java Language Specification", 1996, Addison Wesley (with Guy Steele and Bill Joy)
"The Java Intermediate representation", 1995, SIGPLAN
"Phase relationships in the standardization process", 1991, Usenix
"ACE: a syntax driven C preprocessor", 1989, Proc. AUUG
"The NeWS window system: a look under the hood", 1989, Text Manipulation Conference, Durham, England
"The NeWS Book", 1989, Springer-Verlag
"SUNDEW: A Distributed and Extensible Window System", 1986, Usenix
"The Andrew User Interface Toolkit", 1984, Uniforum
"Implementing Multiprocessor Unix", 1979, CMU CS internal report
"An Efficient Redisplay Algorithm", 1979, ACM Conference on Text Manipulation
"Multics Pascal", 1978, Annual Multics Conference
"Image understanding with a steerable sensor", 1977, undergraduate thesis

Patents Issued

5,740,441 Bytecode program interpreter apparatus and method with pre-verification of data type restrictions and object initialization

5,724,425	Method and apparatus for enhancing software security and distributing software
D389,134 & D386,167	Agent icon for a display screen of a programmed computer system
5,668,999	System and method for pre-verification of stack usage in bytecode program loops
5,651,107	Method and apparatus for presenting information in a display system using transparent windows
5,630,066	System and method for locating object view and platform independent objects
5,519,825	Method and apparatus for NTSC display of full range animation
5,455,464	Method and apparatus for providing dynamically configurable electrical switches
5,367,685	Method and apparatus for resolving data references in generated code
5,267,054	Method and apparatus for the reduction of memory space required for a digital halftone system
5,091,717	Apparatus for selecting mode of output in a computer system

EXHIBIT 2

Program Development Cycle with Non-JAVA™ Technology

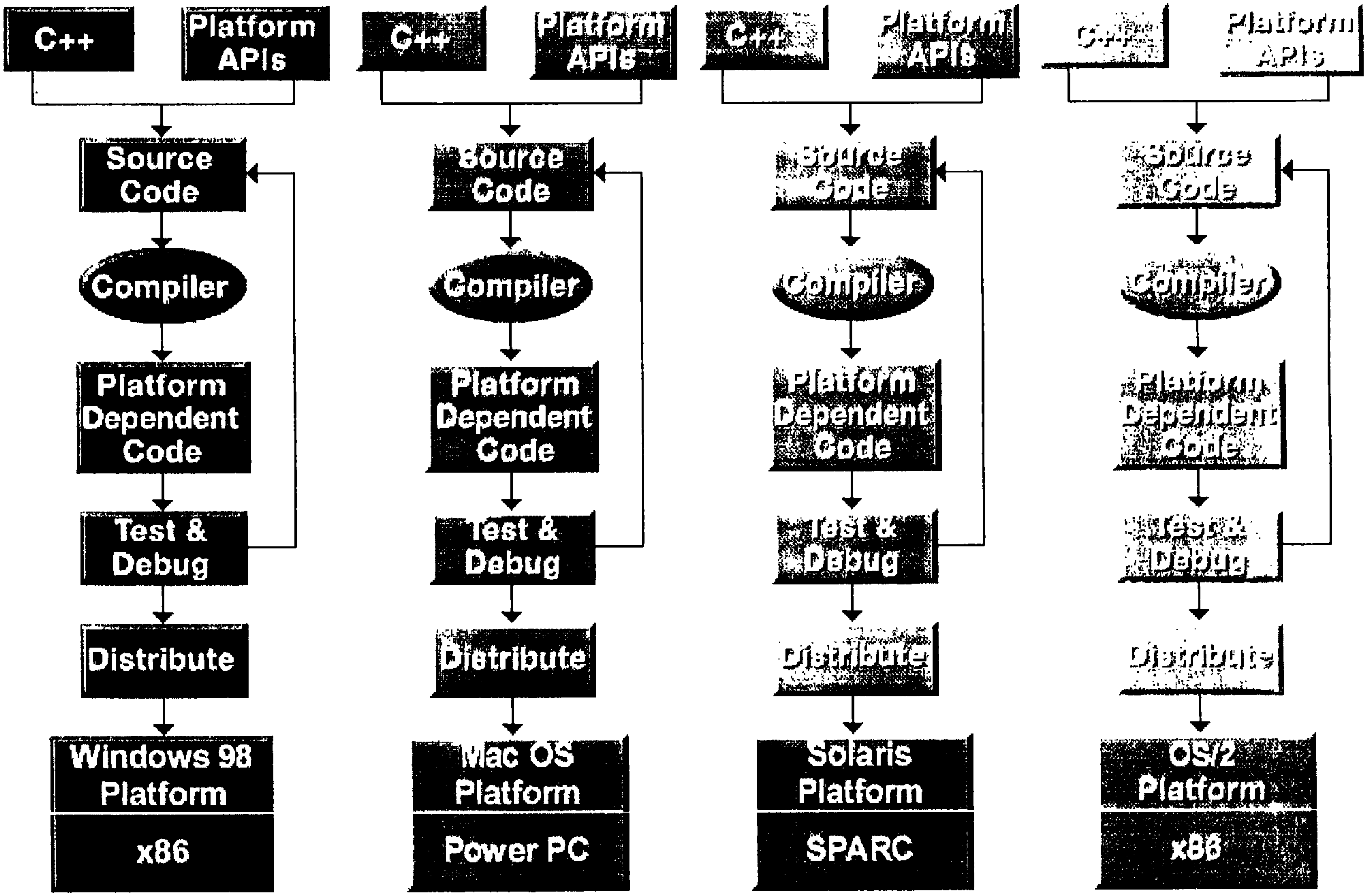
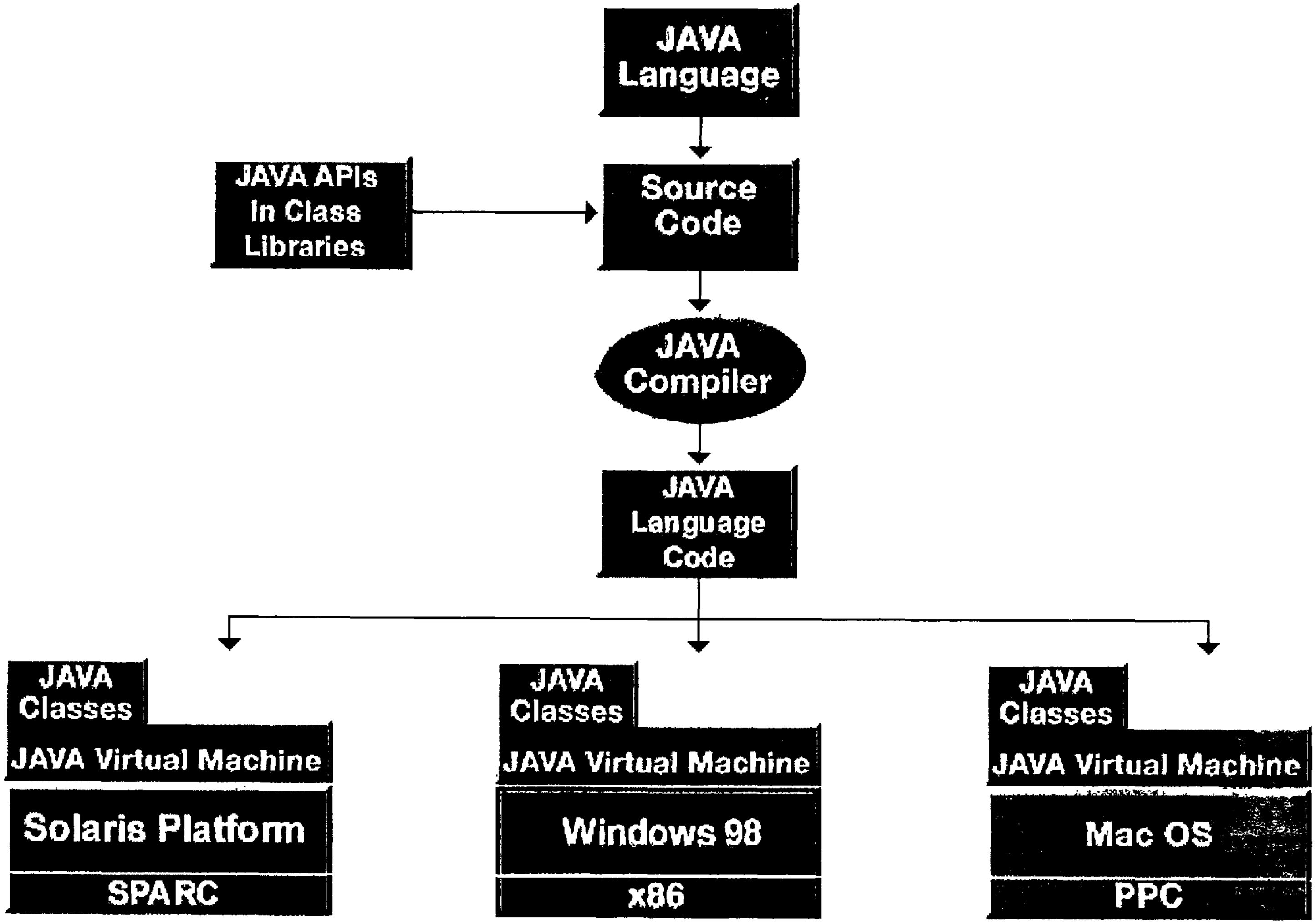


EXHIBIT 3

JAVA™ Programming Environment



JAVA Language

JAVA APIs In Class Libraries

Source Code

JAVA Compiler

JAVA Language Code

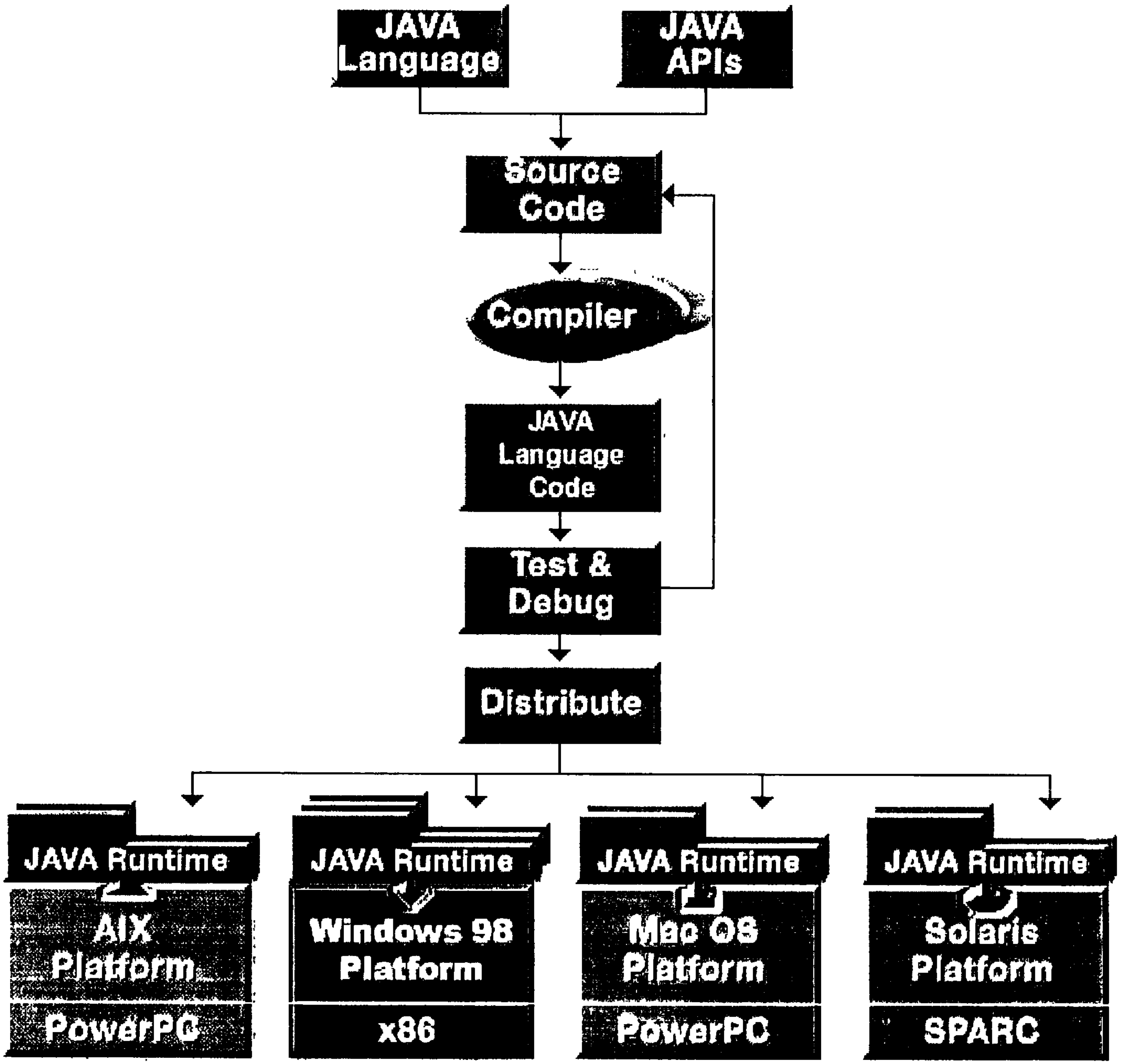
JAVA Classes
JAVA Virtual Machine
Solaris Platform
SPARC

JAVA Classes
JAVA Virtual Machine
Windows 98
x86

JAVA Classes
JAVA Virtual Machine
Mac OS
PPC

EXHIBIT 4

Program Development Cycle with JAVA™ Technology



JAVA Language
JAVA APIs
Source Code
Compiler
JAVA Language Code
Test & Debug
Distribute
JAVA Runtime
AIX Platform
PowerPC
JAVA Runtime
Windows 98 Platform
x86
JAVA Runtime
Mac OS Platform
PowerPC
JAVA Runtime
Solaris Platform
SPARC