Unit 25 Java™

1 Java applets

A Match the examples of Java programs, known as *applets*, (a–e) with the descriptions (1–5).

1 This Land Rover applet allows you to change the look of the vehicle.

2 The Pythagoras theorem applet gives the proof of the Pythagorean theorem without words. It allows you to manipulate triangles and go through the steps of the geometrical proof.

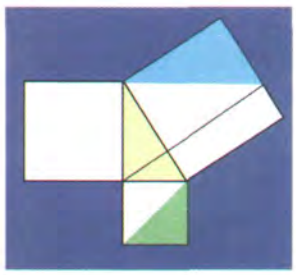
3 The Jman for Java applet permits medical researchers to view sequential MRI (**M**agnetic **R**esonance **I**mages) of the brain.

4 An analogue clock applet displays the time according to the web user's computer and lets you set the colours and style of the hands and numbers.

5 A banner applet displays graphic images on websites in order to advertise products or services.

a .....

c .....



e .....

b .....

d .....

B Match the terms (1–5) with the definitions (a–e).

1 Java

2 applet

3 plug-in

4 platform-independent

5 object-oriented programming

a an auxiliary program that enables web browsers to support new content, for example animation

b software that can run on any operating system

c an island in Indonesia, coffee (in American slang), and a programming language for internet applications

d a computer programming technique that allows the creation of objects that interact with each other and can be used as the foundation of others; used to create graphical user interfaces

e a small Java application, usually designed to run automatically within a web page

Java™

The Java logo

2 The Java language

A These statements about Java are all false. Read the text and correct them.

1 Java was invented by Microsoft.
2 With the interpreter, a program is first converted into Java bytecodes.
3 Java is not compatible with most computing platforms.
4 The Java language is single-threaded, one part executing at a time.
5 Java has no competitors.
6 Flash files are called *animations*.

The Java language

Java is a programming language developed by Sun Microsystems, specially designed to run on the Web. Java programs (called **applets**) let you watch animated characters and moving text, play music, and interact with information on the screen (for example, control animations and select options).

Characteristics of the Java language

Java is an **object-oriented** language, similar to C++, but more dynamic and simplified to eliminate possible programming errors. A Java program is both compiled and interpreted (see Unit 24). First, the source code (a file with a **.java** extension) is compiled and converted into a format called bytecode (a file with a **.class** extension), which can then be executed by a Java interpreter (see Fig. 1). Compiled Java code can run on most computers because there are Java interpreters, known as **Java Virtual Machines**, for most operating systems.

Java is **multi-threaded**, meaning a Java program can have multiple threads (parts) – that is, many different things processing independently and continuously. This enables the program to make the best use of available CPU power.

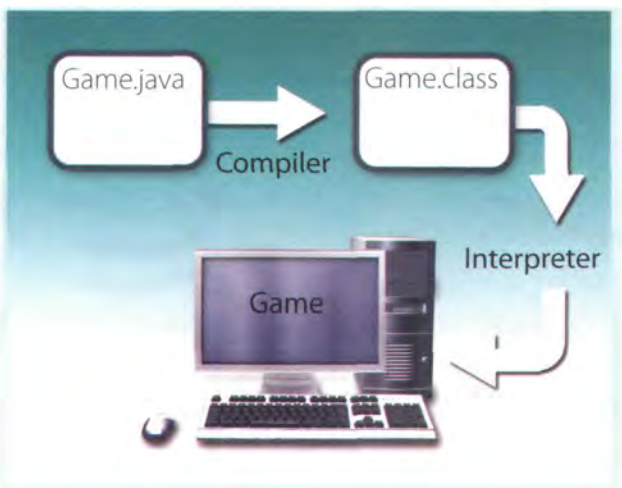


Fig. 1

Why is Java popular?

Most programmers like Java because it allows them to write applets which make web pages more interactive and attractive. They can create graphical objects (for example, bar charts and diagrams) and new controls (for example, check boxes and push buttons with special properties). A web page that uses Java can have sounds that play in real time, music that plays in the background, cartoon-style animations, real-time video and interactive games.

The Java Micro Edition platform (**Java ME**) is used in mobile devices. It provides flexible tools to create applications that run on mobile phones, PDAs, TV set-top boxes and printers. Nowadays, most phones are configured to use Java games.

Alternatives to Java

One alternative to Java is Microsoft's **C#**, pronounced 'C sharp', a **.NET** language based on C++ with elements from Visual Basic and Java. There are no substantial differences between C# and Java. When software developers do measurements on pieces of code, sometimes Java is faster, sometimes C# is.

Another competitor is Adobe **Flash** technology, which supports graphics, a scripting language called ActionScript, and the streaming of audio and video. Flash is used to create animation and advertisements, to integrate video into web pages, and to develop rich internet applications such as portals. **Flash files**, traditionally called **flash movies**, have a **.swf** file extension. They may be an object on a web page or be played in the stand-alone Flash Player.

B Match the words (1–6) with the words (a–f) to make technical terms from the text.

1 Java	4 web	a applet	d system
2 operating	5 source	b page	e object
3 programming	6 graphical	c code	f language

C Complete the sentences with words from the box.

interpreted	animated	configured	used	pronounced	object-oriented	compiled

1 Java lets you watch _____ characters on web pages.
2 Java is an _____ language, similar to C++ but more dynamic.
3 First, the source code of a Java program is _____ into an intermediate format called *bytecode*. This is then _____ by any system possessing a Java interpreter.
4 The Java ME platform is widely _____ in mobile devices.
5 Nowadays, most mobile phones are _____ to use Java games.
6 Microsoft's C# is a simplified version of C and C++ for the Web. It's _____ 'C sharp'.

3 Language work: the -ed form

A Look at the HELP box and then put these verbs into the correct column.

stopped	asked
described	decided
produced	called
watched	executed
published	object-oriented
programmed	persuaded
configured	converted
arranged	designed

/t/	/d/	/ɪd/

HELP box

The *-ed* form

We use the **-ed** form in the following ways:

- To make the past simple (affirmative) of regular verbs

  *Sun Microsystems **developed** Java in 1995.*

  Remember that not all verbs in the past simple end in **-ed**. See page 166 for a list of irregular verbs. See Unit 19 for more about the past simple.
- To make the past participle of regular verbs

  *Flash is **used** to create animation.*
- To make the adjectival form of some verbs

  *Java applets let you watch **animated** characters.*

The **-ed** is pronounced as:

- /t/ after voiceless sounds: /p/, /k/, /θ/, /s/, /f/, /ʃ/or /tʃ/. (e.g. *developed, talked, pronounced*)
- /d/ after voiced sounds: /b/, /g/, /ð/, /z/, /v/, /dʒ/, /l/, /r/; nasal consonants: /m/, /n/, /ŋ/; and vowels (e.g. *compiled, designed, simplified*)
- /ɪd/ after /t/ or /d/ (e.g. *interpreted, multi-threaded*)

B Complete this extract from a lecture handout about Java with the correct form of the verbs in the box.

call	be	begin	can	decide	rename	have	support	develop	base

The idea for Java started in 1990, when a team of software engineers at Sun Microsystems (1) _____ to create a language for a handheld device that could control and interact with various kinds of electronic appliances, ranging from Nintendo Game Boys to VCRs and TV set-top boxes. They (2) _____ an object-oriented programming language that one of the engineers, James Gosling, (3) _____ *Oak*, after the tree outside his window. The device even (4) _____ an animated character named *Duke*, who would go on to become Java's mascot.

With the advent of the Web in 1993, the company made a web browser (5) _____ on the Oak language. Later on, this language was adapted to the Internet and (6) _____ *Java*. The 1.0 version of Java was officially introduced by Sun in May 1995.

At that time, web pages (7) _____ only display text, pictures and hyperlinks. With the arrival of Java, web designers (8) _____ able to include animation and interactive programs on web pages. The first major application created with Java was the HotJava browser. The Java language (9) _____ to attract serious attention from the internet community and was soon (10) _____ by Netscape Navigator and MS Internet Explorer. Today, Java is a hot technology that runs on multiple platforms, including smart cards, embedded devices, mobile phones and computers.

C Listen to an extract from the lecture and check your answers to C. Listen carefully to the pronunciation of the verbs that end in *-ed*.

4 Your experience with computers

A Make notes about the different stages in your computer history. Add more stages if you want to.

Example: *1990: Played my first computer game. It was ...*

Possible stages:

- First computer game
- First computer lesson at school/college
- First programming language learnt
- First software used
- First computer course/qualification
- First job involving computers
- First steps on the Internet
- First chat online

B Ask a partner about their computer history. Look at the *Useful language* box to help you.

Useful language

When did you first ...?

How long ago did you ...?

How old were you when ...?

I started ... in...

I learnt ... when I was ...

I didn't use the Internet until ...