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.
1.6 The C Programming Language

- 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 is possible to write C programs that are portable to most computers.
1.6 The C Programming Language

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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<th>Application</th>
<th>Description</th>
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<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. |
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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.
### Application | Description
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Real-time systems | 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.

Communications systems | 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.

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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.
Why Learn C?

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.
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