

# IT Market and IT Korea

- 이 자료는 교내 비전공자를 위한 **IT** 교육자료의 일부임
  - 의도적으로 수정 없이 가져 왔음
  - **IT Korea** 와 **IT USA** 를 대비해 보실 것

Reference <http://www.softwaretop100.com>

# Programming and Software (Topic 2)

## Part 4

### IT Market and IT Korea

Reference <http://www.softwaretop100.com>

# 학습요령

## □ Market: hardware, software, IT services

- 세 마켓 섹터의 정의를 이해하고, 각각에 대해 두 개의 대표 기업 파악함

## □ 한국 IT 산업의 특징 이해

- † 한국 IT 산업의 미래 전략에 대한 상상
- † Technology venture 이해
- † Global IT leader 이해
- † 여러분의 전공과 IT의 융합 가능성

# IT Hardware Market

Source: <http://www.softwaretop100.com>

# CPU Industry (반복)

- ❑ Processors for general-purpose computers
  - Intel (IA-32, IA-64)
  - IBM (PowerPC)
  - MIPS Technologies (MIPS)
  - Sun Microsystems (SPARC)
- ❑ What is special about this business?
  - In contrast with memory
- ❖ Mobile AP (application processor) for smartphones
  - Qualcomm, Samsung, Intel, (ARM)
- ❖ GPU (graphics processing unit): Nvidia, AMD

# Storage and Monitor Industry (반복)

## ❑ DRAM

- Samsung, Hynix, Elpida, Micron

## ❑ Hard disk

- Seagate, Toshiba, Western Digital
- Closed business: IBM, HP, Quantum, Fujitsu, Samsung

## ❑ Flash memory

- Samsung, Toshiba, Micron, Hynix

## ❑ Flat panel monitors

- Samsung, LG, Taiwanese and Japanese companies

## † Printers

- HP, Xerox, Cannon, Samsung, Epson

# Computer Industry (반복)

## ❑ PC

- Lenovo, HP, Dell, Acer Group

## ❑ Notebooks

- HP, Acer, Lenovo, Dell

## ❑ Servers

- IBM, HP, Dell, Oracle, Fujitsu
  - Many CPUs, hundreds of disks, thousands of terminals
  - † Hardware cost only

## ❑ Supercomputers

- HP, IBM, Europe, Japan
  - Millions of processors (hardware cost only)

# Hardware Revenue Top 100

## ❑ Hardware

- Computer and communications hardware
- Components, peripherals, monitors, printers, telephones, PDAs

## ❑ Not included

- TVs, Audio sets, MP3 players, cameras, navigation and GPS equipment, other consumer electronics

## ❑ Revenue of top 100 companies in 2009: \$1,067B

- 8% decline compared to 2009
  - Economic crisis



# Top 25 Hardware Companies - 2009

1. Samsung	77,865 (77조)	65%	Korea
2. HP	73,729	63%	
3. Foxconn	44,411	100%	Taiwan
4. LG Elec.	42,029	67%	Korea
5. Nokia	40,108	68%	Finland
6. Toshiba	40,057	57%	Japan
7. Dell	38,395	74%	
8. Intel	34,026	97%	
9. Apple	31,772	74%	
10. Cisco	29,510	81%	
11. Quanta C.	24,755	100%	Taiwan
12. Fujitsu	23,056	46%	Japan
13. Cannon	22,567	65%	Japan
14. Ricoh	19,484	89%	Japan
15. Asus	19,074	100%	Taiwan

# Top 25 Hardware Companies - 2009

16. Acer	17,944	100%	Taiwan
17. Compal E.	16,923	85%	Taiwan
18. IBM	16,190	17%	
19. Lenovo	16,132	100%	China
20. NEC	16,127	40%	Japan
21. Alcatel-L.	15,058	69%	France
22. Sony	14,924	19%	Japan
23. Hitachi	14,315	14%	Japan
24. Motorola	14,154	64%	
25. Wistron	13,748	84%	Taiwan

63. Hynix	6,382	100%	Korea
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# Hardware Manufacturing Companies (Top 100)

United States	40 companies
Japan	21
Taiwan	18
China	7
Korea	3
Other	11

- ❑ Stella performance by three Korean Companies
- ❑ Expectation:
  - Growth in smartphone business: Samsung and Apple
  - Rise of Chinese companies (e.g., Huawei)

# IT Software Market

Source: <http://www.softwaretop100.com>

# Software Products

- ❑ Infra software
  - Operating system, security
- ❑ Business software
  - Database, enterprise software (ERP)
- ❑ All vertical markets (IT 융합)
  - 금융, 디자인, 경영, 건강, 법률, 교육, 출판, ...
  - 자동차, 조선, 건설, 통신, ...
- ❑ Personal
  - Office, CAD tools, game

# Software Revenue Top 100

## ❑ Software Revenue

- Prepackaged software (Office, Windows)
- Subscription (연 사용료)
- Support or maintenance (문제 해결, 업그레이드)

## ❑ Not included (see IT services)

- Consultancy, training, custom SW development
- System integration

## ❑ Revenue of top 100 companies in 2010: \$235B

- 7% increase compared to 2009
- Top 10 companies account for 60%
  - Two Korean companies account for 0.5%

# Top 25 SW Companies - 2010

1. Microsoft	54,270 (54조)	80.5%	Infra SW (OS)
2. IBM	22,485	22.5%	Infra SW (OS)
3. Oracle	20,958	69.4%	Database
4. SAP	12,558	75.4% (Germany)	Enterprise SW
5. Ericsson	7,274	24.0% (Sweden)	Telecom
6. HP	6,669	5.3%	Infra SW (OS)
7. Symantec	5,636	93.7%	Security
8. Nintendo	5,456	39.6% (Japan)	Game
9. Activion B.	4,447	100.0% (French)	Game
10. EMC	4,356	25.6%	Storage
11. Nokia Siemens	4,229	25.0% (Finland)	Telecom
12. CA	4,136	92.9%	Infra SW
13. Elec. Arts	3,413	100.0%	Game
14. Adobe	3,177	83.0%	Publishing
15. Alcatel-Lucent	2,561	12.0% (French)	Telecom

# Top 25 SW Companies - 2010

16.	Cisco	2,383	5.8%	Networking
17.	SONY	2,083	2.5% (Japan)	Game
18.	Hitachi	1,939	1.7% (Japan)	Infra SW
19.	Dassault	1,885	90.2% (French)	Enterprise SW
20.	BMC	1,843	93.0%	Infra SW
21.	SunGard	1,762	35.3%	Enterprise SW
22.	Autodesk	1,701	88.0%	Technical design
23.	Konami	1,643	52.6% (Japan)	Game
24.	Salesforce.	1,523	93.6%	Enterprise SW
25.	Sage	1,485	66.7% (England)	Enterprise SW
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66.	Nexen Corp.	608	100.0% (Korea)	Game
68.	NCSoft	579	100.0% (Korea)	Game



# Software Producing Companies (Top 100)

United States	63 companies	
Japan	10	
France	6	
United Kingdom	4	
Germany	3	
China	2	
Canada	2	
Netherlands	2	
Korea	2	// on-line game
Other	6	

# Market Size per Business Category

(회사별 묶음; 제한점 - 한 회사가 여러 상품)

❑ Only an approximation for big picture

Business	Revenue	Revenue %	# Companies
Infra Software (MS, IBM, HP, ..)	85,988 (85조원)	36.6%	5
Enterprise SW	58,911	25.1%	24
Game	25,970	11.3%	16
Telecom/Network	18,104	7.9%	6
Security	9,671	4.2%	6
Technical design	6,933	3.0%	8
Storage	5,991	2.6%	3
Healthcare	3,163	1.4%	5
Ind. vertical markets		7.9%	27

# IT Services Market

Source: <http://www.softwaretop100.com>

# IT Services

- ❑ Internal IT division in big corporation (H대 전산실)
  - Large, medium, small mainframes and PCs
    - Diverse HW and SW, networking, interoperability
  - Expensive, distraction from business activities
- ❑ EDS model in 1980s (similar to “cloud computing” today)
  - Build data processing departments
  - Manage the requirements specification
  - Subcontract for software creation
  - Staff the day to day data center operation
- ❑ Most IT service companies take minor role

# Cloud Computing (Wikipedia)

Computing resources delivered as  
service over network (Internet)

Image of cloud computing in Wikipedia:

[http://en.wikipedia.org/wiki/File:Cloud\\_computing.svg](http://en.wikipedia.org/wiki/File:Cloud_computing.svg)

# IT Services Revenue Top 100

## ❑ IT Services

- System integration, IT consultancy
- Hosting, IT outsourcing, training
- Custom SW development, offshore development
- Network integrators, telecom suppliers

## ❑ Not included

- SW sales, HW sales, communication services

## ❑ Revenue of top 100 companies in 2009: \$453B

- 1.7% increase compared to 2009
- Top 10 companies account for 63.5%
  - 93 companies with revenue more than \$1B

# Top 25 IT Services Companies - 2009

1. IBM	37,247 (34조)	39%	
2. HP	34,678	30%	
3. Fujitsu	26,935	53%	Japan
4. CSC	16,281	100%	
5. Accenture	15,555	71%	
6. Capgemini	11,255	93%	France
7. Hitachi	11,050	11%	Japan
8. Ericsson	11,031	38%	Sweden
9. NTT Data C.	10,425	84%	Japan
10. NEC	9,555	24%	Japan
11. BT Global S.	9,237	27%	UK
12. T-Systems	8,744	69%	
13. Lockheed M.	8,087	18%	
14. SAIC	7,547	70%	
15. Atos Origin	7,386	100%	France

# Top 25 IT Services Companies - 2009

16. Huawei	7,277	33%	China
17. Siemens	6,949	7%	Germany
18. ACS	6,700	100%	Spain
19. Microsoft	6,265	10%	
20. Digital China	6,218	100%	China
21. Tata Con. S.	6,126	97%	India
22. Nokia S. N.	6,038	33%	Finland
23. Logica	6,004	100%	UK
24. Dell	5,599	10%	
25. General D.	5,401	17%	

\* No Korean companies



# IT Services Companies (Top 100)

United States	53 companies
United Kingdom	7
Japan	6
France	5
India	5
China	5
Other	19

# IT Services Revenue Top 100

- ❑ Employee headcount 4.5M (2008 data)
  - 10% headquartered in India
- ❑ Large players offer full range: SW, HW, IT Services
  - IBM, HP, Ericsson, Fujitsu
- ❑ Trend toward even larger companies
  - HP: 3Com, Palm, EDS, IBM: Sterling Commerce, Unica
  - SAP: Sybase, Intel: McAfee, Xerox: ACS, Oracle: Sun
- ❑ Telco suppliers have significant service business
  - Network expertise, new generation of comm. networks
- ❑ US lead with 4 of top 5
  - Fastest growth in Asia: China, India

# To Think about

- ❑ 지금까지의 IT market (HW, SW, IT services) 데이터는  
개인, 기업/조직 및 정부의 전산장비 구입 비용
- ❑ IT convergence in all business sectors (정보혁명)  
(여기서 창출되는 부가가치와 관련 고용의 규모 상상한다면)
  - Tertiary (service) industry  
(New models or remodeling for electronic commerce)
    - Google, Facebook, Twitter, YouTube, ...
    - Amazon, eBay, news, education, ...
    - + B2B, B2C, C2C, B2G
  - Automation in primary and secondary industry
    - Business process, factory, agriculture

# Korean IT Business

## (How good are we?)

학습요령: 전체적인 흐름 이해

# Korean IT Business

New business models

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Software      IT Services

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Hardware

# Korean IT Business

## □ 강점

- Hardware: memory, display, smartphone
  - Manufacturing-oriented
  - Commodity (소모품): 독점성 없음
- † 초고속 유무선 인터넷
  - Do we have global contents?

## □ 비강점 (독점성 있는 분야)

- Hardware: CPU
- Software, IT services, new business models, contents
  - † Mostly domestic player in these areas

# Korean IT Business

## □ 전자산업

- Electronics vs. software/computer
  - Component vs. system/service
  - 제조업 vs. 서비스업

## □ 전자산업의 성공

- Good news and bad news

## □ IT 관련 한국의 정부, 기업, 교육

- 아직은 전자적 생각과 패러다임이 주도
- Can we change?

# Future of IT Korea

- ❑ Can we become major player in large-scale software/system/service/contents/paradigm business?
  - Software: Windows, database, ERP, Office
  - IT services, cloud computing: IBM, HP
  - Computer systems: HP, Dell
  - New business models: Google, Facebook, Twitter
- ❑ Potential barriers
  - Culture, politics, money, market, (technology, people)
- ❑ What are plausible targets?



# 성공사례

- ❑ Smartphones (embedded systems)
  - AP (CPU)
  - Smartphone software
- ❑ On-line games
  - Nexen
- ❑ Construction engineering software (structural analysis)
  - Midas IT
- ❑ Kakaotalk
- ❑ Bada and Tizen
  - Open source, mobile OS, Linux-based

# Future of IT Korea

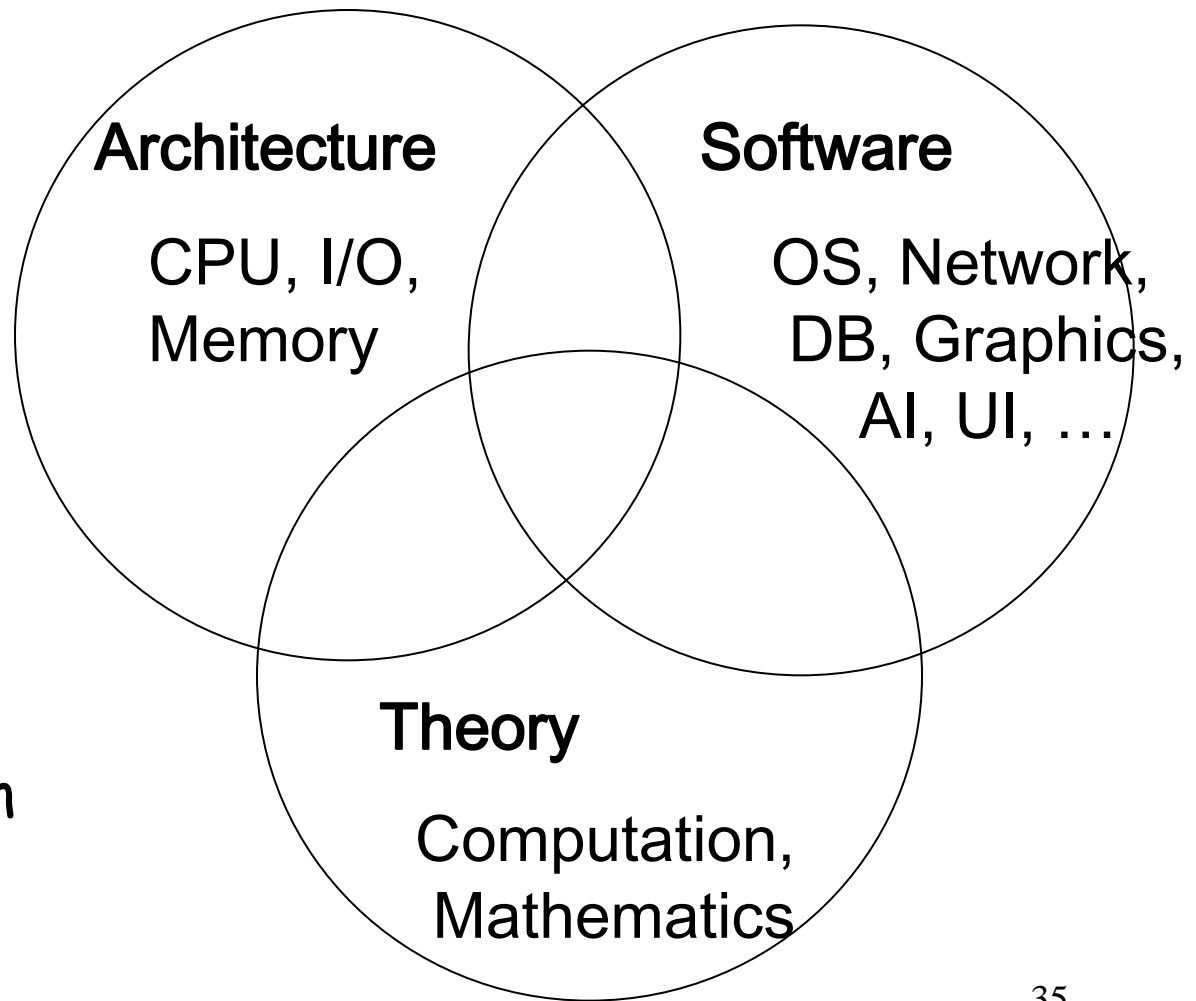
- ❑ 이미 확보한 **IT** 산업을 지킴
- ❑ 새로운 교두보를 확보함
  - **Software for all vertical markets** (강한 중소기업)
    - 금융, 디자인, 경영, 건강, 법률, 교육, 출판, ...
  - **Embedded systems**
    - 스마트폰, 스마트가전, 자동차 **IT**, 조선 **IT**, 건설 **IT**, ...
- ❑ 확보된 교두보를 기반으로 세계화 추진
- † 중장기적인 접근(즉, 꾸준한 개선을 통한 제2의 기적) 필요
  - 교육: 개인적인 역량 강화 (나만의 독특한 역량을 중시)
  - 문화: 과학기술 존중, 강한 중소기업
  - 제도와 시스템의 선진화

# IT Convergence and Core IT (반복)

## ❑ Core IT

## ❑ IT convergence

- Management
- Finance
- Law
- Automotive
- Education
- Transportation
- Silver, ...



# Software Success Story (2013-03) (참고자료)

- 17-year old English boy (Nick D'Aloisio)
  - 모바일 앱 섬리 (news summarization application Summly)
  - 2년전 아이폰용 앱 Trimit 출시한 후 벤처투자 받음
  - What problem did he solve?
    - 모바일 기기 대중화 되었으나
    - 기사와 웹페이지는 마우스 클릭에 맞게 제공
    - 태블릿 PC 와 스마트폰에 맞게 짧게 요약
  - Self study of software at age 9
    - First mobile application design at age 12
  - 매각추정대금 약 \$30M (야후 런던법인 근무 예정)
  - 대학에 진학하면 컴퓨터보다는 철학 등 인문학 공부 희망

# Programmers in USA (독점성, 자율, 창의)

- ❑ USA hold core software business
  - OS, compilers, database, applications
  - Software-based service industry
    - Google, Yahoo, Facebook, Twitter
- ❑ Experienced programmers
  - Company perspective: asset, cannot be replaced easily
    - Good salary, stability, many job opportunities
  - Programmers with diverse background
- ❑ Question among Silicon Valley parents
  - How can I teach programming to my 10-year old kid?

# Proposition - True or False?

- ❑ 누구나 프로그래머가 될 수 있다
  - 전공에 무관
  - 적성, 선택의 문제
- ❑ 보다 중요한 것은: 누구나 소프트웨어 아이디어를 낼 수 있다
  - 다양성 (다양한 전공 배경)이 중요
  - 프로그래밍 이해하면 활성화 됨
    - 고부가가치 창출 및 선진국 진입의 한 축
- ❑ 한국의 미래
  - 모든 지식인은 프로그래밍/소프트웨어를 이해해야 한다
  - 프로그래밍/소프트웨어 교육 필요성
    - 초중고, 대학 (비전공자 인력 양성)

# Strategic Software Project

## (What can we do?)

학습요령: 전체적인 흐름 이해

# 한국의 소프트웨어 경쟁력

## □ OECD 보고서 (2006-2007)

- **Leaders (A):** 미국, 일본, 독일, 영국, 프랑스
- **Challengers (B):** 싱가포르, 오스트리아, 캐나다, 이스라엘, 아일랜드, 핀란드, 인도, 후주, 스페인
- **Beginners (C):** 한국, 포르투갈, 터키, 이탈리아, 중국, 그리스, 벨기에, 뉴질랜드, 멕시코, 노르웨이, 헝가리, 체코, 슬로바키아



# Software Complexity

(참고자료; data from Wikipedia)

## ❑ Operating System (OS)

- 1 billion source lines of code (SLOC) in C++
- Debian 2.2 (55M): 14,005 man-years, 1.9 billion US\$

## ❑ How do we go about this?

Year	OS	SLOC (Million)
1993	Windows NT 3.1	4-5
1994	NT 3.5	7-8
1996	NT 4.0	11-12
2000	2000	> 29
2001	XP	45
2003	Server 2003	50

Year	OS	SLOC (Million)
2000	Debian 2.2	55-59
2002	3.0	104
2005	3.1	215
2007	4.0	283
2009	5.0	324
2005	Mac OS X 10.4	86

# Strategic Project

- ❑ What if we start a Debian project?
    - Commercial perspective
    - Software infrastructure perspective
      - Real architects, managers, programmers
  - ❑ Given its size, Debian is not a good choice
    - Which project do we start?
    - How to build a system to continually push such project?
- † 각 분야에서 인간의 지식과 기술은 소프트웨어 형태로 집약됨
- 소프트웨어 기술이 국가 경쟁력의 중요한 축

# Technology Venture and Silicon Valley

학습요령: 전체적인 흐름 이해

# Early IT Era

- ❑ Big companies in early IT era in USA
  - IBM (computers)
  - AT&T (communications)
- ❑ Antitrust laws (or competition laws)
  - Pricing
  - Innovation (protect ventures)

# Good Old Days

- ❑ Industry R&D (Research and Development)
  - Short-term: product development
  - Long-term
    - What if current products become less profitable?
- ❑ Insurance in good old days
  - IBM
    - T. J. Watson Research Center
  - AT&T
    - Bell Labs.

# Insurance in 21C

- ❑ CEOs: pressure for higher stock price
  - Much smaller long-term R&D budget
  - Buy promising ventures instead

# Technology Venture

- ❑ Virtuous cycles in Silicon valley - became culture
  - Innovative ideas (industry veteran or any new comer)
  - Start ventures
    - Incubation by venture capitals
  - Big companies buy ventures
- ❑ History of 50 years of success
  - Brain, money, win-win strategy

# Silicon Valley Culture

## ❑ Venture CEO

- Not rely on your own money
  - Get salary from external funding
- Not bankrupt even if you fails
  - You don't go to jail even if you fails

## ❑ What can be more important than immediate success

- Credibility and dedication



# Potential IT Industry Leader

학습요령: 전체적인 흐름 이해

# Google Glass (from Wikipedia)

- ❑ Wearable computer
  - Head-mounted display, camera, GPS
  - Android OS, augmented reality (AR)
  - Voice commands

- ❑ Google server
  - Information service

## † Note

- PC->phone->wearable
- Software intensive

Image of Google glass:

[http://en.wikipedia.org/wiki/File:Google\\_Glass\\_detail.jpg](http://en.wikipedia.org/wiki/File:Google_Glass_detail.jpg)

# Google Glass Voice Commands

Google Glass voice commands:

<http://androidweeds.com/google-glass-voice-commands/>

# Google

- ❑ Google search
- ❑ Google Play
  - Former Android market and Google Music
  - Applications and contents (c.f., Google TV)
- ❑ Google Earth (acquisition in 2004)
  - Virtual globe, map, geographical information program
- ❑ Google Now
  - Intelligent personal assistant, answer questions
- ❑ Google driverless car
- ❑ Google Drive (c.f., Google Docs)
  - Storage, documents/spreadsheets/presentation
- ❑ Google+, Google street view, Google YouTube, Gmail

# Possible Contenders

## ❑ Amazon

- Retailer
- E-commerce company
- Devices: tablet, phone
- Sell contents

## ❑ Apple TV vs. Google TV

† 여러분 누구도 혁신적 아이디어 내고 강한 경쟁자 될 수 있음

- 기술적 배경을 지닌 리더
  - 과학기술에 관심 (나의 전공과 융합)