"软件蓝领" 系列教材

软件技术英语 下

广东省教学教材研究室 编

Software

广东教育出版社

编写说明

　　根据《广东省教育厅中等职业学校计算机软件（"软件蓝领"方向）专业课程设置》要求，《软件技术英语》分为上、下两册。上册包括计算机硬件、计算机软件、操作系统、数据库、程序设计语言、Internet、计算机安全等内容的英语；下册内容贯穿整个软件开发过程，包括需求分析、软件设计、软件测试、软件维护以及文档编制等内容的应用英语。

　　针对上册课本练习不足的问题，在下册的编写过程中，我们在每一课课后均附有丰富的练习，并且将练习分为读前练习、导读练习、词汇与结构练习等模块，有助于读者加深对课本知识的理解以及提高阅读软件开发过程中的各类英文文档的能力。

　　本册课本选材难易适中，全书分为6章，共18篇课文，其中第一、二、三、五章由陈思敏编写，第四、六章由王腾编写，全书由陈思敏审校。

　　本书在编写过程中，得到了中山大学罗笑南教授和华南师范大学李冠英教授的大力支持，并提出了宝贵意见；广州中成软件技术培训学院和广东教育出版社在组织编写和出版中做了大量工作，特此感谢。

　　本书可以作为中等职业技术学校软件技术英语教材，也可供软件技术人员阅读参考。由于作者水平有限、编写时间紧迫，不当之处敬请指正。

编者

2004 年 6 月

目录

Chapter 1 About Software Development

Lesson 1 Software Development Process

Text

A software product usually begins as a thought of using a computer to do something, such as " May the computer help us work out the problem?" or "Wouldn't it be nice if we could have an exact picture of our daily cash flow out of a computer!" Once the need for a software product has really been decided, the product goes through a series of developmental phases.

The traditional software development process model is the **waterfall model**. There are many variations of this model, but by and large the model consists of six phases. They are **requirements analysis**, **design**, **implementation**, **integration**, **test, and maintenance**.

1. **Requirements analysis:** This phase consists of gathering the requirements for the product, that is, "What the product is supposed to do?"

2. **Design:** When the requirements of the product are made clear, the product begins to be designed. Traditionally this phase is of two procedures. First comes **architectural design**, in which the product as a whole is broken down into parts called **modules**. Then each module in turn is designed, which is termed **detailed design**.

3. **Implementation:** Implementation means programming, which codes the various designed modules into the machine readable forms.

4. **Integration:** Integration is the process of assembling the parts to complete the product.

5. **Test:** The product is tested to eliminate the errors.

6. **Maintenance:** When the product is delivered and put into operation, the maintenance phase begins. A completed product needs maintaining because of at least two reasons. One is that although the product has been tested, there may still

be remaining faults which may continue to appear and therefore need to be corrected. The maintenance of correcting the remaining faults is called **corrective maintenance**. The other reason is that the environment in which the product operates may change, or the need for the product may change, so the product must be modified to respond to these changes. This kind of maintenance is called **enhancement**.

Apart from the waterfall model, there are other software development process models, such as the **rapid prototype** model, the **incremental model**, the **spiral model**, and so on. In practice, it is often the case that the software development process is actually a combination of these models.

New Words and Expressions

product /'prɔdʌkt/	n. 产品
daily /'deili/	adj. 每天的
cash /kæʃ/	n. 现金
developmental /di,veləp'mentl/	adj. 发展的
phase /feiz/	n. 阶段；时期
traditional /trə'diʃənl/	adj. 传统的
model /'mɔdl/	n. 模型；模范
by and large	adv. 大体而言；一般而论
consist /kən'sist/	vi. 由……组成（与 of 连用）
requirement /ri'kwaiəmənt/	n. 需要；需求
design /di'zain/	n., vt. 设计
implementation /,implimen'teiʃən/	n. 实现；履行
integration /,inti'greiʃən/	n. 整合
procedure /prə'siːdʒə/	n. 过程；步骤
architectural /,ɑːki'tektʃərəl/	adj. 体系结构的
module /'mɔdjuːl/	n. 模块
term /təːm/	vt. 称为；把……叫做
readable /'riːdəb(ə)l/	adj. 可读的
assemble /ə'sembl/	vt. 集；装配
eliminate /i'limineit/	vt. 排除；消除
deliver /di'livə/	vt. 递送；交付
fault /fɔːlt/	n. 过错；缺点；故障；毛病
environment /in'vaiərənmənt/	n. 环境；外界

modify /'mɔdifai/	vt. 更改；修改
respond /ris'pɔnd/	vi. 回答；响应；作出反应
rapid /'ræpid/	adj. 迅速的，飞快的
prototype /'prəutətaip/	n. 原型
incremental /ˌinkri'mentəl/	adj. 增加的
spiral /'spaiərəl/	adj. 螺旋形的

Pre-Reading Exercises

1. Study the following words and try to link the meanings of each group of words.

    (1) think, thought   (2) water, fall, waterfall

    (3) process, processor, procedure   (4) model, module

    (5) architecture, architectural   (6) day, daily

2. Study the following sentences and guess the meanings of the *italic* words. The underlined words may give you some hints.

    (1) The *products* of this factory are bikes. Each product is marked with "Made in China".

    (2) The development of computer hardware has gone through four *phases*: the vacuum tube phase, the transistor phase, the small-scale integration phase, and the large-scale integration phase.

    (3) To make a house, we need to *design* it before we build it.

    (4) She has put up too many *requirements*; I can't satisfy all of her *requirements*.

    (5) Careful *analysis* can show the reason of the mistake.

    (6) To keep the machine working well, we made careful *maintenance* to it.

    (7) Every morning the postman *delivers* the letters and newspapers to every house in this district.

    (8) The computer doesn't work: I press the ESC key, but it doesn't *respond* to my control.

Exercises to Guide Reading

1. *For first reading*:

    (1) Read the title of the text, and think about what the text talks about. Then skim the text, paying attention to the layout of the text, and think about how the text is organized.

(2) Think about what the numbers in the text indicate.

2. *For second reading:* Scan the text to pick out information from it to answer the following questions.
   (1) What is the name of the development model described in detail in the text?
   (2) How many phases are there in the software development?
   (3) How many procedures are there in the design phase?
   (4) How many reasons are there for the maintenance of a product?
   (5) Are there any other software development models being mentioned in the text?

3. *For intensive reading:*
   I. Study the following sentences and guess the meanings of the *italic* words or phrases. The words that may give you hints are underlined.
   (1) There are many *variations* of the model. (Para. 2)
   (2) The product as a whole is broken down into parts called *modules*. (Para. 4)
   (3) *Implementation* means programming, which codes the various designed modules into the machine readable forms. (Para. 5)
   (4) Integration is the process of *assembling* the parts to complete the product. (Para. 6)
   (5) The product is tested to *eliminate* the errors. (Para. 7)
   (6) There may still be remaining *faults* which may continue to appear and therefore need to be corrected. (Para. 8)
   (7) The other reason is that the *environment* in which the product operates may change. (Para. 8)
   (8) So the product must be *modified* to respond to these changes. (Para. 8)

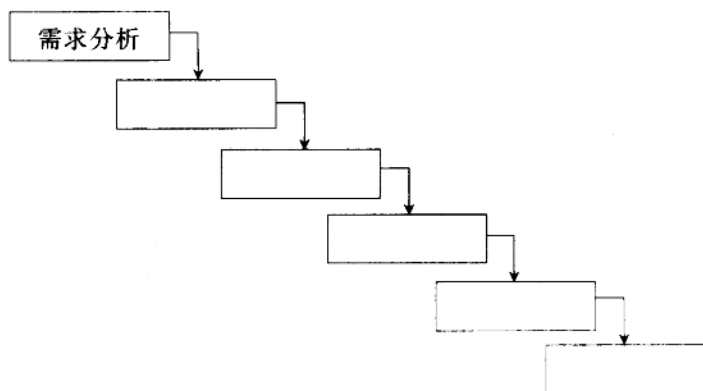   II. Choose the best answer from the four ones marked with A, B, C and D and specify your reasons.
   (1) The author implies that the waterfall model of software development_____.
       A. has exactly six phases
       B. has more than six phases
       C. has less than six phases
       D. usually has six phases, but it may have more or less
   (2) The work of writing programs is done in the _____ phase.

A. requirements analysis   B. design

C. implementation   D. integration

(3) "The machine readable forms" (Para. 5) refer to ____.

A. architectural design   B. detailed design

C. programs   D. designed modules

(4) If we compare software development to making cars, the work of integration should be done in ____.

A. 发动机制造车间   B. 外壳制造车间

C. 装配车间   D. 试车场

(5) According to the text, the test phase ____ get rid of all errors in the software.

A. can   B. can not

III. Finish the following charts in Chinese with the information derived from the text:

(1) 软件开发过程的瀑布模型

(2) 瀑布模型的层次结构

软件开发过程
1.
2.   (1) 总体设计
     (2)
3.
4.
5.
6.   (1)
     (2) 升级   (1) 适应性维护 (adaptive maintenance)
               (2) 完善性维护 (perfective maintenance)

Exercises of Vocabulary and Structure

1. Translate the following words or expressions into English or Chinese.

    (1) a series of developmental phases

        一连串难题   _____

        一系列步骤   _____

    (2) detailed design

        详细报告   _____

        细节分析   _____

    (3) be broken down into parts

        分成若干类   _____

        做成若干块   _____

    (4) remaining faults

        遗留问题   _____

        残余势力   _____

2. Look up in your dictionary the relative words of the following words as required in the bracket, and then fill in the blanks with the given words. Change the form where necessary. Then translate the sentences into Chinese.

development	(*v.*) _____	process	(*v.*) _____
variation	(*v.*) _____	requirement	(*v.*) _____
implementation	(*v.*) _____	integration	(*v.*) _____
maintenance	(*v.*) _____	architectural	(*a person*) _____
detailed	(*n.*) _____	modify	(*n.*) _____

    (1) This building was designed by a famous _____.

    (2) The process of object-oriented software development is similar to that of traditional software development, but the methods _____.

    (3) We must _____ the natural resources and make them for our use.

    (4) The task of _____ a software usually begins when the software has been made out and put into use.

    (5) A software maintainer should have _____ skills because he has to deal with various problems.

    (6) A few _____ to this software would greatly improve its functions.

    (7) If a software doesn't work properly, it _____ modification.

    (8) CPU means the central _____ unit of a computer.

    (9) Before writing the requirements analysis report, the software developer

usually discusses with the customer about his requirements in _____ .

(10) On October 15, 2003, China _____ its dream of piloted spaceflight.

3. Fill in the blanks with proper prepositions or adverbs. Then translate the sentences into Chinese.

(1) They are in the need _____ a computer to store the data.

(2) This data base consists _____ twelve tables.

(3) The cup dropped from the table and broke _____ pieces.

(4) When the software product _____ a whole is delivered to the user, it contains not only the files in some kind of storing medium, but also the user's manual printed in paper.

(5) All these coded programs are tested _____ turn.

(6) A software product contains _____ least one executable program file.

(7) If the computer does not respond _____ any controls, it is out of work.

(8) Apart _____ the corrective maintenance, there are other kinds of maintenance such as adaptive maintenance or perfective maintenance.

4. Fill in the blanks with *which*, *in which*, *for which*, *to which*, *who* or *by whom*, and then translate the sentences into Chinese.

(1) The procedure _____ the modular structure of the software is built is termed architectural design.

(2) The person _____ the task of maintenance is carried out is called the maintainer.

(3) The hardware of the computer and the operating system as well as other supporting software make up the environment _____ a software product works.

(4) The task _____ is performed to eliminate the remaining errors in the software product is called corrective maintenance.

(5) The person _____ codes the designed modules into programs is called a programmer.

(6) Software quality is an important factor _____ we must pay much attention.

(7) One of the reasons _____ a software product needs maintaining is that there may be some remaining faults in the product.

(8) The traditional software development process model, _____ consists of

six phases, is called waterfall model.

(9) One hundred degrees is the extent of temperature _____ water begins boiling.

(10) They are using a software product _____ they have paid a large sum of money.

5. Translate the English sentences into Chinese, paying attention to the *italic* words; then translate the Chinese sentences into English, using the given words in the way as the English sentences.

(1) This kinds of design is *termed* detailed design.

_____

(2) The various designed modules are *coded* into the machine readable forms.

_____

(3) 到了三岁他才被取名为张鲁。 (name)

_____

(4) 这个软件的开发进程(progress)已按用户的要求排好了时间。(time)

_____

(5) 这些旧书存放在一间小房间里。 (house)

_____

(6) 需求分析是沟通客户与开发人员之间的鸿沟(gap)的桥梁。(bridge)

_____

Lesson 2 Software Quality

Text

Quality assurance is an essential activity for any business that produces products to be used by others. There is no doubt that high-quality software is an important goal of the software development. But how do we define quality? What is a good software product?

The quality of something often refers to measurable characteristics—things we are able to compare to know standards such as length, color, and so on. However, software, largely an intellectual entity, is more challenging to characterize than physical objects.

But nevertheless, measures of a program's characteristics do exist. These characteristics include cyclomatic complexity, cohesion, number of function points, lines of code, and many other factors. The factors that affect software quality can be classified into two groups: factors that can be directly measured and factors that can be measured only indirectly. In either case measurement must occur. We must compare the software (documents, programs, data) with some datum and arrive at an indication of quality. The most frequently discussed factors are **correctness, reliability, maintainability**, and **usability**.

Correctness. This factor refers to the extent to which a software product satisfies its requirements. For example, we can measure the correctness of a software product by the percentage of the client's mission objectives that the software product can fulfill. Correctness is the essential quality factor of a software product. After all, what is the use of a program if what it does is not what we want it to do?

Reliability. Software reliability means the extent to which a software product can be expected to implement its function with required preciseness. It is often measured by the number of mistakes, or errors, or faults that occur when the product is in operation. Software reliability is an important factor of its overall quality. If a software product repeatedly and frequently fails to work, it matters little whether other software quality factors are acceptable.

Maintainability. This refers to the effort required to locate and fix an error in the software product and the effort required to transfer the product from one hardware or software environment to another. There is no way to measure maintainability directly. In practice, it is usually measured by the time or cost it takes to maintain a software product.

Usability. "User friendliness" has become an important standard of a successful software product. Usability indicates the extent of how easily the software product is learnt and operated and how easy it is to prepare the input and understand the output in the operation of the product. Several characteristics have been defined to measure usability, of which the user's subjective attitude towards the product is the most important one that decides whether the product is "user friendly".

There are many other factors which indicate the quality of a software product, such as **efficiency, integrity, flexibility, testability, reusability, interoperability**, and so on.

New Words and Expressions

quality /'kwɔliti/	n. 质量,品质
assurance /ə'ʃuərəns/	n. 确信；保证
essential /i'senʃəl/	adj. 本质的；实质的；基本的
produce /prə'dju:s/	vt. 生产,制造；引起
no doubt	无疑地
goal /gəul/	n. 目的；目标
measurable /'meʒərəbl/	adj. 可测量的
characteristic /ˌkæriktə'ristik/	n. 特性,特征
intellectual /ˌinti'lektjuəl/	adj. 智力的；有智力的；显示智力的
entity /'entiti/	n. 实体
challenging /'tʃælindʒiŋ/	adj. 挑战性的
nevertheless /ˌnevəðə'les/	adv. 仍然；不过
measure /'meʒə/	n. 方法；测量；度量
exist /ig'zist/	vi. 存在；生存
cyclomatic /ˌsaiklə'mætik/	adj. 循环的
complexity /kəm'pleksiti/	n. 复杂,复杂性
cohesion /kəu'hi:ʒən/	n. 结合；凝聚
affect /ə'fekt/	vt. 影响
directly /di'rektli/	adv. 直接地；立即
indirectly /ˌindi'rektli/	adv. 间接地
measurement /'meʒəmənt/	n. 测量法；度量
occur /ə'kə:/	vi. 发生；出现
frequently /'fri:kwəntli/	adv. 常常,频繁地
reliability /riˌlaiə'biliti/	n. 可靠性
maintainability /ˌmenteinə'biliti/	n. 可维护性
usability /ˌju:zə'biləti/	n. 可用性
extent /iks'tent/	n. 程度；广度；宽度
satisfy /'sætisfai/	vt. 使满意；说服；使相信
mission /'miʃən/	n. 使命；任务
objective /əb'dʒektiv/	n. 目标；目的
fulfill /ful'fil/	vt. 履行；实现；完成
preciseness /pri'saisnis/	n. 精确
acceptable /ək'septəbl/	adj. 可接受的
effort /'efət/	n. 努力

transfer /træns'fəː/	vt. 转移；传递
subjective /sʌb'dʒektiv/	adj. 主观的
attitude /'ætitjuːd/	n. 态度；看法；意见
flexibility /ˌfleksə'biliti/	n. 弹性；适应性；机动性
testability /ˌtestə'biləti/	n. 可检测性
reusability /riˌjuːzə'biliti/	n. 可再用性
interoperability /'intəˌɔpərə'biləti/	n. 互用性, 协同性

Pre-Reading Exercises

1. Study the following constructions of words, and do the exercises.

A. –able （可……的） *e.g.* read→readable （可读的）, access→accessible （可访问的）

Exercise: Convert the following words by adding "*able*" to them, and then translate them into Chinese.

maintain → _____   accept → _____

test → _____   rely （依靠） → _____

operate → _____   measure （度量）→ _____

use → _____   flex → _____

B. –ability （可……性） *e.g.* adapt → adaptability （可适应性）, operate → operability （可操作性）

Exercise: Convert the following words by adding "*–ability*" to them. Then translate them into Chinese.

maintain → _____   accept → _____

operate → _____   rely → _____

test → _____   measure → _____

flex → _____

C. –ness （*adj.*→*n.*）   *e.g.* glad → gladness, useless → uselessness

Exercise: Turn the following adjectives into nouns.

ill → _____   friendly → _____

correct → _____   precise （精确的） → _____

2. Study the following words and try to link the meanings of each group of words.

(1) sure, assure, assurance, ensure   (2) product, produce

(3) character, characteristics, characterize   (4) bicycle, cycle, cyclomatic

(5) class, classify, classification (6) fact, factor

(7) data, datum (8) per, cent, century, percentage

(9) full, fill, fulfill (10) object, objective, subjective

(11) transform, transport, transfer (12) use, reuse

(13) integrate, integrity (14) operate, interoperate, international

3. Study the following sentences and guess the meanings of the *italic* words. The underlined words may give you some hints.

(1) When we buy something, we consider not only the price of the goods, but also the *quality* of the goods.

(2) Everything was done to *assure* the safety of the landing plane.

(3) I don't like those jobs which can be easily done; I like *challenging* work.

(4) *Physical objects* are things we can see and touch.

(5) If you go to the station by bus, you have to change buses several times; the *direct* way to the station is to take a taxi.

(6) A program isn't good enough if any errors *occur* when it is running.

(7) The temperature of the burning house rose to such an *extent* that nobody could get close to it.

(8) In the morning of October 16, 2003, Yang Liwei successfully completed his *mission* of piloted spaceflight and returned back to the earth.

(9) He is clever enough to work out the problem without much *effort*.

Exercises to Guide Reading

1. *For first reading*: Skim the first two paragraphs of the text and pick the sentence(s) which can best express the general meaning of the text, and then choose another proper title for the text from the following.

A. The Importance of Software Quality

B. How to Measure Software Quality

C. How to Develop High-Quality Software Product

2. *For second reading*: Read the second paragraph more carefully and then guess what may be talked about in the following paragraphs. The first word of the next paragraph may give you some hints, and some possible answers are suggested below.

A. Talking about the characteristics of physical objects.

B. Talking about the impossibility of measuring software quality.

C. Talking about the characteristics of software quality.

D. Talking about the importance of software quality.

3. *For third reading*: Scan the whole text and note down the characteristics of software quality which are talked about in detail in the text.

(1) _____ (2)_____ (3)_____ (4)_____

4. *For intensive reading*:

   I. Study the following sentences and guess the meanings of the *italic* words or phrases. The words that may give you hints are underlined.

(1) However, software is more *challenging* to characterize than physical objects. (Para. 2)

(2) But *nevertheless*, measures of a program's characteristic do exist. (Para. 3)

(3) The factors that *affect* software quality can be classified into two broad groups. (Para. 3)

(4) The most *frequently* discussed factors are correctness, ... (Para. 3)

(5) This factor refers to the extent to which software product *satisfies* its requirements. (Para. 4)

(6) The user's subjective *attitude* towards the product is the most important one ... (Para. 7)

   II. Complete the following notes with the information of the text.

Factors of Software Quality

(1) Correctness

   Indication: extent software satisfies requirement

   Measurement: percentage of mission objectives software fulfills

(2) Reliability

   Indication: _____

   Measurement:_____

(3) Maintainability

   Indication:_____

   Measurement: _____

(4) Usability

Indication: _____

Measurement: _____

III. Choose the best answer from the four ones marked with A, B, C and D and specify your reasons.

(1) The author thinks that it is _____ to define software quality.

   A. easy   B. important   C. difficult   D. interesting

(2) According to the text, quality of something should be able to be measured by _____.

   A. length   B. color   C. degree   D. standard

(3) The author thinks to characterize physical objects is _____ intellectual entities.

   A. easier than   B. more difficult than   C. as easy as   D. as difficult as

(4) The sentence "In either case measurement must occur." in paragraph three means "_____."

   A. If there is measurement, the factors of software quality can be directly measured; otherwise they can only be measured indirectly

   B. There must be measurement whether the factors of software quality can be measured directly or indirectly

   C. In the case that the factors of software quality can be directly measured, there must be measurement; otherwise there needn't be any measurement

   D. In the case that measurement occurs, the factors of software quality can directly measured; otherwise they can only be measured indirectly

(5) Of the four factors of software quality, the author thinks the decisive factor is _____.

   A. correctness   B. reliability   C. maintainability   D. usability

(6) The phrase "it matters little" in paragraph five means _____.

   A. there is little matter   B. it is worth little consideration

   C. the matter is little   D. no matter how little it is

(7) The text says that the amount of money spent on the maintenance _____.

   A. is a factor of software quality

   B. has nothing to do with software quality

   C. is a direct measure of software quality

   D. is essential to improve software quality

(8) The author implies that software's usability can be measured _____.