Introduction to Business Information Systems

Course Intro.

Software

Hardware / Moore’s Law

My info.

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Office hours for Winter term:
Mon. 2-4pm, Tue/Thur. 9-10am
Also, Tue. @ 4pm, until nobody is left or 5pm

‘Shift happens’

‘Did you know?’ video... a modern classic

Focus: technology and education

Original version has been updated

Let’s take a look (4min video)

‘May you live in interesting times.”

Chinese proverb

Shift happens to business leaders

This “telephone” has too many shortcomings to be seriously considered as a means of communication. The device is inherently no value to us.

Western Union internal memo, 1876

I think there is a world market for maybe five computers.

Thomas Watson, chairman of IBM, 1943

There is no reason anyone would want a computer in their home.

Ken Olson, president, chairman, and founder of Digital Equipment Corp., 1977

Dell has a great business model, but that dog won’t scale.

John Shoemaker, head of Sun’s server division, 2000

Why we are here

Information systems and information technologies are integral to your lives

Information systems are used by all functional areas in an organization

Information systems offer career opportunities
Companies are shifting

Tech Is Everywhere

“Think you can afford to wait on tech study then quickly get up to speed? Whom do you expect to have an easier time adapting and leveraging a technology like social media—today’s college students who are immersed in technology or their parents who are now dipping their toes into the waters of Facebook? Those who put off an understanding of technology risk being left in the dust.”

- John Gallaugher

If you think you don’t want to work with technology... you will. Avoid the Lloyd Dobler syndrome.

A note on “tech jobs”

- Not all MIS / IT workers are programmers! E.g., in consulting firms, careers range from hard-core programmers who “build stuff” to analysts who do no programming but work on identifying problems and developing a solutions blueprint
- Recent surveys have shown there to be more IT openings than in any field except health care.
- Money magazine recently ranked tech jobs as two of the top five “Best Jobs in America.”
- Business Week recently ranked consulting (which heavily hires tech grads) and technology as the second and third highest paying industries for recent college graduates.

% of jobs that are computer intensive (trend over time)

Tech Is Everywhere

- By studying the intersection of business and technology today, you develop a base to build upon and critical thinking skills that will help you evaluate new, emerging technologies.
- Consider that Fortune’s ranking of the “Best Companies to Work For” is full of technology firms and has been topped by a tech business for five years straight.
This course...

M I S

Textbook’s focus

Additional class notes, discussion, and HW

Textbook


To see the text, visit www.flatworldknowledge.com and click the ‘Find My Class’ button and then enter Pangburn.

There are different purchase options for accessing the book content:

- Read online, $19.95
- Read online + get eBook formats, $35
- Order printed copy, $50

Additional readings will be provided in class as an online.

Schedule overview

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>HW due</th>
<th>Textbook chap. reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Software and Moore’s Law / hardware. Digital information storage &amp; bandwidth</td>
<td></td>
<td>2, 3</td>
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<tr>
<td>2</td>
<td>Leveraging information strategically / Zara case study.</td>
<td>HW #1 due Thurs.</td>
<td>4 and 5</td>
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<tr>
<td>3</td>
<td>Sharing information via websites</td>
<td>HW #2 due Thurs.</td>
<td>6</td>
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<tr>
<td>4</td>
<td>CSS, urls, and the DNS</td>
<td>HW #3 (Tue.). Midterm Thurs.</td>
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Six HW assignments

- HW is to be submitted individually
- Each HW is worth a maximum of 10 points, with partial credit for errors as follows
  - 9pts if only small error
  - 7pts if multiple small errors or a significant error
  - 5pts if multiple significant errors
- Late HW incurs an extra 3pt deduction.
- HW submitted incorrectly (e.g., missing name, wrong file name, wrong file location, wrong format, wrong media) incurs a 2pt deduction.
- Requests for HW regarding must be accompanied by a written note and must be submitted within 2 weeks of when the HW was graded.

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<td>6</td>
<td>Modeling info. and decisions (via Data Tables and simulations in Excel)</td>
<td></td>
<td>9</td>
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<tr>
<td>7</td>
<td>Databases (design and queries)</td>
<td>HW #4 due Tues.</td>
<td>10</td>
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<tr>
<td>8</td>
<td>Searching for information (online), Visualizing data</td>
<td>HW #5 due Tues.</td>
<td>15</td>
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<td>9</td>
<td>Online advertising, online surveys, intro. to VBA</td>
<td>HW #6 due Thurs., WP deadline</td>
<td>10</td>
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<td>10</td>
<td>Information security / privacy</td>
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Overall Grading Weights

- Midterm, 20%
- Final, 35%
- you can bring an 8½ x 11 double-sided notes sheet to the final
- 6 HW, 30%
- WP blog project, 10%
- Google mini-course, 5%
Agenda
- Course Intro.
- Software
- Hardware / Moore’s Law

OS, firmware, embedded systems
- Levels of software sophistication:
  - Complex (e.g., a personal computer) – the control software is referred to as the operating system
  - Simple (e.g., a digital watch) – the control software is referred to as the firmware
- Where stored (typically)?
  - Operating systems are big, complicated, and in need of frequent updating / bug-finding, and so are typically stored on a “secondary storage” device (e.g., a “hard drive”)
  - Firmware, like typical “embedded [software] systems” (e.g., Otis Elevator’s service alert software), are typically stored in ROM chips

OS market share

IT often designed around “layers”

Writing software
- Programming language vs. IDE
  - The language defines the syntax, keywords, and features available to the programmer
  - An IDE is an desktop application that a programmer uses to create software in some language
  - Some IDE’s support multiple languages
- Analogy
  - You want to write a letter, and can do so in multiple languages (English, Spanish, French)
  - You can use a word-processing “IDE”
    - Notepad, Wordpad, MS-Word
Alternative ways programming code is executed (run)

- **Machine (“compiled”) code**
  - The program runs as low-level instructions on the hardware CPU
  - Such program code is referred to as a “compiled program”
  - Very fast!

- **In a Java Virtual Machine**
  - The code is pre-processed to create “intermediate level” instructions, and these are run within a special application called Sun’s JVM (Java Virtual Machine) that is available for many different platforms
  - This code is referred to as a Java Applet
  - The code is run by Sun’s JVM and therefore is slow

- **Script code** that runs within an application
  - The raw code is run within some specialized application (and is therefore somewhat slow)
  - For example: SPSS and VBA code (we will use this next week)

Apps

- **Desktop apps**
  - Productivity enhancing
    - Examples: Word processor, spreadsheet... even an IDE
  - Networking/Internet
    - Examples: Email, browser, VPN, FTP
  - Games

- **Enterprise apps**
  - DBMS – Database Management System
  - ERP - Enterprise Resource Planning
  - SCM – Supply Chain Management

ERP systems

- **ERP = cross functional DB + visual interfaces + connecting logic**

ERP is sometimes a disaster

- **Examples from chapter:**
  - FoxMeyer
    - Successful pharmaceutical distributor (4th largest in U.S.), worth $5,000,000,000
    - Sold for < 1/50 (1.6%) of that one year after adopting ERP

- Less extreme losses due to ERP “glitches”
  - Hershey Foods – approx. $470 million
  - HP – approx. $160 million
  - Nike – over $100 million

- How does software cause such extreme losses?
- Who gets the blame?

Cost of software systems to businesses

- **Off-the-shelf applications**
  - As expensive as the price of software can be, firms spend 70-80% of IT budgets not on purchasing software, but rather on keeping it running
  - Google recognizes this

- **In-house development projects**
  - 1 in 3 fails to be deployed (!)
  - Estimates are that U.S. businesses lose $60 - $70 Billion each year due to such problems
8 common reasons for IT-project failures
- Unclear project goals / leadership
- Inaccurate estimates of resource needs
- “Feature creep” during development
- Poor reporting of project status
- Sloppy development / testing practices
- Poor project management
- Use of immature technology
- Stakeholder politics

Which of these should you, as a non-IT manager, expect to take the blame for when the (1 in 3) IT projects fail?

Agenda
- Course Intro.
- Software
- Hardware / Moore’s Law

Why Is Tech Everywhere?
- Gordon Moore: cofounder of Intel
- Moore wrote a short 4 page article in Electronics Magazine predicting that chip performance per dollar would double every two years.
  - More precisely, the paper stated transistors per chip, a proxy for power, would double every two years
  - Corollary: in 2 years, chips that are same speed as today’s should be half the price

Why Is Tech Everywhere?
- Moore’s exponential prediction has been found to apply more broadly
  - Optical fiber (9mo. doubling)
  - Hard drives (12mo. doubling)
  - Chips (24mo. doubling)

The figure at right shows growth at the 9 / 12 / 24 month doubling rates.

Related examples
- Hard disks (nonvolatile, secondary memory)
  - When Amazon.com was founded in 1995, the largest corporate database was one terabyte
  - Amazon’s subsequent “Search Inside the Book” feature used a 20TB database even at its launch (brought 7% sales jump for included titles)
  - In 2012 we have 1TB drives at $50 for PCs
  - Savvy managers use Moore’s Law to plan ahead
- Cell phones
  - It took roughly 20 years to sell the 1st billion mobile phones
  - the 2nd billion sold in four years
  - the 3rd billion took just two years
- Negroponte’s OLPC ($100 PC) initiative

Memory chips
- Memory capacity also increasing according to Moore’s Law, or faster
- Two basic categories of memory chips:
  - Random-access memory (RAM)
  - Read-only memory (ROM)
- Memory chips are “solid state” memory (no moving parts)
- In contrast with traditional “hard drives” which have moving parts
- Terminology regarding whether memory loses data when powered down:
  - volatile memory
  - nonvolatile memory
- “Flash” Memory (e.g., CompactFlash, SD cards)
  - SSD drives replace traditional hard drives but have the benefits of using flash memory chips (solid state) instead of moving parts
5 Waves of computing

- 1960s - large, room size mainframe computers
- 1970s – refrigerator size so-called (at the time) “minicomputers”
- 1980s – PCs
- 1990s - cheap servers and networks connect by an “Internet”
- Wave 5 (now) – ubiquitous computing
  - Bring tech to what was non-tech

Moore’s Law restructures industries?

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<td></td>
<td>4. Trans World Music</td>
<td>4. iTunes</td>
<td>4. iTunes, Amazon be</td>
<td>4. Amazon, Target be</td>
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Note: Twelve tracks are equivalent to one CD.

Moore’s Law restructures industries. The firms that dominated music sales when you were born are now bankrupt, while one that had never sold a track now sells more than anyone else.

How does this relate to Moore’s Law?

Meeting firm’s computing power needs in the present

- Experts say the Moore’s Law ride won’t continue much longer
- Chip densities are now being limited by the sizes of atoms
- Strategies for getting more power on a piece of silicon
  - Multi-core processors
  - Stacked (3D) processors
  - Someday? – Quantum processors

Some businesses tackle massive problems requiring extremely fast computers

- Options:
  - Buy a large ($$$) supercomputer... many parallel CPUs
  - Example: United Airlines purchased IBM’s “Deep Blue” and gained the ability to examine 350,000 flight path combinations for its scheduling systems
  - previous limit was 3,000
  - Estimated operational cost savings through better yield management: > $30,000,000 per year
  - Massively parallel computers
  - E.g., Virginia Tech created the world’s third fastest computer by using 1,100 Apple PCs connected together ($5.2 million)
  - “Grid computing” - firms place special software on existing PCs or servers that enables these computers to work together on a common problem

Examples of “non-IT firms” using grids

- Movie studios: for special effects and animated films.
- Proctor & Gamble: to redesign the manufacturing process for Pringles potato chips.
- GM and Ford: to simulate crash tests, saving millions in junked cars and speeding time to market.
- Pratt and Whitney: to test aircraft engine designs.
- JP Morgan Chase: for financial portfolio analyses. (By the 2nd year of operation, the grid was saving $5M / year)

E-Waste: the dark side of Moore’s Law

- Expected lifetimes:
  - PC: 3-5 years
  - Cell phone: 2 years
- in 2007 the United States alone generated over 2.5 million tons of e-waste (EPA estimate)
- 80 percent of the material dropped off for recycling is eventually exported
- Where does it end up? (Many articles/videos on subject)