Brief History of C and Unix
C and Unix History

- C
- Unix
  - Bell Labs
  - Berkeley
  - Others
- Linux
1.6 The C Programming Language

- C evolved from two previous languages, BCPL and B.

- BCPL was developed in 1967 by Martin Richards as a language for writing operating-systems software and compilers.

- Ken Thompson modeled many features in his B language after their counterparts in BCPL, and in 1970 he used B to create early versions of the UNIX operating system at Bell Laboratories.
The C language was evolved from B by Dennis Ritchie at Bell Laboratories and was originally implemented in 1972.

C initially became widely known as the development language of the UNIX operating system.

Many of today’s leading operating systems are written in C and/or C++.

C is mostly hardware independent.

With careful design, it’s possible to write C programs that are portable to most computers.
Built for Performance

- C is widely used to develop systems that demand performance, such as operating systems, embedded systems, real-time systems and communications systems (Figure 1.5).
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<tr>
<th>Application</th>
<th>Description</th>
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<tr>
<td>Operating systems</td>
<td>C’s portability and performance make it desirable for implementing operating systems, such as Linux and portions of Microsoft’s Windows and Google’s Android. Apple’s OS X is built in Objective-C, which was derived from C. We discuss some key popular desktop/notebook operating systems and mobile operating systems in Section 1.12.</td>
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**Fig. 1.5** | Some popular performance-oriented C applications.
## C Applications

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<td>Embedded systems</td>
<td>The vast majority of the microprocessors produced each year are embedded in devices other than general-purpose computers. These embedded systems include navigation systems, smart home appliances, home security systems, smartphones, robots, intelligent traffic intersections and more. C is one of the most popular programming languages for developing embedded systems, which typically need to run as fast as possible and conserve memory. For example, a car’s anti-lock brakes must respond immediately to slow or stop the car without skidding; game controllers used for video games should respond instantaneously to prevent any lag between the controller and the action in the game, and to ensure smooth animations.</td>
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**Fig. 1.5** Some popular performance-oriented C applications.
### C Applications

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<td>Real-time systems</td>
<td>Real-time systems are often used for “mission-critical” applications that require nearly instantaneous response times. For example, an air-traffic-control system must constantly monitor the positions and velocities of the planes and report that information to air-traffic controllers without delay so that they can alert the planes to change course if there’s a possibility of a collision.</td>
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<tr>
<td>Communications systems</td>
<td>Communications systems need to route massive amounts of data to their destinations quickly to ensure that things such as audio and video are delivered smoothly and without delay.</td>
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**Fig. 1.5** | Some popular performance-oriented C applications.
By the late 1970s, C had evolved into what is now referred to as “traditional C.” The publication in 1978 of Kernighan and Ritchie’s book, *The C Programming Language*, drew wide attention to the language.

**Standardization**

- The rapid expansion of C over various types of computers (sometimes called hardware platforms) led to many variations that were similar but often incompatible.
- In 1989, the C standard was approved; this standard was updated in 1999 and is often referred to as C99.
The New C Standard

- The new C standard (referred to as C11) refines and expands the capabilities of C.
- Not all popular C compilers support the new features. Of those that do, most implement only a subset of the new features.
Portability Tip 1.1

Because C is a hardware-independent, widely available language, applications written in C often can run with little or no modification on a range of different computer systems.
Early Unix

- In 1970's Unix development continued between Bell Labs and the academic community with V7 important version in 1979.

- Beginning in 1975 BSD (Berkeley Software Distribution) Unix competed with AT&T version (particularly System V Unix).
Unix to Linux

- Resulted in ‘80s-‘90s period of OS Wars included DEC, HP, SUN and OSF versions.

- In 1991 Linus Torvalds developed Linux kernel as part of Unix-like OS developed on the philosophy of free software which makes Linux a variant of GNU version of Unix.

- Ubuntu is a Debian*-based Linux OS.

* Free software carrying GNU licensing