徐秀兰　主编

# 计算机与通信专业英语

（修订第四版）

# ENGLISH FOR COMPUTERS AND TELECOMMUNICATIONS

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## 内 容 简 介

本书主要取材于两个世纪之交国外发表的近40种最新材料。内容广泛，语言现象丰富。所选内容既有基础理论，又尽量跟踪最近两三年内公众关心的热点与新技术。教材内容基本能覆盖计算机、通信这两个专业常用的技术词汇、词组及常见的科技语法。

本书在本次改编中，对全书作了一些重要的改进，即：大量增加了习题的类型和份量，目的是力图帮助各个层面的读者在学完课文之后都能有较大的提高（所有习题均附有解答）。因此，本书除可作为计算机与通信两个专业学生的英语教材外，也可供其他工程专业作为专业英语教材或参考书，更有利于从事计算机、通信、信息等工作的技术人员的自学。

一如既往，本次教材的编写除对于所选专题的正文给出部分参考译文，列出较多的关键字，对于某些较难的语法现象，给出相应的参考译文注释并对语法现象予以分析之外，在本书的最后还附有生词表，以供读者快速查阅。

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# 前　言

本书初版自1995年问世，到本次的修订第四版的出版，共换了5个版本，印刷了11次，发行量近五万册，并在2000年被评为北京邮电大学的优秀教材，本书受到读者如此之厚爱，编者深受鼓舞。

因此，当编者在编写此书时总是兢兢业业，精心取材，力求将有关技术的新进展奉献给读者，使读者在提高英语水平的同时，能获得相应的新知识。

近几年，计算技术正变得无所不在，故在本书的第1单元向读者介绍了一种正在兴起的新计算技术——Pervasive Computing(普适计算)。此外通信与电视技术也一直在向纵深发展，且与计算技术互相渗透，互相融合，而使它们之间的界限变得日益模糊。因此，在本书此次的编写中充分照顾了这些方面的新进展。本书新增加的内容有：支持多媒体运作及通信的最新操作系统Windows XP、集中与共享多个平台资源的Grid Computing(网格计算)、下一代因特网协议IPv6，最新的面向对象语言C#、多媒体与宽带通信等。

由于半导体计算机的速度和容量都快要达到其极限，各种新型计算机将在21世纪出现。光计算机、生物计算机(DNA计算机)和量子计算机将在新世纪中大显身手。尽管这些技术目前还不够成熟，但对其研究的进展也足以令我们对其关注。因此，在本书的最后一单元介绍了这3方面的内容，藉以扩大读者的视野。

根据多年的教学实践，编者在此次编写中作了一些重要的改进。主要是：大量增加了习题的类型和份量，目的是力图帮助各个层面的读者在学完课文之后都能有较大的提高；增加的多项选择练习在于帮助读者复习和巩固基础语法；英译汉练习在于帮助读者加深对课文中精彩或具有结论性的句子的理解，而汉译英练习在于帮助基础较好的读者提高应用能力。所有习题均有参考答案。

本书对课文中出现的大量生词及词组作了注解，以尽可能帮助读者从不同的角度来理解；较难的句子在注解中作了简要的语法分析；课文中出现的各种缩略词也一一作了介绍；在书的末尾给出生词速查表。

因为增加的习题占据了相当的篇幅，编者不得不删去一些相对陈旧和次要的内容。

本书仍由徐秀兰同志担任主编并完成第1,2,3,4,5,6,7,8,9,10,11,12,13,17,18共15个

单元的编写，徐劲同志担任第14，15共两个单元的编写，第16单元由李程同志完成。全书注解主要由徐秀兰同志编写。杨燕群同志协助了书稿的部分输入。在此，编者向所有为本书作出贡献的同志表示感谢。

在本书改编过程中，虽经反复核对及修改，但限于编者水平，各种错误仍难以避免。不足之处，恳请读者批评指正。

编 者

2005年6月于北京

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# UNIT 1

## A New Computing Model—Pervasive (Ubiquitous) Computing

### 1-1 What is Pervasive Computing?

Pervasive computing has its goal as the enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user. A number of researchers around the world are now working in the pervasive computing framework. Their work impacts all areas of computer science, including hardware components (e.g. chips), network protocols, interaction substrates (e.g. software for screens and pens), applications, privacy, and computational methods.

Pervasive computing is not virtual reality, it is not a Personal Digital Assistant (PDA) such as Apple's Newton, it is not a personal or intimate computer with agents doing your bidding. Unlike virtual reality, pervasive computing endeavers to integrate information displays into the everyday physical world. It considers the nuances of the real world to be wonderful, and aims only to augment them. Unlike PDA's, pervasive computing envisions a world of fully connected devices, with cheap wireless networks everywhere; unlike PDA's, it postulates that you need not carry anything with you, since information will be accessable everywhere. Unlike the intimate agent computer that responds to one's voice and is a personal friend and assistant, pervasive computing envisions computation primarily in the background where it may not even be noticed. Whereas the intimate computer does your bidding, the pervasive computer leaves you feeling as though you did it yourself.

Pervasive computing is exploring quite different ground from Personal Digital Assistants, or the idea that computers should be autonomous agents that take on our goals?[1] The difference can be characterized as follows. Suppose you want to lift a heavy object. You can call in your strong assistant to lift it for you, or you can be yourself made effortlessly, unconsciously, stronger and just lift it. There are times when both are good. Much of the past and current effort for better computers has been aimed at the former; pervasive computing aims at the latter.

The approach the researchers took was to attempt the definition and construction of new computing artifacts for use in everyday life. They took their inspiration from the everyday objects found in offices and homes, in particular those objects whose purpose is to capture or convey information. The most pervasive current informational technology embodied in artifacts is the use of written

symbols, primarily words, but including also pictographs, clocks, and other sorts of symbolic communication. Rather than attempting to reproduce these objects inside the virtual computer world, leadig to another "desktop model", instead the new kind of computer will also be put out in this world of concrete information conveyers.[2] And because these written artifacts occur in many different sizes and shapes, with many different affordances, so the computer embodiments to be of many sizes and shapes, including tiny inexpensive ones that could bring computing to everyone.

Pervasive computing gives us tools to manage information easily. Information is the new currency of the global economy. We increasingly rely on the electronic creation, storage, and transmittal of personal, financial, and other confidential information, and demand the highest security for all these transactions. We require complete access to time-sensitive data, regardless of physical location. We expect devices—personal digital assistants, mobile phones, office PCs and home entertainment systems—to access that information and work together in one seamless, integrated system. Pervasive computing can help us manage information quickly, efficiently, and effortlessly.

Pervasive computing is about making our lives simpler. Pervasive computing aims to enable people to accomplish an increasing number of personal and professional transactions using a new class of intelligent and portable devices. It gives people convenient access to relevant information stored on powerful networks, allowing them to easily take action anywhere, anytime.

These new intelligent appliances or "smart devices" are embedded with microprocessors that allow users to plug into intelligent networks and gain direct, simple, and secure access to both relevant information and services. These devices are as simple to use as calculators, telephones or kitchen toasters.

Pervasive computing simplifies life by combining open standards-based applications with everyday activities. It removes the complexity of new technologies, enables us to be more efficient in our work and leaves us more leisure time. Computing is no longer a discrete activity bound to a desktop; pervasive computing is fast becoming a part of everyday life.

## Key words

| | |
|---|---|
| affordance | 可提供的(设备或物体) |
| appliance | 器具，仪表，设备 |
| artifact | 产品，人工制品 |
| augment | 放大，增强 |
| bidding | 吩咐，命令 |
| confidential | 保密的，机密 |
| embody | 具体表现(思想感情等) |
| endeavor | 努力，尽力，企图 |
| framework | 框架，主机，结构 |
| intimate | 宣布，明白表示 |
| nuance | 意义，意见，颜色等方面的细微差别 |

| | |
|---|---|
| PDA: Personal Digital Assistant | 个人数字助理 |
| pervasive | 遍布的，弥漫的，渗透的 |
| pictograph | 象形文字，统计图 |
| postulate | 假定，条件，主张，假设前提 |
| seamless | 天衣无缝，圆满的 |
| substrate | 衬底，基底，基件 |
| take…from… | 离开，移去，使退出 |
| transaction | 事务，交易 |
| ubiquitous | 无所不在的，普遍存在的 |

**Notes**

1. Pervasive computing is exploring quite different ground from Personal Digital Assistants, or idea that computers should be autonomous agents that take on our goals.
   这是一个带有两级定语从句的主从复合句。第一个 that 引导的定语从句修饰 pervasive computing。第二个 that 引导的定语从句修饰 agents。全句意思请见参考译文。
2. Rather than attempting to reproduce these objects inside the virtual computer world, leading to another "desktop model", instead the new kind of computer will also be put out in this world of concrete information conveyers.
   本句的主句是：instead 后面引导的一个句子，即：the new kind of computer will also be put out in this world of concrete information conveyers. 而 Rather than…后面引导的是一个分词短语，起方式状语作用，意为"不是…"。全句意思请见参考译文。

## 1-2 Challenges to Pervasive Computing

Getting the computer out of the way is not easy. This is not a graphical user interface (GUI) problem, but is a property of the whole context of usage of the machine and the affordances of its physical properties: the keyboard, the weight and desktop position of screens, and so on. The problem is not of "interface". For the same reason of context, this was not a multimedia problem, resulting from any particular deficiency in the ability to display contains kinds of realtime data or integrate them into applications. (Indeed, multimedia tries to grab attention, the opposite of the pervasive computing ideal of invisibility). The challenge is to create a new kind of relationship of people to computers, one in which the computer would have to take the lead in becoming vastly better at getting out of the way so people could just go about their lives.[1]

Work on pervasive computing is still at an early phase. Most work now is concentrating on the mobile infrastructure for wireless networking. Because pervasive computing envisions hundreds of wireless computers in every office, its need for wireless bandwidth is prodigious. For instance, I work in a not-very-large building with 300 other people. If each of us has 100 wireless devices in our offices, each demanding 256 kbits/sec, we are using 7.5 gigabits of aggregate bandwidth in a

single building. This is difficult to achieve with currently envisioned wireless technologies.

A second challenge of the mobile infrastructure is handling mobility. Networking developed over the past twenty years with the assumption that a machine's name, and its network address, were unvarying. However, once a computer can move from network to network this assumption is false. Existing protocols such as TCP/IP and OSI are unprepared for to handle machine mobility without change. A number of committees and researchers are now working on methods of augmenting or replacing existing protocols to handle mobility.

A third challenge of the mobile infrastructure is window systems. Most window systems, such as those for the Macintosh and for DOS, are not able to open remote windows over a network. Even window systems designed for networking, such as X, have built into them assumptions about the mobility of people. The X window system protocol, for instance, makes it very difficult to migrate the window of a running application from one screen to another, although this is just what a person traveling from their office to a meeting might want.[2]

This then is phase I of ubiquitous computing: to construct, deploy, and learn from a computing environment consisting of tabs, pads, and boards. This is only phase I, because it is unlikely to achieve optimal invisibility. (Later phases are yet to be determined). But it is a start down the radical direction, for computer science, away from attention on the machine and back on the person and his or her life in the world of work, play, and home.

## Key words

| | |
|---|---|
| aggregate | 汇聚，聚集 |
| deficiency | 缺点，缺陷，不足 |
| get out of sth. | 逐渐放弃… |
| go about | 四处走动，走来走去 |
| pad | 拍子簿，印色盒 |
| prodigious | 巨大的，大得惊人的 |
| radically | 根本上 |
| tab | 标签，垂片，垂圈 |

## Notes

1. The challenge is to create a new kind of relationship of people to computers, one in which the computer would have to take the lead in becoming vastly better at getting out of the way so people could just go about their lives.
本句为一个主从复合句。第一个逗号之前的部分为主句，逗号之后的代词 one 指主句中的 new kind of relationship。in which 引导的是一个定语从句，它对 one 作进一步说明。so 引导的是一个结果状语从句。全句可译为：困难(指普适计算)在于创建一种新型的人与计算机的关系，这种关系使计算机在摈弃并大大优于原有的计算方式中占主导地位，因而人们能够在生活中随意使用。

2. The X window system protocol, for instance, makes it very difficult to migrate the window of a running application from one screen to another, although this is just what a person traveling from their office to a meeting might want.
这是一个主从复合句，although 引导的是一个让步状语从句。全句可译为：举例说 X Window 协议使得将一个运行着的应用程序窗口从一个屏幕移到另一个是非常困难的，然而这恰恰是一个人走出他们的办公室去参加一个会议时所需要的。

## 1-3 Turning Pervasive Computing into Mediated Spaces

With pervasive computing, we envision a future in which computation becomes part of the environment. The computer forms (workstation, personal computer, personal digital assistant, game player) through which we now relate to computation will occupy only a small niche in this new computational world. Our relationship with pervasive computing will differ radically from our current relationship with computers. When computation becomes part of the environment, most human-computer interaction will be implicit, and it will have to take account of physical space. Physical space rarely matters in current human-computer interaction; but as computational devices become part of furniture, walls, and clothing, physical space becomes a necessary consideration. First, more than one person can occupy a space. Second, individuals within the space are doing things other than interacting with the computer: coming and going, and perhaps most strikingly, interacting with each other—not just with the computer. Finally, physical space provides a sense of place: individuals associate places with events and recurrent activities.

The emerging relationship between people and pervasive computation is sometimes idealized as a "smart space": the seamless integration of people, computation, and physical reality. This paper focuses on a particular kind of smart space, the "mediated space," in which the space understands and participates in multiperson interaction. Mediated spaces will expand human capability by providing information management within a context associated with that space. The context will be created by recording interaction within the space and by importing information from the outside. Individuals will interact with the space explicitly in order to retrieve and analyze the information it contains, and implicitly by adding to the context through their speech and gesture. Achieving the vision of mediated spaces will require progress in both behind-the-scenes technology (how devices coordinate their activities) and at-the-interface technology (how the space presents itself to people, and how the space deals with multiperson interaction). This paper explores the research challenges in both of these areas, examining the behind-the-scenes requirements of device or manifestation description and context maintenance, as well as the interface problems of metaphor and understanding natural human-to-human spoken interaction.

The pervasive computing revolution will surely occur: computation will be embodied in things, not computers. We can already put computation almost anywhere. Embedded computation controls braking and acceleration in our cars, defines the capability of medical instruments, and runs virtu-

ally all machinery. Hand-held devices (especially cell phones and pagers) are commonplace; serious computational wristwatches and other wearables are becoming practical; computational furniture and rooms are demonstrable. Relentless progress in semiconductor technology, low-power design, and wireless technology will make embedded computation less and less obtrusive.[1] Computation is ready to disappear into the environment.

But what will it all mean? The nature of our relationship to computation in its pervasive form will necessarily be different from our relationship to computation in its current form. The first key difference is the explicitness of the computational task. Presently people think in terms of performing explicit tasks "on the computer"—creating documents, sending e-mail, and so on. When computation is part of the environment, this comfortable explicitness will disappear. Individuals will do whatever they normally do: move around, use objects, see and talk to each other. The computation in the environment may be able to facilitate these actions, and individuals may come to expect certain services, but they will usually not be doing things "on the computer".

We see the beginnings of this form of interaction with existing embedded computers. For example, an automatic braking system engages when the driver performs the normal action of pushing the brake pedal. The "automatic" is significant: the computation is implicit—braking simply works better (most of the time ) and we do not care how. Currently this form of interaction is extremely limited. We allow it only when our intent is unambiguous and when the computer can clearly do the job better than we can. In order to take advantage of pervasive computing, we must be able to greatly expand this form of interaction. Implicit computation will be available everywhere; we need to figure out how to interact with it.

A second key difference in the pervasive computing world is the importance of physical space. Current computers obviously occupy physical space, but this is usually irrelevant. Apart from dealing with limitations of "screen real estate" and ergonomic considerations of head and hand positioning, most computer interface design has nothing to do with physical space. With very rare exceptions, conventional computer interfaces are unaware of the presence, much less the identity, of human beings.[2]

When computation is part of the environment, it will be part of everyday physical space. This single shift radically changes the relationship between humans and computation—from a fairly static single-user location-independent world to a dynamic multiperson situated environment.[3] First, pervasive computation environments are necessarily dynamic with respect to their human users. Individuals move around in space, changing position and visual focus, coming and going. Second, more than one person can occupy a space. When more than one person is in a space, they tend to interact with each other. Finally, the physical location of the computation—or more precisely the interface to the computation—becomes relevant. Computer users are currently encouraged to disassociate computation from location: information is available from any tap; "the network is the computer. " While this is a valuable viewpoint that will certainly continue in the pervasive computing world, it is based on the separation between computers and real things. A computer is an artificial

entity; it does not matter very much where it is, especially in a networked world. This is very different from a computational desk or conference room table, where the interface is part of a specific spatial environment that has other attributes and associations. Individuals associate places with events ("you were sitting right there when I told you that") and recurrent activities (the conference room, my office, my favorite store for children's clothing).

## Key words

| | |
|---|---|
| accelerate | 加速 |
| ambiguous | 含糊不清的，可能有两种以上的意义 |
| brake pedal | 制动踏板，刹车板 |
| cell phone | 蜂窝电话 |
| engage | 雇佣，允诺，担保 |
| ergonomic | 人机工程 |
| estate | 地产，不动产，状况 |
| explicit | 明白的，明确的 |
| figure out | 想出，理解，指望，料想 |
| gesture | 手势，姿势 |
| implicit | 暗示的，含蓄的，隐含的 |
| manifestation | 显示，表明，明白表示的言行 |
| mediated | 中间的，居中调停的 |
| metaphor | 暗喻，隐喻 |
| niche | 壁龛，适当的位置 |
| obtrusive | 强人的，闯入的 |
| pager | 寻呼机 |
| recurrent | 经常发生的，周期性发生的 |
| strikingly | 引人注意的，显著的，惊人的 |
| tap | 分接头，抽头，三通头 |

## Notes

1. Relentless progress in semiconductor technology, low-power design, and wireless technology will make embedded computation less and less obtrusive.
   此处的"less and less obtrusive"意为:强迫性越来越少。全句可译为:在半导体技术，低能耗设计，以及无线技术方面的无情的进步使得嵌入式计算变得越来越自然。
2. With very rare exceptions, conventional computer interfaces are unaware of the presence, much less the identity, of human beings.
   此句可译为:除极少数例外，常规计算机的接口不认识它(指物理空间)的存在，而远比识别人的身份能力差。
3. This single shift radically changes the relationship between humans and computation —

from a fairly static single-user location-independent world to a dynamic multiperson situated environment.

这是一个简单句，破折号后面的短语对原句中的 relationship 作进一步的说明。全句可译为：这种简单的变化从根本上改变了人与计算的关系——从一个相当静态的单用户，独立于位置的世界变到一种动态的多人参与的环境。

## Exercises

1. Fill in the following blanks with proper words or phrases found in the text given below:

mediated　nuance　postulate　framework　augment
currency　implicit　remote　unambiguous

(1) A number of researchers around the world are now working in the pervasive computing _____.

(2) Pervasive computing endeavers to integrate information _____ of displays into the everyday physical world.

(3) Pervasive computing _____ that you need not carry anything with you.

(4) Information is now the new _____ of the global economy.

(5) A number of committees and researchers are now working on methods of _____ or replacing existing protocols to handle mobility.

(6) Most window systems are not able to open _____ windows over a network.

(7) When computation becomes part of the environment, most human-computer interaction will be _____

(8) The context associated with _____ space will be created by recording interaction with the space and by importing information from outside.

(9) Currently we only allow automatic interaction when our intent is _____ and when the computer can clearly do the job than we can.

2. True/False:

(1) Researches on pervasive computing influence some of the areas of computing science. (　)

(2) Pervasive computing is just a personal or intimate computer with agents doing your bidding. (　)

(3) We require complete access to time-sensitive data, regardless of physical location. (　)

(4) Pervasive computing removes the complexity of new technologies, enables us to be more efficient in our work and leaves us more leisure time. (　)

(5) Getting the computer out of the way is not easy because it is a problem of a property of the whole context of usage of the machine and the affordances of its physical proper-