CAREER PATHS

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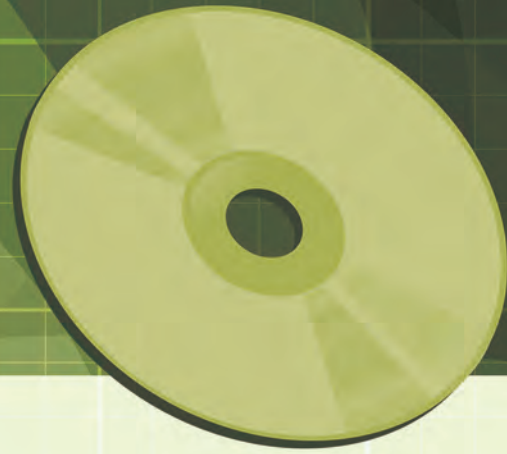
SOFTWARE ENGINEERING

SOFTWARE
ENGINEERING

Book 1

Virginia Evans
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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	The Software Engineer	Course description	artifact, design, develop, evaluate, install, investigate, programming-in the-large, programming-in-the small, software, test, write	Expressing enthusiasm
2	Types of Eomputers	Journal article	computer, computing cluster, desktop, embedded computer, laptop, notebook, PC, server, tablet, workstation	Making plans
3	Accessories and Peripherals	Email	flash drive, flat panel, inkjet printer, keyboard, laser printer, monitor, optical mouse, peripheral, scroll wheel, scanner, wireless	Apologizing for an error
4	Inside the Computer	Brochure	case, CD/ DVD drive, cover, fan, hard drive, heat sink, motherboard, port, power supply, processor	Offering advice
5	System Software 1	Textbook chapter	BIOS, control, device driver, firmware, hardware, manually, operate, operating system, system software, windowing system	Giving a reminder
6	System Software 2	Webpage	antivirus software, deny, firewall, malware, permit, quarantine, removal, security software, spyware, virus	Describing consequences
7	Programming Software	Textbook chapter	compiler, debugger, IDE, interpreter, linker, program, programming language, programming software, source code editor, text editor	Expressing confusion
8	Application Software 1	Advertisement	accounting, application software, desktop publishing, enterprise software, image editing, office suite, spreadsheet, video editing, web browser, word processing	Politely disagreeing
9	Application Software 2	Journal article	bioinformatics, cost analysis, data management, digital assistant, mobile app, multimedia player, payroll, route planning, satellite navigation, simulation	Asking for more information
10	The Desktop and GUI	Manual	cursor, desktop, dropdown menu, folder, GUI, icon, open, right-click, run, select	Giving instructions
11	Basic Numbers and Math	Chart	add, equal, divide by, hundred, less, minus, multiply by, over, plus, subtract, times	Making a realization
12	Analyzing Numbers and Quantities	Textbook chapter	convert, decimal number, denominator, fraction, numerator, out of, percent, percentage, point, reduce	Describing progress
13	Describing Change	Magazine article	decline, decrease, double, expand, fluctuate, increase, rise, stablilize, steady, trend	Expressing confidence
14	Presentations and Communication	Email	body language, eye contact, handout, note card, presentation, project, review, signpost, summarize, visual aid	Giving constructive criticism
15	Education	Webpage	Bachelor's degree, calculus, circuit analysis, computer architecture, computer engineering, control system, electronics, foundation, linear algebra, programming	Describing order of events

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SOFTWARE ENGINEERING

Book 2

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Traits of a Software Engineer	Webpage	ability, commitment, critical thinking, curious, dedicated, expertise, focus, goal-oriented, innovative, logical, outside the box, team player	Expressing a preference
2	Problem Solving	Email	address, analysis, application, approach, iterative, iteration, problem identification, procedure, problem solving, redefine, solution, synthesis	Asking about progress
3	Accounting	Textbook excerpt	closed system, consumption, extensive quantity, final, generation, initial, intensive quantity, input, open system, output, system, universal accounting equation	Making comparisons
4	Requirements Engineering	Webpage	customer-driven, elicitation, functional hierarchy, market-driven, mode, object, requirements engineering, response, specification, user class, user-friendly, validation, verification	Expressing relief
5	Software Architecture	Agenda	application framework, conceptual view, deployment view, design pattern, idiom, implementation view, module, process view, programming plan, software architecture	Setting a deadline
6	Architectural Styles	Textbook excerpt	abstract data type, component, connector, control structure, DSSA, implicit invocation, layered, main program with subroutines, pipes and filters, repository, system model	Disagreeing with an opinion
7	Design Considerations	Blog	abstraction, call graph, cohesion, complexity, coupling, information hiding, intra-modular attributes, simplify, stopping rule, system structure, wicked problem	Expressing confusion
8	Design Methods 1	Course description	bottom-up design, decompose, design method, functional decomposition, idealistic, philosophy, primitive, rational, stepwise refinement, subfunction, top-down design	Discussing pros and cons
9	Design Methods 2	Textbook excerpt	data flow design, DFD, implementation stage, JSD, JSP, modeling stage, network stage, SA, schematic logic, structure chart, SD, structure diagram	Making a polite request
10	Design Methods 3	Online encyclopedia article	attribute, Booch method, class, class diagram, collaboration diagram, Fusion method, interaction diagram, object-oriented, OMT, property, sequence diagram, state, state diagram	Confirming information
11	Software Testing Objectives	Webpage	compare, demonstration model, destruction model, error, evaluation model, expected, error, failure, fault, fault detection, fault prevention, oracle, prevention model, satisfy, test criterion	Making a prediction
12	Software Testing Techniques	Journal article	black-box testing, coverage-based testing, dynamic analysis, error-based testing, Fagan inspection, fault-based testing, peer review, proof of correctness, static analysis, scenario-based evaluation, stepwise abstraction, white-box testing	Delivering bad news
13	Test Adequacy Criteria	Handbook	anticomposition property, antidecomposition property, antiextensionality property, applicability property, complexity property, general multiple change property, inadequate empty set, monotonicity property, non-exhausting applicability property, renaming property, statement coverage property, test adequacy criteria	Giving advice
14	Software Maintenance 1	Memo	adaptive maintenance, corrective maintenance, enhance, insufficient, law of continuing change, law of increasing complexity, perfective maintenance, preventive maintenance, release, repair, software maintenance, unstructured code	Describing order of events
15	Software Maintenance 2	Journal article	design recovery, functional equivalence, legacy system, modernize, redocumentation, reengineering, renovation, restructuring, revamping, reverse engineering, web-based	Describing degree

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Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	User Interface Design 1	Textbook excerpt	apparatus level, cognitive view, CLG, communication component, conceptual model, conceptual component, design view, keystroke level, linguistic view, material component, mental model, semantic level, spatial layout level, syntax level, task level, user interface	Assigning tasks
2	User Interface Design 2	Job listing	artistic design, dialog, end user, ergonomics, functionality, groupware, HCI, humanities, layer, MVC paradigm, presentation, Seeheim model, task analysis, UVM, user-centered design	Rating importance
3	Software Reuse 1	Journal article	ad hoc, approach, black-box reuse, compositional, COTS, generative, product, scope, substance, software crisis, software reuse, source code, technique, usage, white-box reuse	Making a recommendation
4	Software Reuse 2	Textbook excerpt	ADL, application generator, code scavenging, domain analysis, instantiate, intermediate product, middleware, MIL, program library, skeleton, template, transformation system, VHLL	Describing ability
5	Software Reliability	Handbook	BM, defensive programming, exception domain, expected exception domain, fault-tolerant, LPM, N-version programming, probability, recovery block, redundancy, reliability, robust programming, software reliability model, standard domain, threshold	Stating a preference
6	Software Tools 1	Webpage	CASE, city, environment, family, individual, integrated environment, language-centered environment, process-centered environment, process scale, state, tool, toolkit, user scale, workbench	Estimating time
7	Software Tools 2	Review	AWB, back-end, IPSE, MWB, PCTE, programming environment, PWB, reserved checkout, SSCS, UNIX, unreserved checkout,visual programming environment	Describing necessity
8	Configuration Management	Email	approve, baseline, CCB, change-oriented, change request, configuration item, configuration management, corresponding, delta, flaw, incorporate, parallel development, retrace, version-oriented, workflow	Describing a process
9	Programming Teams	Letter	commitment style, chief programmer team, hierarchical organization, integration style, matrix organization, open structured team, relation style, relation directedness, separation style, specialize in, SWAT team, task directedness	Expressing concerns
10	Software Quality Control	Report	CMM, common feature, conform to, improve, IEEE Standard for Quality Assurance Plans, ISO 9001, key practice, key process area, maturity level, quality control, quality criteria, quality factor, TQM	Making a realization
11	Development and Cost	Memo	algorithmic model, budget, base formula, COCOMO, comparison method, Delphi-method, development time, estimate, KLOC, learning effect, man-month, optimistic, Putnam model, Walston-Felix	Delivering good news
12	Project Management	Advertisement	allocation problem, critical path, degree of certainty, design problem, exploration problem, Gantt chart, PERT chart, process certainty, product certainty, realization problem, resource certainty, risk factor, risk management, WBS	Summarizing a point
13	Ethics	Poster	adequate, best interests, deceptive, ensure, ethics, health, integrity, principle, professional judgment, public interest, safety, standard, unethical, welfare	Emphasizing a point
14	Cloud Computing: SaaS & PaaS	Journal article	bandwidth, browser, cloud computing, computing platform, distribution, metered fee, online, PaaS, pay-as-you-go, SaaS, software as a product, software license, software on demand	Giving an opinion
15	Career Options	Webpage	advance, ACM, analyst, architect, contractor, developer, educator, freelancer, IEEE, manager, membership, professional development, researcher, software life cycle, technical support, tester	Asking for advice

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HOME **ABOUT US** **SERVICES** **CONTACT**

INTERNET

firewall

SHARP ALERT
COMPUTING SYSTEMS

Security threats can cause serious damage to your computer. SharpAlert offers excellent **security software** to keep your computer safe.

Antivirus Software – Don't let unauthorized parties steal your personal information with **spyware**! And stop **viruses** before they destroy your computer. The SharpAlert Exviro package protects against all types of **malware**. It **quarantines** infected files. Then threat **removal** just takes one click.

Firewalls – Remember to update network security programs regularly. SharpAlert's Steelbar firewall **permits** access only to authorized users. It will **deny** access to anyone without proper credentials. Make sure your confidential information stays confidential!

PRIVATE NETWORK

deny

permit

security software

SHARP ALE
COMPUTING SYSTEMS

Scan & Clean

Current Progress
HyperTerminal Icon Ext

removal

Stop Scan   Pause

Malware Found (Double-click for more information)
Name   Status   Comments

malware

Get ready!

❶ Before you read the passage, talk about these questions.

1 What are some threats to computer security?
2 How can users protect computers from security threats?

Reading

❷ Read the webpage. Then, mark the following statements as true (T) or false (F).

1 __ The company's Exviro package includes protection against spyware.
2 __ The antivirus software destroys files that are infected by malware.
3 __ The webpage recommends using antivirus software instead of firewalls.

Vocabulary

❸ Write a word that is similar in meaning to the underlined part.

1 The purpose of the software is to <u>not allow</u> access to unauthorized users.
    _ e _ _
2 The system <u>allows</u> access only after users enter their passwords.
    _ _ r _ i _ s
3 The engineer installed <u>a program that protects a computer from various threats</u> on the company's systems.
    s _ _ _ r _ _ _   _ o f _ _ _ r _

4 Place the correct words and phrases from the word bank under the correct headings.

word BANK

removal malware virus spyware
quarantine firewall antivirus software

Security threats	Security programs	Protective actions
_____	_____	_____
_____	_____	_____
_____	_____	_____

5 🎧 Listen and read the webpage again. What is the difference between spyware and viruses?

Listening

6 🎧 Listen to a conversation between a company manager and a software engineer. Choose the correct answers.

1 What is the main idea of the conversation?

   A how much damage was caused by a virus

   B which information was stolen by a spyware program

   C why the company should update its antivirus software

   D what caused a failure in the company's firewall

2 What prediction does the woman make?

   A Unauthorized users will attempt to access the network again.

   B The company's systems will be damaged by a virus.

   C A new firewall will probably not be effective.

   D The company's files will need to be quarantined.

7 🎧 Listen again and complete the conversation.

Engineer: Well, Mr. Clay. I **1** _____ _____ _____ from your company's system.

Manager: Oh, thank you! Our systems contain a lot of **2** _____ _____ .

Engineer: Yes, I can see that. If you don't update your **3** _____ _____ , you could really be in trouble.

Manager: Really? You think this will **4** _____ _____ ?

Engineer: Whoever wanted your information is likely to **5** _____ _____ .

Manager: I guess we'd **6** _____ _____ the company's antivirus software, then.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

If you don't ... you could ...

You think this will ...

I guess we'd better ...

Student A: You are an engineer. Talk to Student B about:

- security threats to his or her system
- consequences of the threats
- ways to prevent security problems

Student B: You are a company manager. Talk to Student A about security threats to your system.

Writing

9 Use the conversation from Task 8 to complete the email from a software engineer.

Dear Mr. Greene,

I am concerned about your company's computer security. When I inspected your systems, I discovered _____ . This is dangerous because _____ _____ . To keep your systems safe, I recommend _____ . This will help because _____ .

Let's meet to discuss this further.

Danielle Corwin
SharpAlert Computing Systems

Get ready!

1 **Before you read the passage, talk about these questions.**

1 What are some ways that software is distributed?
2 How do users pay for cloud computing services?

SOFTWARE METERING AND CHARGEBACK

Pay for
what you USE
NOT for what you own!

metered fee

cloud service

CLIENT

cloud computing

Computer World:

Specialized Software

Cloud computing is changing the **distribution** of computing and storage services. Cloud computing is a network of companies and users sharing resources. Software engineers must be ready to meet demands for this specialized software.

One model of cloud computing is **SaaS**, or Software as a Service. In this model, software is hosted by a provider and accessed over a network. Another example is **PaaS**, or Platform as a Service. In this model, computer hardware and software are rented. **Software on demand** falls under the PaaS category.

To provide their services, companies purchase **software licenses**. Then they charge users for access to the software. Some companies charge users by **metered fees**. This means that users pay afterwards for whatever they used. Others support **pay-as-you-go** systems. In these cases, **software as a product** is purchased in advance, when it is needed.

Several requirements of the **computing platform** are necessary to access cloud technology. The computer must be **online**. The **bandwidth** of the system needs to be large in order to quickly send and receive information. But if the specifications are right, cloud computing is a tremendously useful tool. Users can easily access data from web **browsers**, among other methods. A tip to software engineers: get into this expanding industry!

Reading

2 **Read the journal article. Then, choose the correct answers.**

1 What is the main idea of the article?
  A the challenges of developing cloud computing software
  B recent changes in cloud computing technology
  C the history of the development of cloud computing
  D an overview of cloud computing models

2 What is true of SaaS users?
  A They access software that is provided by a network host.
  B They rent software from a cloud computing provider.
  C They purchase software from the developer.
  D They need a specialized web browser.

3 Which of the following is NOT required for users to access a cloud?
  A web browser   C a fee
  B software license   D a large bandwidth

Vocabulary

3 **Match the words (1-8) with the definitions (A-H).**

1 __ cloud computing   6 __ online
2 __ distribution   7 __ bandwidth
3 __ software license   8 __ software on
4 __ computing platform   demand
5 __ browser

A a software system that is used to gain access to information on the internet

B being connected to the internet

C a measure of a computer system's capacity to send and receive information

D a combination of hardware and system software that allows an application to run

E a model in which software is rented from a provider

F a legal agreement which grants the buyer of a program the right to use it

G the action of supplying a product or service

H a model in which computing is delivered as a service rather than as a product

4 **Choose the sentence that uses the underlined part correctly.**

1 **A** In <u>PaaS</u>, computer software can be rented.

  B A computer must be equipped with <u>SaaS</u> to access a web browser.

2 **A** The company uses a <u>pay-as-you-go</u> system, requiring a set monthly fee.

  B The customer pays a <u>metered fee</u>, so he only pays for the services he uses.

3 **A** To access data storage, a computer must have <u>software on demand</u>.

  B Some software developers only supply <u>software as a product</u>.

5 🎧 **Listen and read the journal article again. What must a computer have in order to access the cloud?**

Listening

6 🎧 **Listen to a conversation between a manager and an engineer. Mark the following statements as true (T) or false (F).**

1 __ The man had a negative experience with cloud computing.

2 __ The company recently requested a new software license.

3 __ The woman recommends SaaS.

7 🎧 **Listen again and complete the conversation.**

Manager: Hey, Tonya. I'm thinking about upgrading the company's network, and I was wondering what **1** _____ _____ _____ _____ .

Engineer: SaaS is a networking model.

Manager: I don't know much about computers. What does that mean?

Engineer: Let me explain the basics. SaaS stands for Software as a Service. It is a model that **2** _____ _____ _____ _____ .

Manager: What's cloud computing?

Engineer: It's a **3** _____ _____ _____ _____ _____ services.

Manager: So it's a way to access information?

Engineer: Yes, partly. Clients purchase the rights to a **4** _____ _____ . Then they share that software with their users.

Manager: Okay. How **5** _____ _____ _____ for that, though?

Engineer: Clients typically pay regular fees. Some companies charge users metered fees, while others **6** _____ _____ - _____ - _____ - _____ . It just depends on your needs.

Speaking

8 **With a partner, act out the roles below based on Task 7. Then, switch roles.**

USE LANGUAGE SUCH AS:

I'm thinking of ...

What are your thoughts on ..?.

Some prefer ...

Student A: You are a manager. Talk to Student B about:

- elements of cloud computing

- how the services work

- his or her recommendation

Student B: You are an engineer. Talk to Student A about elements of cloud computing.

Writing

9 **Use the journal article and conversation from Task 8 to write a review of SaaS and PaaS. Include: user options for accessing information, how users can pay for services, and what computer requirements users need to access the cloud.**

Glossary

accounting [N-UNCOUNT-U8] **Accounting** is the process of recording and managing financial transactions.

add [V-T-U11] To **add** a number to another number is to increase it by that amount.

anti-virus software [N-UNCOUNT-U6] **Anti-virus software** is a type of security software that removes malware, or prevents its installation.

application software [N-UNCOUNT-U8] **Application software** is any software that is used to perform a single task, or perform multiple tasks that are related to each other.

artifact [N-COUNT-U1] An **artifact** is a feature of software that determines its type or function.

bachelor's degree [N-COUNT-U15] A **bachelor's degree** is a certificate indicating that someone has completed an educational program, usually after four years of study, and is qualified to practice a particular profession.

bioinformatics [N-UNCOUNT-U9] **Bioinformatics** is the application of computer software to the field of biology.

BIOS [N-COUNT-U5] A **BIOS** (Basic Input Output System) is a set of instructions in firmware that controls a device's input and output operations.

body language [N-UNCOUNT-U14] **Body language** is communication that is expressed with positions of the body instead of words, including hand gestures and facial expressions.

calculus [N-UNCOUNT-U15] **Calculus** is a complex branch of mathematics that deals with rates of change and advanced measurements of physical properties.

case [N-COUNT-U4] A **case** is a protective enclosure that contains the parts of something.

CD/DVD drive [N-COUNT-U4] A **CD/DVD drive** is a device that reads and writes data on compact discs and digital versatile discs.

circuit analysis [N-UNCOUNT-U15] **Circuit analysis** is the study of how electrical components conduct currents.

compiler [N-COUNT-U7] A **compiler** is a program that decodes instructions written in a higher order language.

computer [N-COUNT-U2] A **computer** is an electronic instrument for storing data and performing various electronic tasks and functions.

computer architecture [N-UNCOUNT-U15] **Computer architecture** is the physical configuration of computers from hardware components.

computer engineering [N-UNCOUNT-U15] **Computer engineering** is a branch of engineering that includes computer science and electrical engineering, and usually involves designing both hardware and software components for computers.

computing cluster [N-COUNT-U2] A **computing cluster** is an extremely powerful computer designed to process large quantities of data.

control [V-T-U5] To **control** something is to have power over its actions or functions.

control system [N-COUNT-U15] A **control system** is a device or set of devices that regulates the actions of other devices.

convert [V-T-U12] To **convert** something is to change it into a different form or system of measurement.

cost analysis [N-COUNT-U9] A **cost analysis** is a report that explains expenses.

cover [N-COUNT-U4] A **cover** is something that is placed over something else for protection.

cursor [N-COUNT-U10] A **cursor** is a movable icon on a computer screen that indicates the point where user input will appear.

data management [N-UNCOUNT-U9] **Data management** is the ability to track and evaluate information.

debugger [N-COUNT-U7] A **debugger** is a computer program that detects and corrects errors in other computer programs.

decimal number [N-COUNT-U12] A **decimal number** is a value in a numbering system based on the number 10, with numbers on both sides of the decimal point.

decline [N-COUNT-U13] A **decline** is the process of becoming worse or smaller in amount.

decrease [V-I-U13] To **decrease** is to become smaller.

denominator [N-COUNT-U12] A **denominator** is the number that is below the line in a fraction. In the fraction 1/2, the denominator is 2.

SOFTWARE ENGINEERING

Career Paths: Software Engineering is a new educational resource for software engineering professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. *Career Paths: Software Engineering* addresses topics including software development, software testing, the user interface, modeling, and career options.

The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's Book** contains a full answer key and audio scripts.
The **Teacher's Guide** contains detailed lesson plans, a full answer key and audio scripts.

The **audio CDs** contain all recorded material.