

Trivia for today...Operating systems

■ Examples

- DOS
- Windows (95, 98, NT, 2000, XP, windows 7, windows 8, windows 10, server OS)
- Mac OS X
- Unix/Linux
 - Ubuntu, CentOS, Redhat
- Android OS, iOS...

Fun names...

■ Mac OS X & macOS version code names

- OS X 10 beta: Kodiak - 13 September 2000.
- OS X 10.0: Cheetah - 24 March 2001.
- OS X 10.1: Puma - 25 September 2001.
- OS X 10.2: Jaguar - 24 August 2002.
- OS X 10.3 Panther (Pinot) - 24 October 2003.
- OS X 10.4 Tiger (Merlot) - 29 April 2005.
- [OS X 10.4.4 Tiger (Chardonnay)]
- OS X 10.5 Leopard (Chablis) - 26 October 2007.

■ Android Version Names: Every Os From Cupcake to Android P

- **Android 1.6:** Donut. ...
- **Android 2.0 and 2.1:** Eclair. ...
- **Android 2.2:** Froyo. ...
- **Android 2.3, 2.4:** Gingerbread. ...
- **Android 3.0, 3.1, and 3.2:** Honeycomb. ...
- **Android 4.0:** Ice Cream Sandwich.

On google campus...

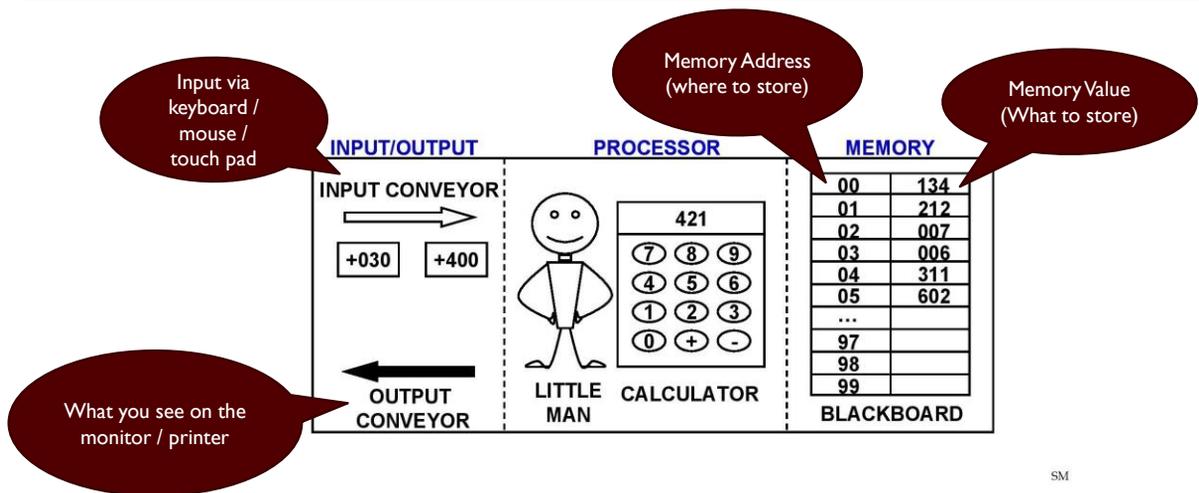


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Operating system

- Allocates and assigns:
 - Memory
 - e.g. file system, virtual memory
 - Processor time
 - e.g. multitasking (threading), multiprocessing
 - I/O devices
 - e.g. printer, keyboard, etc.
- May also provide other capabilities useful to many users or programs
 - Graphical User Interface (GUI) capabilities
 - Fonts, network protocols, ...
 - Web browser, Database systems (EHR)

A Simplified Computer



Operating System as Magician: The four illusions

- Multitasking (threading)
 - Many separate computers, one for each process
- Virtual memory
 - Large memory
- File Systems
 - Disks and other secondary storage are organized as collections of files
 - These days cloud storage (dropbox) too
- Graphical User Interface (GUI)
 - Windows and menus

Assessing and Achieving Value in Health Care Information Systems

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Learning Objectives

- Discuss the nature of IT-enabled value
- Review the components of the IT project proposal
- Understand steps to improve IT project value realization
- Discuss factors that ensure value delivery



Outline

- Definition of IT-enabled value
- Differing objectives for projects
- Scoring objectives
- Reducing the budget
- Common proposal problems
- Ensuring the delivery of value
- The IT value challenge
- Digital maturity

Definition IT-Enabled Value

- Tangible (measurable value) & intangible (difficult to measure value)
 - **Tangible:** Increases in revenue, fewer errors, reduction in turnover, etc.
 - **Intangible:** Improved decision making, communication, compliance, etc.
- Significant
 - Quality of diabetes care outcome: Use of EHR had 15% better care outcomes compared to paper-based sites
- Variable across organizations
 - Organizations may focus on different objectives
- Diverse across IT proposals
- Diverse value in a single investment
- Different analyses for different objectives (see next slide)

IT Objectives: National Research Council (NRC)

- Infrastructure
 - Enables other investments or applications to be implemented and deliver desired capabilities (e.g., data communication networks, workstations, clinical data repositories)
- Mandated
 - May be necessary in order to comply with initiatives of accrediting bodies
- Cost reduction
- Specific new products and services
 - Involves consumer utilization, competitor response, and impact on related businesses
- Quality improvement
 - E.g., reduce waiting times, improve the ability of physicians to locate information, improve treatment outcomes, reduce errors in treatment
- Major strategic initiative
 - Intended to significantly change the competitive position of the organization or redefine the core nature of the enterprise

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Classes of IT Investment

- Transformation
 - Effect a significant improvement in overall performance
 - Change the nature of the organization
- Renewal
 - Upgrade core IT infrastructure and applications
 - Reduce the costs
 - Improve the quality of IT services
- Process improvement
 - Improve the operations of a specific business entity
- Experiments
 - Evaluate new information technologies and test new types of applications

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Sources of Value Information

- Conferences
- Industry publications
- Industry research organizations (e.g., Gartner and the Advisory Board)
- Consultants
- Vendors
- Formal financial analysis
 - Net present value
 - Internal rate of return

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Formal Financial Analysis

- Net present value (NPV)
 - Calculated by subtracting the initial investment from the future cash flows that result from the investment
- Internal rate of return (IRR)
 - Discount rate at which the present value of an investment's future cash flow equals the cost of the investment

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NPV/IRR/discount rate (see excel sheet)

- In finance, discounted cash flow (DCF) analysis
- a method of valuing a project, company, or asset using the concepts of **the time value of money**
- All future cash flows are estimated and **discounted by using cost of capital to give their present values (PVs)**

- Discounted cash flow= $\frac{CF_n}{(1+r)^n}$
 - r=discount rate
 - n=time in year

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Scoring: Comparing Different Types of Value

- Select key proposal areas for scoring
- Assign a score for each area & total the scores
 - Range: 1 (minimal or no contribution) to 5 (significant contribution)
- Benefits
 - Forces leadership to discuss why team members assigned different scores
 - Forces leadership to defend any decision not to fund a project with a high score or to fund one with a low score

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Reducing the Budget Deciding which Proposals to Fund

- Is it mandatory due to a regulation (e.g., a new Medicare rule)?
- Can the project be put off until next year?
- Does the IT staff have time to take on another project?
- Does the user department have stable management?
- Are the value proposition and resource estimate complete?
- Is there a less expensive application or non-IT approach?
- Can the progress occur at a slower pace?

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Common Proposal Problems I

- Fractions of effort
 - Saving fractions of staff effort does not always lead to salary savings!
- Reliance on complex behavior
 - People do not always behave as we expect or want them to.
- Unwarranted optimism
 - Nothing will go wrong
 - You're in control of all variables that might affect the project
 - You know exactly what changes in work processes are needed and what system features must be present
 - Everyone can give full time to the project

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Common Proposal Problems II

- Shaky extrapolations
 - Assuming that gains in the first year will continue during the remaining life of the project
- Underestimating the effort
 - Forgetting to account for the time users and managers devote to system design, developing workflow changes, and training
- Fairy-tale savings
 - Redeploying expenses instead of reducing the budget
- Failing to account for post implementation costs
 - Maintenance contacts, hardware upgrades, etc.

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Problems with software development

- Computerworld magazine
 - “Nearly one-third of all projects fail”
 - “More than half come in **over budget**”
 - “Only 16% of all projects come in on time and on budget”
 - Survey of 8000 projects from 385 companies.
- Key factor for success or failure:
 - “User involvement/input”

Facts & Fallacies about SW Development

- Facts
 - The most important factor in software development is the quality of the programmers.
 - The best programmers are up to 28 times better than the worst.
 - Adding people to a late project makes it later.
 - One of the most common causes of runaway projects is poor estimation.
 - The other most common cause of runaway projects is unstable requirements.
 - Requirements errors are the most expensive to fix during production.
 - Maintenance typically consumes 40 to 80 percent of software costs.
 - Enhancements represent roughly 60 percent of maintenance costs.
- Fallacies
 - Software needs more methodologies.
 - You teach people how to program by showing them how to write programs.
- Adapted from Robert L. Glass, Facts and Fallacies of Software Engineering, Addison Wesley, 2003

Ensuring Delivery of Value

- Make sure the homework was done
- Require formal project proposals
- Increase accountability for investment results
 - Business owner should defend the investment
 - Project sponsors and business owners must understand the accountability for successful completion of the project
 - Present projects in a forum that routinely reviews such requests
- Manage the project well
- Manage outcomes

Ensuring Delivery of Value

- Conduct post-implementation audits
 - Value is NOT automatically achieved because the implementation is over.
- Celebrate value achievement
- Leverage organizational governance
- Shorten the deliverables cycle
- Benchmark value
 - Benchmark performance against the performance of peers
- Communicate value
 - Develop a communication plan for the 12 months ahead

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Portfolio: Types of Portfolio Investments

1. Infrastructure
 - The core information technology that serves as the foundation for all applications
2. Transactional
 - Supports the core operations processes
3. Informational
 - Supports the decision making such as clinical decision support, quality measurement and analyses, market assessment, and budget performance
4. Strategic
 - Critical to the furthering of an organization's strategy

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The IT Value Challenge

- Factors that hinder value return
 - The overall strategy is wrong or its assessment of its competitive environment is inadequate
 - The necessary IT applications and infrastructure are not defined appropriately
 - The organization fails to identify all the investments and initiatives necessary to carry out its plans
 - The organization fails to execute the IT plan well
 - External factors (e.g., competitors' actions, customers' reactions, etc.)

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The IT Value Challenge

- The investment-performance relationship
 - Spending more money on IT is no guarantee that the organization will be better off
 - Factors other than the appropriateness of the tool to the task also influence the relationship
- The value of the overall investment
 - Difficult to assess the value of its overall investments in IT
- Progressive realization of IT value
 - Requires innovation in business practices
 - Economic value comes from incremental innovations rather than “big bang” initiatives
 - The strategic impact comes from the cumulative effect of sustained initiatives to innovate business practices

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Summary

- Definition of IT-enable value
- Differing objectives for projects
 - Infrastructure
 - Mandated
 - Cost reduction
 - Specific new products and services
 - Quality improvement
 - Major strategic initiative
- Scoring objectives
- Reducing the budget
- Common proposal problems
 - Fractions of effort
 - Reliance on complex behavior
 - Unwarranted optimism
 - Shaky extrapolations
 - Underestimating the effort
 - Fairy-tale savings
 - Failure to account for post-implementation costs

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Summary

- Ensuring the delivery of value
 - Make sure homework was done
 - Require formal project proposals
 - Increase accountability
 - Manage the project well
 - Manage outcomes
 - Conduct post-implementation audits
 - Celebrate value achievement
 - Leverage organizational governance
- Shorten the deliverables cycle
- Benchmark value
- Communicate value
- The IT value challenge
 - How to measure?
 - Progressive realization
- Digital maturity
 - Digital intensity
 - Transformation management intensity

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During break, read assignment 5

Presentation: Nanotechnology

- Peer Review
- How well was the technology described in the presentation ?
- How well did you understand the three take aways for hospital managers?
- How well did the presentation discuss the relevance and impact of the technology on health care?
 - Great
 - Good
 - Reasonable
 - Bad

Assignment 5

- Individual
- Read 4 papers: Answer the following questions for each paper you read.
 - Q1: What is the main point of the paper?
 - Q2: Write at least three facts that support the point
 - Q3: Do you agree with the point? Why or why not.
 - Q4: Write at least one other related opinion you had after reading the paper, and state evidence from the paper to support your opinion.
- Write one paper with 5 sections
 - One section for each paper
 - Conclude the submission with two subsections
 - a summary (one paragraph) of the adoption, use, and impact of HIT in the three papers you selected and read
 - an executive summary (one paragraph) synthesizing everything

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AI in Health Care: AI and machine learning: What cuts hype from reality?

- Each group will read
 - <https://www.healthcareitnews.com/projects/ai-and-machine-learning>
 - one assigned reading
 - and one you pick (EXCEPT the assigned readings)
- Prepare a group presentation for next class
 - The main idea from the assigned article
 - Three takeaways for healthcare managers from the assigned reading
 - One takeaway from each of the individual readings in the group
- **Complete by wed (3/6): share gslides or email ppt**

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Next week (AFTER spring break)

- BEFORE spring break:
 - Finish the AI slides by 3/6 (share gslides, or submit via email)
- AFTER spring break
 - Read Chapter 10-11
 - Quiz 7 (opens 3/6 due 3/17)
 - Assignment 5: one week assignment, but due 3/17

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