



国家新闻出版改革发展项目库入库项目
物联网工程专业教材丛书
高等院校信息类新专业规划教材

English
for the Internet of Things

物联网专业英语

主 编 许 可
副主编 刘 佳 任春蕾 王姗姗 赵 欣



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内 容 简 介

本教材从物联网的基本技术、应用、政策三个方面精选 15 篇文章作为课文,并结合产出导向的教育理念,在技能讲解和习题部分设计了学术、生活及工作三个场景,以及综合阅读、词汇、听说、写作四大板块,以全方位提高读者的语言技能。本教材在场景设计之下融合物联网的专业知识,使读者能够掌握精确的行业术语,深入思考物联网技术为生活和社会治理带来的深刻变革,并使用英语灵活讨论行业相关内容。本教材可作为物联网、电子信息、微电子、计算机等相关专业的教材或培训用书。

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长久以来,我国的英语教育一直为人们所诟病,其中一个原因就是其仅把重点放在语言技能的训练上,很少涉及专业知识,即在英语课上所讨论和练习的话题通常都是日常生活中的话题。这对于初高中学生学习英语来说可能还够用,但对于大学生学习英语来说,仅对日常话题的讨论是远远不够的。学生在学习过程中和在未来的工作中更需要的是将英语与本专业的知识相结合,能够使用英语在专业内进行沟通,或者进行学术研究。因此在我国英语教学的诸多侧重点中,专门用途英语变得热门起来。

编者的设计理念是使本教材成为拥有物联网专业背景的综合英语教程,因此本教材涉及听、说、读、写及词汇训练的各个方面,并基于产出导向法,编者在技能讲解和习题部分分别设计了学术、生活、工作三个场景,在场景之下引导读者做任务,继而在任务的基础上锻炼读者主动解决问题和团队合作的能力。本教材的侧重点是英语知识,而不是对物联网技术知识的介绍。因为物联网专业的教师会通过更具体详细的课程来系统地教授物联网知识,所以在本教材的三章中仅有一章是介绍物联网基础知识的。读者在使用本教材时应已具备相关专业知识,通过阅读本教材的文章来了解专业中的基本知识如何用英语来表达,并学习英文术语。教材的第2章和第3章分别介绍了物联网的应用和政策考量,这种编排使全书更具人文特色,鼓励读者在学习技术的同时也要对技术所带来的社会生活文化甚至是伦理问题的变化进行思考。

入选本教材的15篇文章皆经过精心挑选,来自物联网技术的权威原版教材、影响力大的学术论文、标准制定组织发布的报告及语言和内容皆优质的英美期刊。编写团队在筛选和改编文章时充分考虑了读者的需求,控制文章的难度,并使其整体结构更合理,逻辑更严密。本教材的读者对象是普通高等院校物联网及相关专业的学生,同时本教材也适合人文学科专业对物联网技术感兴趣的学生以及职场人士使用。

在编写本教材之时,市场上已有多本“物联网英语”的相关教材,编者也做了详细的调研,阅读了大部分市场上能找到的教材。已有教材大多以文章阅读为主,并在课文后附上少量名词解释或者翻译习题。本教材相对于已有教材有着明显的优势。第一,有着专业而详细的语言技能讲解,如对逻辑地图、SQ3R(survey, question, read, recall and review)等阅读技能的

讲解,对学术论文、说服性文章等写作技能的讲解。本教材能够授人以渔,提高读者的语言使用能力,而不仅仅是专业内容的灌输。第二,不同于市面上“物联网英语”相关方面的教材仅呈现文章和少量词汇翻译习题的做法,本教材涉及听、说、读、写全方位的训练,能够让读者灵活使用英语讨论与物联网相关的话题。第三,输入输出并重,或者以输出带动输入,课后设计了大量活动以方便教师在课堂上开展。第四,将术语和通用词汇分开,行业英语很重要的一部分就是术语的处理和学习,术语需要和通用词汇分开学习。第五,课文析出词汇使用英文进行词义的标注。这些析出重点词汇为大学英语四级及以上词汇,有利于降低阅读难度,读者若遇到生词可以及时在课文一侧找到释义。之所以没有像许多教材那样直接使用中文释义,而是放上英文释义,是想加强读者查阅英英词典的意识,或者使读者习惯使用英文来理解生词,这样读者可以更加准确地理解词汇以及词汇的用法。

本教材提供详细的语言技能讲解以及精心设计、相关性强的习题,读者在阅读文章后,首先可以通过课后阅读题来检验自己对文章的理解情况,其次可以根据阅读技巧的讲解来训练和提高自身的阅读能力。词汇和听力部分的练习也适合读者自学。

本教材的编排适合教师在课堂上开展活动。在每个章节的各个技能点中,尤其是口语和写作部分,编者设计了丰富多彩的场景化活动,将语言技能训练和物联网工作、生活场景完美结合。例如,第1单元的口语活动部分要求学生假设自己是一名教授物联网技术的教师,要去给中小學生做一个讲座,讲一些基本的物联网概念和应用。学生在准备这个讲座时需要充分考虑中小學生这类听众,因此准备的内容应简单易懂、图文并茂、趣味性强。在这种“产品”的导向下,学生不仅需要掌握物联网基本技术,而且需要练习如何用简单的英文对其进行表达。在这个过程中,学生的语言组织能力、信息搜索能力、利用专业知识解决问题的能力都能得到提升。

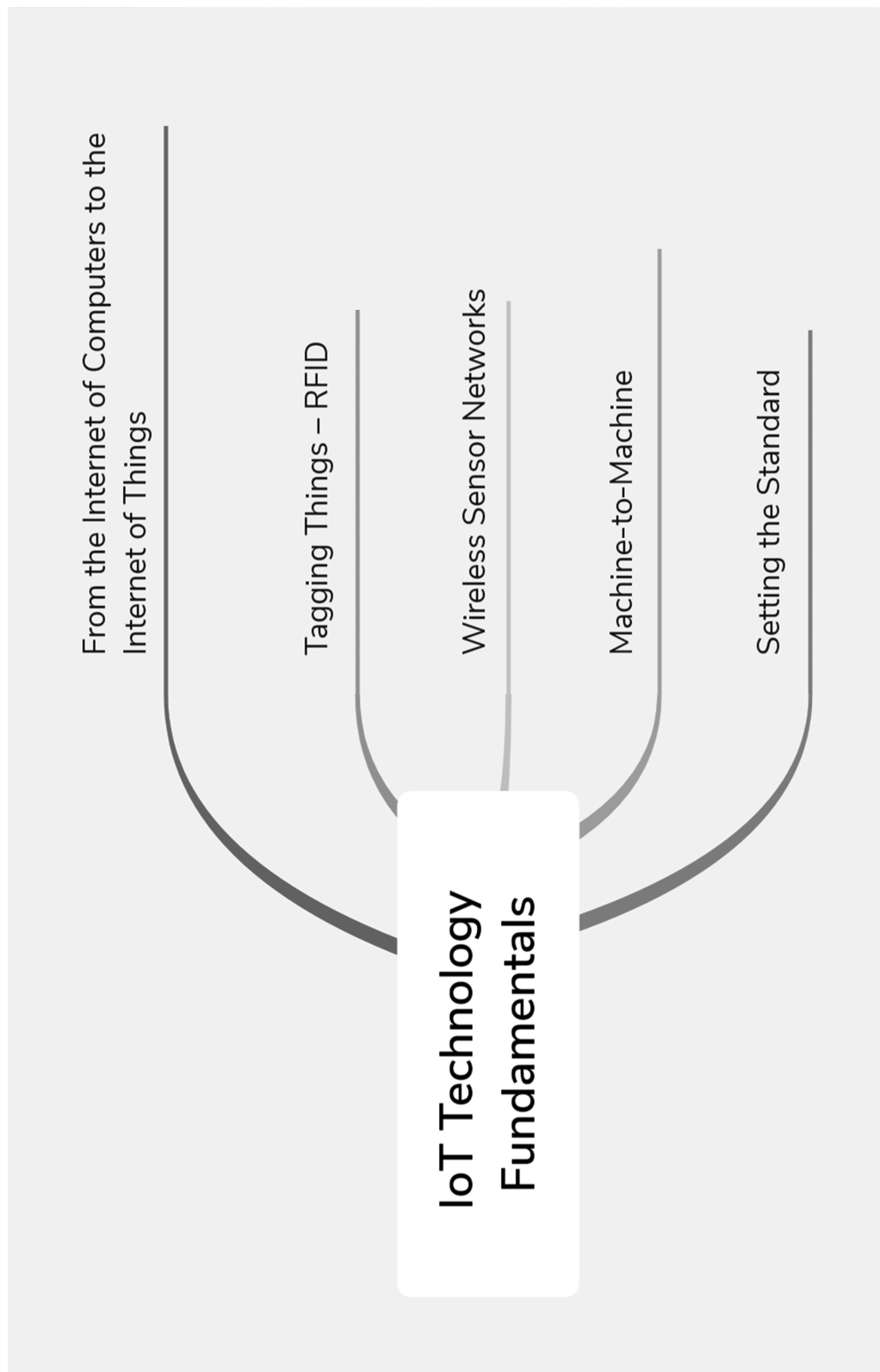
本教材的编写团队由北京邮电大学人文学院从事一线教学的5位青年教师组成,编者有着语言学、翻译学和外语教育的科研背景,并对信息科学技术知识抱有极大的热情。本教材凝结着编者在若干年教学中总结的精华。从最初的理念设计到选文、编写和校对的各个过程,编写团队出色的团队合作意识使整个教材的编写过程愉快且富有成效。本教材第1~3单元由许可老师编写,第4、5、9单元由任春蕾老师编写,第6~8单元由赵欣老师编写,第10、14、15单元由王姗姗老师编写,第11~13单元由刘佳老师编写。同时感谢北京邮电大学人文学院英语教研组的白天惠老师在教材初期的设计和选文上给予的大力支持,感谢“物联网工程专业教材丛书”总主编张锦南老师对编者团队的信任,感谢北京邮电大学出版社的姚顺编辑对本书出版的支持。

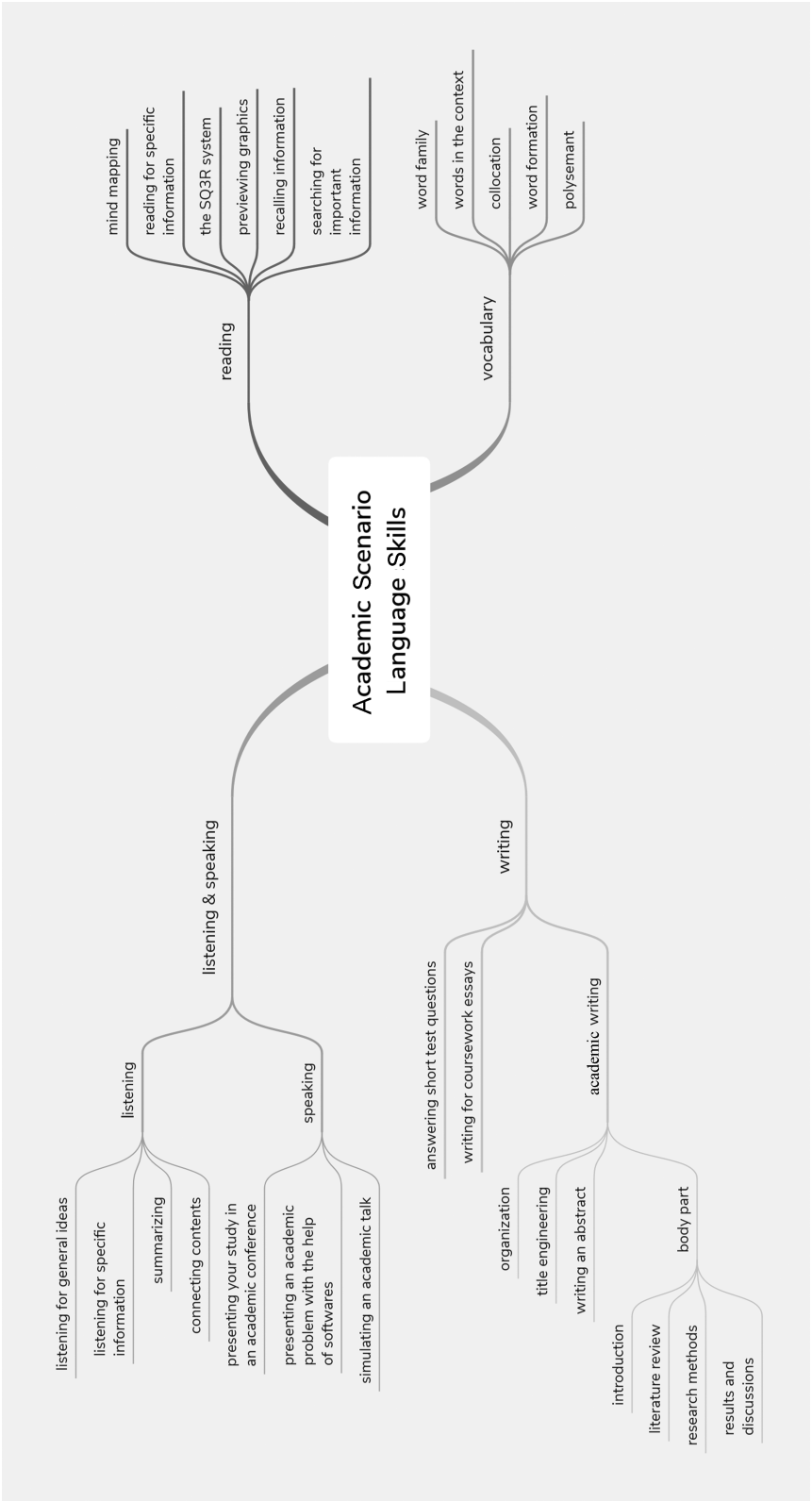
由于时间仓促和编写团队的能力有限,书中难免存在疏漏和错误,欢迎读者积极与编写团队沟通在教材使用和阅读过程中遇到的问题,以便我们能够向读者呈现更加优质的教材。

许 可
于北京邮电大学

2 | 物联网专业英语

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Chapter 1 IoT Technology Fundamentals

This Chapter provides 5 articles on some basic IoT technologies. You will be put in an academic scenario, in which you will learn how to read for academic purposes, write research papers, and communicate in academic conferences.

Unit 1 From the Internet of Computers to the Internet of Things

1 The Internet of Things represents a vision in which the Internet extends into the real world embracing everyday objects. Physical items are no longer disconnected from the virtual world, but can be controlled remotely and can act as physical access points to Internet services. An Internet of Things makes computing truly ubiquitous—a concept initially put forward by Mark Weiser in the early 1990s. This development is opening up huge opportunities for both the economy and individuals. However, it also involves risks and undoubtedly represents an immense technical and social challenge.

2 The Internet of Things vision is grounded in the belief that the steady advances in **microelectronics**, communications and information technology we have witnessed in recent years will continue into the foreseeable future. In fact—due to their diminishing size, constantly falling price and declining energy consumption—**processors**, **communications modules** and other electronic components are being increasingly integrated into everyday objects today.

3 “Smart” objects play a key role in the Internet of Things vision, since embedded communication and information technology would have the potential to revolutionize the use of these objects. Using sensors, they are able to perceive their

vision /'vɪʒən/ *n.*

a dream or similar experience, especially of a religious kind

embrace /ɪm'breɪs/ *v.*

to accept a set of beliefs, especially when it is done with enthusiasm

ubiquitous /ju:'bɪkwɪtəs/ *adj.*

seeming to be everywhere; very common

immense /ɪ'mens/ *adj.*

extremely large or great

be grounded in/on sth (to be)

based on sth

foreseeable /fɔr'siəbəl/ *adj.*

that you can predict will happen

diminish /dɪ'mɪnɪʃ/ *v.*

to become or to make sth become smaller, weaker, etc.

diminishing *adj.*

integrate /'ɪntɪɡreɪt/ *v.*

to combine two or more things so that they work together

embed /ɪm'bed/ *v.*

to fix sth firmly into a substance or solid object

revolutionize /ɪrevə'lju:ʃənəɪz/ *v.*

to completely change the way that sth is done

perceive /pə'si:v/ *v.*

to notice

context /'kɒntekst/ *n.*

the situation in which sth happens

generate /'dʒenəreɪt/ *v.*

to produce or create sth

substantial /səb'stænjəl/ *adj.*

large in amount, value or importance

forerunner /'fɔːrʌnə/ *n.*

a person or thing that came before and influenced sb/sth else that is similar

attain /ə'teɪn/ *v.*

to succeed in getting sth, usually after a lot of effort

unattained *adj.*

negligible /'neglɪdʒəbəl/ *adj.*

of very little importance or size and not worth considering

efficient /'ɪfɪjənt/ *adj.*

doing sth well and thoroughly with no waste of time, money, or energy

in a... manner the way that sth is done or happens

optimize /'ɒptɪmaɪz/ *v.*

to make sth as good as it can be

catchy /'kætʃɪ/ *adj.*

pleasing and easily remembered

metaphor /'metəfə/ *n.*

a way of describing something by referring to it as something different and suggesting that it has similar qualities to that thing

interpret /ɪn'tɜːprɪt/ *v.*

to explain the meaning of sth

postulate /'pɒstjʊleɪt/ *v.*

to suggest or accept that sth is true so that it can be used as the basis for a theory, etc.

propagate /'prɒpəgeɪt/ *v.*

to spread an idea, a belief or a piece of information among many people

context, and via built-in networking capabilities they would be able to communicate with each other, access Internet services and interact with people. “Digitally upgrading” conventional object in this way enhances their physical function by adding the capabilities of digital objects, thus generating substantial added value. Forerunners of this development are already apparent today—more and more devices such as sewing machines, exercise bikes, electric toothbrushes, washing machines, electricity and photocopiers are being “computerized” and equipped with network interfaces.

4 In other application domains, Internet connectivity of everyday objects can be used to remotely determine their state so that information systems can collect up-to-date information on physical objects and processes. This enables many aspects of the real world to be “observed” at a previously unattained level of detail and at negligible cost. This would not only allow for a better understanding of the underlying processes, but also for more efficient control and management. The ability to react to events in the physical world in an automatic, rapid and informed manner not only opens up new opportunities for dealing with complex or critical situations, but also enables a wide variety of business processes to be optimized. The real-time interpretation of data from the physical world will most likely lead to the introduction of various novel business services and may deliver substantial economic and social benefits.

5 The use of the word “Internet” in the catchy term “Internet of Things” which stands for the vision outlined above can be seen as either simply a metaphor—in the same way that people use the Web today, things will soon also communicate with each other, use services, provide data and thus generate added value—or it can be interpreted in a stricter technical sense, postulating that an **IP protocol stack** will be used by smart things (or at least by the “**proxies**”, their representatives on the network).

6 The term “Internet of Things” was popularized by the work of the Auto-ID Center at the Massachusetts Institute of Technology (MIT), which in 1999 started to design and propagate a cross-company **RFID infrastructure**. In 2002, its co-founder and former head Kevin Ashton was quoted in *Forbes* Magazine as saying, “We need an internet for things, a standardized way for computers to understand the real world”.

This article was entitled “The Internet of Things”, and was the first documented use of the term in a literal sense. However, already in 1999 essentially the same notion was used by Neil Gershenfeld from the MIT Media Lab in his popular book *When Things Start to Think* when he wrote “in retrospect it looks like the rapid growth of the World Wide Web may have been just the trigger charge that is now setting off the real explosion, as things start to use the Net”.

7 In recent years, the term “Internet of Things” has spread rapidly—in 2005 it could already be found in book titles, and in 2008 the first scientific conference was held in this research area. European politicians initially only used the term in the context of RFID technology, but the titles of the RFID conferences “From RFID to the Internet of Things” (2006) and “RFID: Towards the Internet of Things” (2007) held by the EU Commission already allude to a broader interpretation. Finally, in 2009, a dedicated EU Commission action plan ultimately saw the Internet of Things as a general evolution of the Internet “from a network of interconnected computers to a network of interconnected objects” (Internet of Things—An action plan for Europe, 2009).

8 From a technical point of view, the Internet of Things is not the result of a single novel technology; instead, several complementary technical developments provide capabilities that, taken together, help to bridge the gap between the virtual and physical world. These capabilities include communication and cooperation, **addressability**, identification, sensing, **actuation**, embedded information processing, **localization** and **user interfaces**.

Word count: 862

Source: Adapted from an updated translation of Mattern F, Floerkemeier C. Vom Internet der Computer zum Internet der Dinge[J]. Informatik-Spectrum, 33(2): 107-121.

in retrospect thinking about a past event or situation, often with a different opinion of it from the one you had at the time

trigger /'trɪgə/ *n.*

the part of a bomb that causes it to explode

explosion /ɪk'spləʊʒən/ *n.*

a large, sudden or rapid increase in the amount or number of sth

allude to sb/sth to mention sth in an indirect way

dedicated /'dedɪkeɪtɪd/ *adj.*

designed to do only one particular type of work

ultimately /'ʌltɪmɪtli/ *adv.*

in the end; finally

evolution /i:və'lju:ʃən/ *n.*

the gradual development of sth

complementary /ˌkɒmplɪ'mentəri/ *adj.*

things go well together, although they are usually different

virtual /'vɜ:tʃʊəl/ *adj.*

made to appear to exist by the use of computer software, for example on the Internet

physical /'fɪzɪkəl/ *adj.*

connected with things that actually exist or are present and can be seen, felt, etc. rather than things that only exist in a person's mind

I Reading

Reading for academic purposes

If you are going to read for academic purposes, you will find that most of the materials will be intended for “serious” readers. You will be exposed to language which is directly relevant to your specific fields of study. It is important to keep the reading purpose in mind while reading a text. This way, you can make decisions about the most effective way to read that text. For example, you can decide whether to read quickly through a text, or skip some of the materials and spend time reading carefully through the parts that help achieve the task.

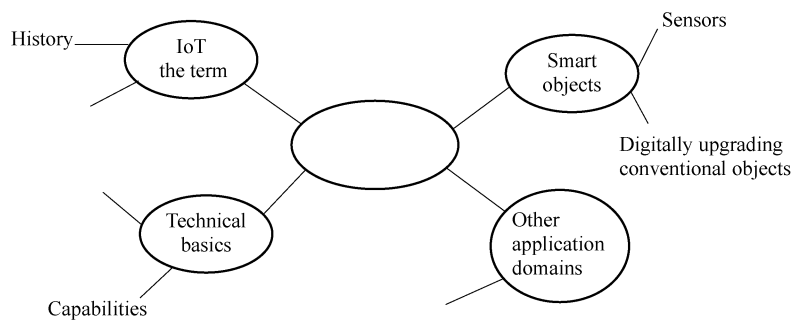
When you read for academic purposes, you are probably searching for a topic to write about, finding evidences to support your ideas, updating your knowledge on the latest discoveries. Whatever your purpose may be, you need to acquire a general understanding. Creating a mind map may help you achieve that goal.

1. Reading and mind mapping

When you read, creating a mind map may help you understand the structure of the text, and figure out the main idea and supporting details. Glossing over part headings and the first sentences of each paragraph may help.

Task 1

Directions: Please complete the following graph, and fill in as many details as possible.



2. Reading for specific details

Task 2

Directions: Please answer the following questions.

(1) What enables the processors, communications modules and other electronic components to integrate into everyday objects today?

(2) Please list some of the conventional objects that have been “computerized” or “digitally upgraded” to generate added value.

(3) Which organization popularized the term “Internet of Things”?

(4) Apart from novel technologies, what are the complementary technical developments that enable the Internet of Things?

II Vocabulary

Key words and expressions

vision	embrace	ubiquitous	immense
be grounded in/on sth	foreseeable	diminish	integrate
embed	revolutionize	perceive	context
generate	substantial	forerunner	attain
negligible	efficient	in a... manner	optimize
catchy	metaphor	interpret	postulate
propagate	in retrospect	trigger	explosion
allude to sb/sth	dedicated	ultimately	evolution
complementary	virtual	physical	

Terminology

microelectronics	<i>n.</i>	微电子学
processor	<i>n.</i>	处理机, 处理器
communication module	<i>n.</i>	通信模块
IP protocol stack	<i>n.</i>	互联网通信栈
proxy	<i>n.</i>	代理
RFID (Radio Frequency Identification)	<i>n.</i>	无线射频识别基础设施
infrastructure		
addressability	<i>n.</i>	寻址能力
actuation	<i>n.</i>	驱动
localization	<i>n.</i>	本地化
user interface (UI)	<i>n.</i>	用户界面

1. Word bank

Task 1

Directions: Please fill in the blanks with the words listed below. You may need to change the form when necessary.

ubiquitous	context	diminish	optimize	interpret
physical	evolution	explosion	virtual	postulate
substantial	efficient	perceive	integrate	generate

(1) Science fiction stories and movies can also be used to deal with ethical (道德的) issues. Fictional examples can often be more effective than historical or current events, because they explore ethical issues in a _____ that students often find interesting and that is independent of current political or economic considerations.

(2) Researcher has found that earnings are higher when the academic major is _____ as closely related to employment.

(3) Susan was assigned a difficult task. She couldn't sleep well for many days and felt that she might one day _____ under stress.

(4) The _____ of management training at McDonald's has clearly reached a new level, as a new generation of managers can create and sustain successful business environments.

(5) This charity was trying to refurbish an existing building in the village but required _____ funding to bring it up to a suitable standard.

(6) What was once the wild dream of spies—to plant a “bug” in every object—has been enlarged and re-shaped into the millennial dream of _____ computing.

(7) Our current management system is too old, and thus should be _____.

(8) Throughout his political career, he has taken _____ every position on every issue.

(9) Steve Wozniak had a genius for designing the most _____ computer from the least number of parts.

(10) These sensors will _____ enormous amount of data we never had before from the physical world.

2. Word family

One way to figure out the meaning of an unknown word is to look for its relationship with other words in the same word family. Even if you cannot figure out the exact meaning, your understanding can be enough to allow you to read on.

Task 2

Directions: Please look at the phrases from the text. Write down at least one other word you know that is related to the underlined word. An example has been given to you.

- (1) the foreseeable future _____ foresee _____
- (2) revolutionize the use of these objects _____