

(교양 035-001) 컴퓨터의 개념 및 실습

- 강사: 김형주교수, 02-880-1826, 010-5213-1992, hjk@snu.ac.kr, (연구실: 301동 406호)
- 강의실: 301-203, 강의시간: 화목 10:30 – 12:10
- Office Hours: 월 (오후 3시30분 -- 5시: Email appointment is needed)
- 조교(TA): Internet Database Lab (880-1830) 석박사통합과정생
이용현 leeyh@idb.snu.ac.kr (Computing Principles(ch 1, 2, 3, 7, 8, 9, 10) and Python)
이인용 iylee@idb.snu.ac.kr (HTML & JavaScript (ch 4, 5, 6, 17, 18, 19, 20))
임유빈 yblim@idb.snu.ac.kr (Data & Information (ch 11, 12, 13*, 14*, 15*, 16*) and Python)
- 예정 강의 schedule
(ch 1,2,3,4,5,6) → (ch 17,18,19,20) → Python & (ch 7,8,9,10,11,12) → ch(13,14,15,16) * 유동적
- Class Materials: Internet Database Lab Website: <http://idb.snu.ac.kr>
- 가능하면 Notebook PC를 가져오는 것이 좋음
- 평가: (예정) 3 quizzes (30분), 3 exams (1시간), 6 assignments
- Grading based on groups: {CSE, Non-CSE} X {1st Trial, Multi Trial}
- 카카오톡 방을 만들어서 운영할 예정!

FLUENCY⁶

with information technology
SKILLS, CONCEPTS, & CAPABILITIES



LAWRENCE SNYDER

Python 3

PYTHON

PROGRAMMING:

AN INTRODUCTION TO COMPUTER SCIENCE

SECOND EDITION

JOHN ZELLE



FRANKLIN, BEEDLE & ASSOCIATES INC.
[INDEPENDENT PUBLISHERS SINCE 1985]

Table of Contents (Fluency 6)

- Part 1: Becoming Skilled at Computing
- Part 2: Algorithms and Digitizing Information
- Part 3: Data and Information
- Part 4: Problem Solving

Table of Contents [1/4]

- Part 1: Becoming Skilled at Computing
 - Chapter 1: Defining Information Technology
 - Chapter 2: Exploring the Human-Computer Interface
 - Chapter 3: The Basics of Networking
 - Chapter 4: A Hypertext Markup Language Primer
 - Chapter 5: Locating Information on the WWW
 - Chapter 6: An Introduction to Debugging
- Part 2: Algorithms and Digitizing Information
- Part 3: Data and Information
- Part 4: Problem Solving

Table of Contents [2/4]

- Part 1: Becoming Skilled at Computing
- Part 2: Algorithms and Digitizing Information
 - Chapter 7: Representing Information Digitally
 - Chapter 8: Representing Multimedia Digitally
 - Chapter 9: Principles of Computer Operations
 - Chapter 10: Algorithmic Thinking
- Part 3: Data and Information
- Part 4: Problem Solving

Table of Contents [3/4]

- Part 1: Becoming Skilled at Computing
- Part 2: Algorithms and Digitizing Information
- Part 3: Data and Information
 - Chapter 11: Social Implications of IT
 - Chapter 12: Privacy and Digital Security
 - Chapter 13: The Basics of Spreadsheets (optional)
 - Chapter 14: Advanced Spreadsheets for Planning (optional)
 - Chapter 15: Introduction to Database Concepts (optional)
 - Chapter 16: A Case Study in Database Organization (optional)
- Part 4: Problem Solving

Table of Contents [4/4]

- Part 1: Becoming Skilled at Computing
- Part 2: Algorithms and Digitizing Information
- Part 3: Data and Information
- Part 4: Problem Solving
 - Chapter 17: Fundamental Concepts Expressed in JavaScript
 - Chapter 18: A JavaScript Program
 - Chapter 19: Programming Functions
 - Chapter 20: Iteration Principles
 - Chapter 21: A Case Study in Algorithmic Problem Solving (X)
 - Chapter 22: Limits to Computation (X)
 - Chapter 23: A Fluency Summary (X)

FLUENCY TIP

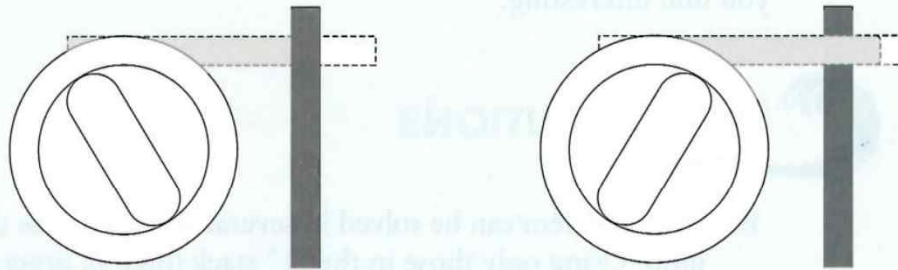
Pulling Rank. An easy way to remember the directions of “higher” and “lower” in a hierarchy is to think of the military hierarchy: general, colonel, major, captain, lieutenant, sergeant, corporal, and private. Moving up or down in the hierarchy corresponds to moving up or down the chain of command, or to higher or lower rank.

FLUENCY BIT

No Confusion. The World Wide Web and the Internet are different. The Internet is all of the wires and routers connecting named computers, that is, the hardware. The World Wide Web is a subset of those computers (Web servers), their files, and their services.

FLUENCY BYTE

Tuning In to Everyday Explanations. Explaining to ourselves how things work makes using them easier. This is true even if the explanation isn't really correct—just as long as the explanation matches the operation, it will work. For example, if we have a deadbolt lock on our door, we may check it often to see if it's locked. But, if we think about its operation, we can tell at a distance and save time. How does a deadbolt work? If we don't know we formulate an explanation that matches the facts.



Because the knob is turned to the 11:00 position when the lock is open, we imagine that the bolt, which is inside the door and not visible, is attached to the top of the knob. Turning it right to 1:00 moves the bolt into the locked position. This simple explanation, which is probably not very accurate and possibly wrong, lets us see from a distance whether the door is locked: Knob at 11:00 means not locked, knob at 1:00 means locked. Our imagined explanation reminds us which is which. (Of course, there are many other kinds of deadbolts, and even this kind can be installed differently.)

FLUENCY BACK STORY

Hypertext. To describe how a Web page should look, most pages use **Hypertext Markup Language (HTML)**. Markup languages, traditionally used in publishing and graphic design, describe the layout of a document, including margin width, font, text style, image placement, and such. Hypertext began as an experiment to break away from the straight sequence of normal text: first paragraph, second paragraph, third paragraph, and so on. As you know, with hypertext it's possible to jump from one point in the text to somewhere else in the text or to some other document and then return. This familiar feature, which breaks a document's linear sequence, gives it a more complex structure. The (usually blue) highlighted words—the **hyperlinks**—provide the point from which we can (optionally) jump and return. The term *hypertext* was coined in the late 1960s by Theodore Nelson, although in his book *Literary Machines* he credits the original idea to computer pioneer Vannevar Bush. Combining the two ideas—markup languages and hypertext—was the contribution of Tim Berners-Lee. It lets us build nonlinear documents, which are ideal for the dynamic and highly interconnected Internet. The World Wide Web was born! The first Web page is here: <http://info.cern.ch/hypertext/WWW/TheProject.html>.

FLUENCY ALERT

Unexpectedly Flaky. Occasionally a familiar application will do something strange, such as slowing down, “forgetting” changes, misaligning the cursor, or failing in other ways. Such behaviors are unexpected and often immediately precede a crash. When you notice your software “acting strange,” act immediately: *Save to a new file name*, exit, and restart. The problem is usually just with the software, but it could be with the instance; a new file name avoids overwriting your previously saved version.

INTERVIEW



with

Vinton G. Cerf

Vinton G. Cerf is vice president and chief Internet evangelist at Google. Widely known as one of the “Fathers of the Internet,” Cerf is the co-designer of the TCP/IP protocols and the architecture of the Internet. With his colleague Robert Kahn, Cerf received the U.S. National Medal of Technology in 1997 for co-founding and developing the Internet. In 1994 and 1998 respectively, Kahn and Cerf were honored as Marconi Fellows. They received the ACM Alan M. Turing award in 2004 for their work on the Internet protocols. In November 2005 they received the Presidential Medal of Freedom. In 2008 they received the Japan Prize.

Vint Cerf served as chairman of the board of the Internet Corporation for Assigned



3.3 Asking for Help. The Web server for the Astronomy Picture of the Day (APOD) has the domain name `apod.nasa.gov` and the IP address `204.202.20.2`. In principle, what authoritative name servers will your computer's DNS server ask to find this IP address for you?

TRY IT SOLUTIONS

- 3.3** It begins by asking one of the 13 root name servers for `gov-ANS`; getting that, it asks for `nasa-ANS`, and getting that, it asks for the IP address of `apod`—so it asks three.



REVIEW QUESTIONS

Multiple Choice

1. Saving information for possible reuse is called
 - a. caching
 - b. hopping
 - c. DNS lookup
 - d. serving

Short Answer

1. All IP addresses of authoritative name servers for TLDs are maintained and managed by 13 _____ servers.
2. A communication that goes out to many people within a specific target audience is called a(n) _____.

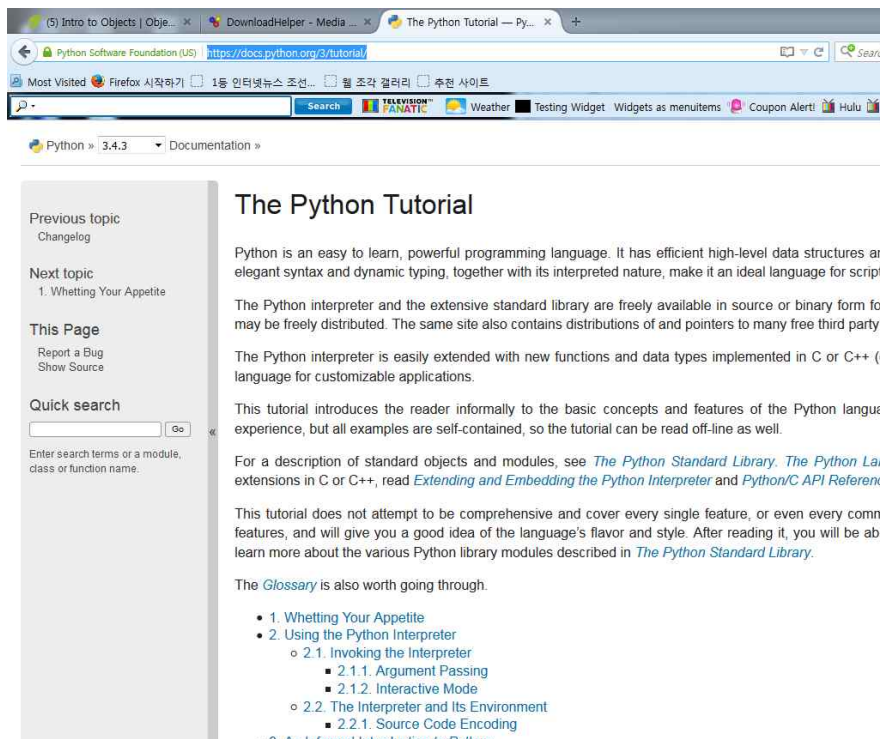
Exercises

1. Explain how “Imagine the benefits if every person on the planet spoke a common language!” relates to the Internet.
2. Label the following with an *S* to indicate synchronous communication or an *A* to indicate asynchronous communication.
 - a. _____ movie
 - b. _____ chat session

Python Programming

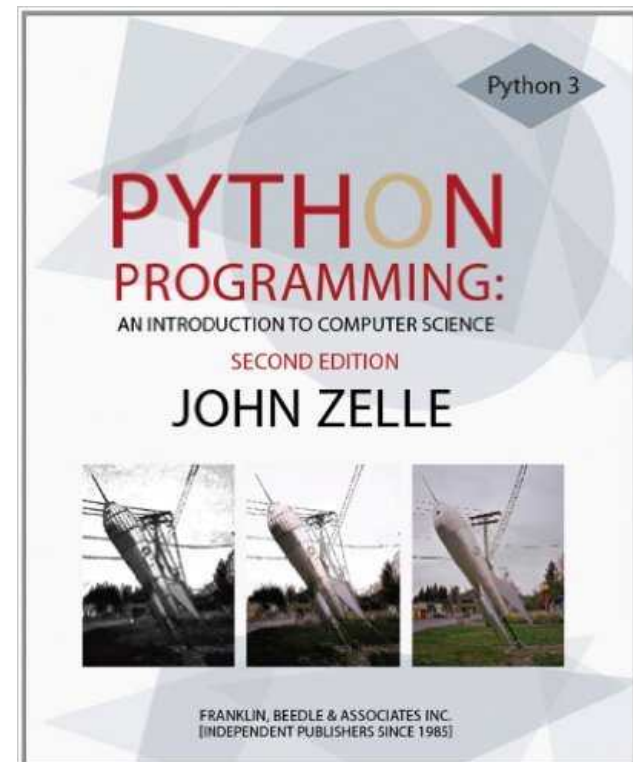
** Lecture notes for python programming will be provided in <http://idb.snu.ac.kr>

<https://docs.python.org/3/tutorial/>



The screenshot shows a web browser displaying the Python 3.4.3 documentation page. The page title is "The Python Tutorial". The left sidebar contains navigation links: "Previous topic: Changelog", "Next topic: 1. Whetting Your Appetite", "This Page: Report a Bug, Show Source", and a "Quick search" box. The main content area starts with the heading "The Python Tutorial" followed by a paragraph: "Python is an easy to learn, powerful programming language. It has efficient high-level data structures an elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripti". Below this, it states: "The Python interpreter and the extensive standard library are freely available in source or binary form for may be freely distributed. The same site also contains distributions of and pointers to many free third party l". Another paragraph follows: "The Python interpreter is easily extended with new functions and data types implemented in C or C++ (o language for customizable applications. This tutorial introduces the reader informally to the basic concepts and features of the Python languag experience, but all examples are self-contained, so the tutorial can be read off-line as well. For a description of standard objects and modules, see [The Python Standard Library](#). [The Python Lan](#) extensions in C or C++, read [Extending and Embedding the Python Interpreter](#) and [Python/C API Referenc](#). This tutorial does not attempt to be comprehensive and cover every single feature, or even every comm features, and will give you a good idea of the language's flavor and style. After reading it, you will be able learn more about the various Python library modules described in [The Python Standard Library](#). The [Glossary](#) is also worth going through.

- 1. Whetting Your Appetite
- 2. Using the Python Interpreter
 - 2.1. Invoking the Interpreter
 - 2.1.1. Argument Passing
 - 2.1.2. Interactive Mode
 - 2.2. The Interpreter and Its Environment
 - 2.2.1. Source Code Encoding
- 3. An Informal Introduction to Python



Any Questions So far?

Then we move to

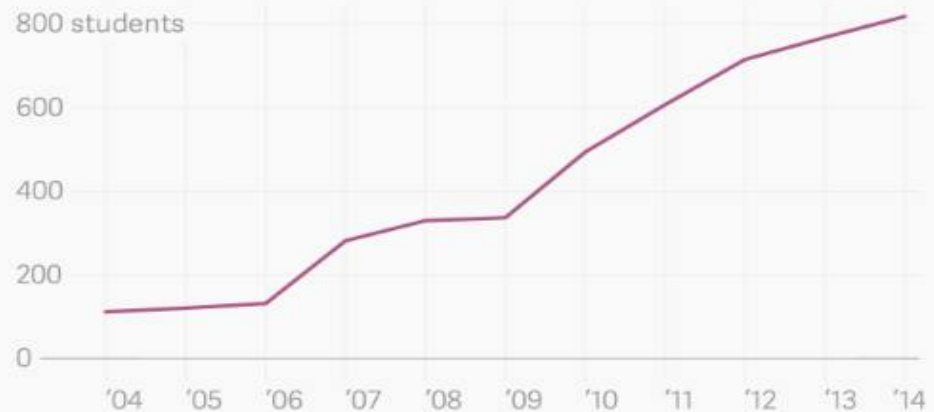
Intro to computer science is now the most popular course at Harvard



Harvard students know which way the wind is blowing. According to a report [from the Harvard Crimson](#), the school's introductory computer science class (CS50) has a record 818 undergraduates this fall. Twelve percent of undergraduates are taking the course, making it the most popular Harvard course in at least a decade.

Here's the increase in course enrollment since 2004, the year Mark Zuckerberg created Facebook in his Harvard dorm room:

Enrollment in Harvard's introduction to computer science



Quartz | qz.com

Data: Harvard

Despite its reputation as one of the school's hardest courses, CS50 has surpassed the perennial favorite, Principals of Economics (Ec10A). There appears to be some cannibalization: CS50 enrollment jumped to 818, from 768 last year. Ec10A enrollment dropped to 711, from 772.

It's a rational response to [rapidly rising salaries](#) for computer science graduates, reports of skill shortages, and the growing roster of tech billionaires.

Univ of Washington, Seattle

CS Department 홍보동영상 (10년전)

1. Interviews with CS graduate students

- CS as the power to change the world?
- When did you choose CS as a major?
- What is CS?
- Do you need a CS background?
- How's the job market?

2. Interviews with 3 CS Graduates

- Google engineer in Silicon Valley
- Amazon engineer in Silicon Valley
- Program manager of MS Office SW in Seattle

2015학년도 공과대학 교양 이수규정

□ 공과대학 (컴퓨터공학부)

교양		44 학점 이상		
영역	필수과목	학점	비고	
학문의 기초	사고와 표현	[1-2] 글쓰기의 기초 또는 과학과 기술 글쓰기 중 1과목	3	
	외국어	[1-1][3-1] 외국어 2개 교과목	4-6	• 입학 시 TEPS 900점 이하인 학생은 영어 1과목 필수 이수
	수량적 분석과 추론	[1-1] 수학 및 연습 1 또는 고급수학 및 연습 1 [1-2] 수학 및 연습 2 또는 고급 수학 및 연습 2 [1-2] 공학수학 1 [2-1] 공학수학 2 [2-2] 통계학, 통계학실험	16	• 통계학을 수강하는 학생은 반드시 해당 학기에 실험을 동시에 수강하여야 함
	과학적 사고와 실험	[1학년 1-2] 선택적 필수 과목(12) - 물리학1-2(또는 고급물리학1-2), 화학1-2, 생물학1-2, 물리학, 화학, 생물학, 물리학실험1-2, 화학실험1-2, 생물학실험1-2, 물리학실험, 화학실험, 생물학실험 중에서 [1-1]에 8학점, [1-2]에 4학점	12	• 생명과학부에서 개설하는 '생물학(또는 생물학1)' 과목에는 컴퓨터공학부 학생들만을 위한 강좌가 별도로 개설되며, 이를 이수할 것을 권장함 • 과학적 사고와 실험 영역에서 선택한 교과목을 수강하는 학생은 반드시 해당학기에 실험을 동시에 수강하여야 함 • 고교과정에서 물리 1,2를 모두 이수하지 않은 학생은 '물리학 1,2' 대신 '물리의 기본 1,2'를 이수해도 됨. 단, 물리학실험 1,2 해당 실험과목을 동시에 수강하여야 함.
	컴퓨터와 정보 활용	[1-1] 컴퓨터의 개념 및 실습	3	
학문의 세계	언어와 문학		6	+ (3)
	문화와 예술			
	역사와 철학			
	정치와 경제		6	+ (3)
	인간과 사회			
	자연과 기술			
	생명과 환경			
전체 교양 교과목				• 전체 교양 교과목 중 학생이 자유롭게 선택

컴퓨터공학부 제2전공(복수전공, 부전공) 졸업 규정

♣ 컴퓨터공학 복수전공 총 이수학점

- 07학번까지 : 컴퓨터공학부 전공 51학점 이상 (공대 공학개론 포함)
- 08학번이상 : 컴퓨터공학부 전공 39학점 이상 (공대 공학개론 제외)

< 08학번~14학번 해당 >

※ 복수전공 이수 요건

아래의 전필 교과목 및 전선 내규 필수 교과목을 포함하여 컴퓨터공학부 전공 총 39학점 이상 이수 및 졸업논문을 작성하여야 함.

|

1. 복수전공 전필 교과목 (총 33학점)

- 이산수학 (3학점)
- 컴퓨터프로그래밍 (3학점)
- 논리설계 (3학점)
- 논리설계실험-> 2015년 1학기 폐지('하드웨어시스템설계'로 대체 이수) (3학점)
- 전기전자회로 (3학점)
- 자료구조 (3학점)
- 프로그래밍의 원리 (3학점)
- 컴퓨터구조 (3학점)
- 운영체제 (3학점)
- 프로그래밍언어 (3학점)
- 알고리즘 (3학점)

2. 복수전공 내규 필수 교과목 (총 5학점)

- 컴퓨터공학세미나 (1학점)
- IT-리더십세미나 (1학점)
- 프로젝트1 (3학점) 또는 프로젝트2 (3학점) 중 1과목 이수-> '창의적통합설계1,2'로 명칭 변경

컴퓨터공학부 제2전공(복수전공, 부전공) 졸업 규정

< 15학번부터 해당 >

※ 복수전공 이수 요건

아래의 전필 교과목 및 전선 내규 필수 교과목을 포함하여 컴퓨터공학부 전공 총 39학점 이상 이수 및 졸업논문을 작성하여야 함.

1. 복수전공 전필 교과목 (총 34학점)

- 이산수학 (3학점)
- 컴퓨터프로그래밍 (4학점)
- 논리설계 (4학점)
- 전기전자회로 (3학점)
- 컴퓨터구조 (3학점)
- 자료구조 (4학점)
- 소프트웨어 개발의 원리와 실제 (3학점)
- 시스템프로그래밍 (4학점)
- 하드웨어시스템설계 (3학점)
- 알고리즘 (3학점)

2. 복수전공 내규 필수 교과목 (총 4학점)

- 컴퓨터공학세미나 (1학점) 또는 IT-리더십세미나 (1학점) 중 1과목 이수
- 창의적통합설계1 (3학점) 또는 창의적통합설계2 (3학점) 중 1과목 이수

2007년도 컴퓨터공학부 홍보동영상