IMS1002/CSE1205
Systems Analysis and Design

Lecture 1

Introduction and Review of the SDLC

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Tutorials This Week

- No tutorials this week (week 1)
- Use Allocate+ for tutorial allocation
- If you have a problem with tutorial allocation, contact
  - Terri Wall - Ph: 9903 1468
    email – terri.wall@sims.monash.edu.au
- If you have a problem with unit allocation contact the Faculty office

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Subject Information

- All materials (lectures, tutorials, assignments, notices) on the subject web page at the SIMS website
  - http://www.sims.monash.edu.au/subjects/cse1205/index.html
- Or, follow the links on SIMS main page
  - http://www.sims.monash.edu.au/subjects/
  - SIMS Units - 2005 → First Year → IMS1002 or CSE1205

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Subject Information

- Prescribed Text
  - Whitten, J.L., Bentley, L.D. and Dittman, K.C., (2004), *Systems Analysis and Design Methods*, (6th edn.), McGraw-Hill, Boston, MA., USA.
- Recommended/Additional Reading
  - Hoffer, J.A., George, J.F. and Valacich, J.S., (2002), *Modern Systems Analysis and Design*, (3rd edn.), Pearson Education Inc., Upper Saddle River, NJ, USA.
  - Kendall, K.E. and Kendall, J.E., (2005), *Systems Analysis and Design*, (6th edn.), Pearson Education Inc., Upper Saddle River, NJ, USA.

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Subject Information

- Recommended/Additional Reading
  - Satzinger, J.W., Jackson, R.B. and Burd, S.D., (2004), *Systems Analysis and Design in a Changing World*, (3rd edn.), Thomson Course Technology, Boston, MA, USA.
  - Valacich, J.S., George, J.F. and Hoffer, J.A., (2004), *Essentials of Systems Analysis and Design*, (2nd edn.), Pearson Education Inc., Upper Saddle River, NJ, USA.
  - Whitten, J.L., Bentley, L.D. and Dittman, K.C., (2004), *Systems Analysis and Design Methods*, (6th edn.), McGraw-Hill, Boston, MA., USA.

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Assessment

- Assessment
  - exam - 60%, assignment - 40%
  - a pass requires a final mark of 50% or more
  - hurdle - you must earn a minimum of 40% for the exam AND a minimum of 40% for the assignments
- So if…..
  - Practical mark = 35/40 = 87.5%
  - Exam mark = 20/60 = 33%
  - Total mark = 55/100 = FAIL !!
  - Because exam mark is less than 40% the officially recorded result will be a fail

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Your Responsibilities

- You are responsible for your own learning
  - outcomes are generally directly proportional to effort
- We help you with information, direction and services
- You must
  - read widely, ask questions, think
  - practice the techniques that you learn
  - eat green vegetables, drink lots of water, plenty of sleep!
- If you have a problem – let us know!!
  - Tutor → Lecturer → Unit Leader → Director of Undergraduate Studies → Deputy Head of School → Head of School

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What You Should Already Know

- The nature of business problems
- The use of computer based information systems to solve business problems
- Different types of information system
- The role of the systems analyst in the information systems development process

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Lecture Objectives

- Preview of this unit
- Review of information system concepts and components
- Review of the Systems Development Life Cycle – SDLC
  - as a basis for the task of building information systems

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Subject Topics

- The Analysis and Design phases of the System Development Life Cycle in detail
- Systems Analysis issues and techniques
  - process modelling review
  - data modelling
  - normalisation of data

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Subject Topics

- Design and Implementation issues and techniques
  - generating and evaluating design alternatives
  - system architecture
  - Interface design
  - alternative development strategies
- Implementation - testing, conversion, acceptance planning, documentation
- Maintenance and Review

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Information Systems

- An Information System (IS) is an arrangement of people, data, processes, information presentation, and information technology that interact to support and improve day-to-day operations in a business as well as support the information, problem-solving and decision-making needs of the management and users of an organisation

Whitten, Bentley and Dittman (2004), p. 12

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Information Systems Components

- Information System components include
  - People
    - need the information, build the system, operate it and use it
  - Data and Information
    - the raw and processed material which the system is set up to manage and distribute
  - Machines
    - (usually computers) help manage the data and information
  - Procedures
    - define how the information is to be input, stored, processed, etc - (formal or informal)

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Functions of an IS

- Any information system performs four main functions
  - data input
    - recording information
  - data storage/retrieval
    - keeping information
  - data processing
    - transforming information
  - data output
    - displaying/presenting information

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The Complexity of an IS

- Even small information systems can be very complex
  - many components
    - lots of information
  - much interaction between components
  - systems within systems
  - the intangibility of information
    - hard to define
  - the subjective nature of information
    - variability

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Building Information Systems

- Activities involved in building computer-based information systems are
  - identifying information problems
  - analyzing and describing information needs
  - designing solutions to meet those needs
  - acquiring/building new systems
  - implementing new systems

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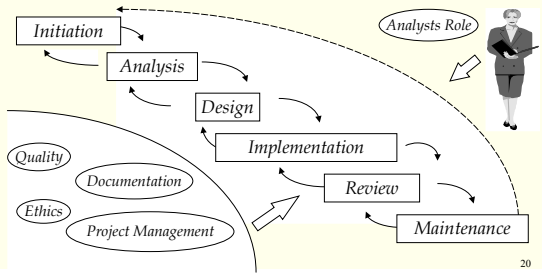
Systems Development Life Cycle - SDLC

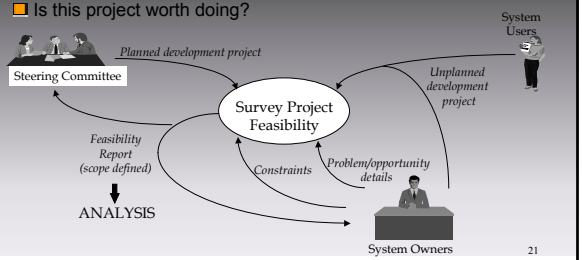
- The SDLC provides
  - a systematic and orderly approach to solving business problems
  - a means of managing, directing, monitoring and controlling the process of system building
    - a description of the process - steps to be followed
    - deliverables - reports/programs/documentation/etc
    - milestones - dates of completion of steps, or deliverables

Systems Development Life Cycle - SDLC



Initiation

- Is this project worth doing?



Initiation – 'is it worth doing?'

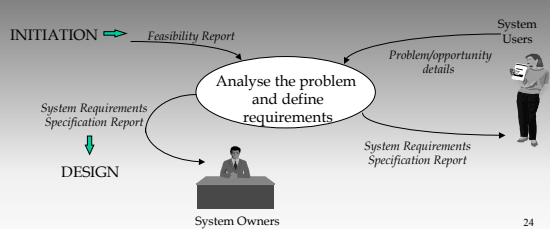
- A preliminary investigation of the problems, opportunities, constraints and available resources to decide on a course of action
  - enhance existing system
  - develop a new information system
  - do nothing .. add it to the backlog
- Which IS project is the 'best' one to do

Initiation – 'is it worth doing?'

- Define the scope .. poor scope management often results in unsuccessful systems
  - scope - identifying .. key client groups, perceived problems and opportunities, constraints, possible solutions & client expectations
- POSTEL
  - Political, operational, scheduling, technical, economic, legal/contractual

Analysis - 'what is happening?'

- Define the clients requirements (What?)

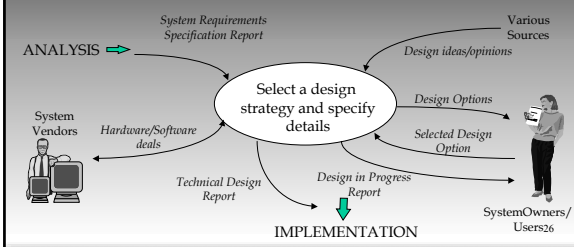


Analysis - 'what is happening?'

- "Don't try to fix it unless you understand it"
- Study the existing system, to thoroughly understand the problems and opportunities
- Review findings with clients and revise scope if necessary
- Clearly define WHAT the new system must do
- Agree on acceptance criteria for the new system - signed systems specification
  - should the system spec. be frozen?
- Assess feasibility again

Design – 'how will it happen?'

- Define how the system will be implemented

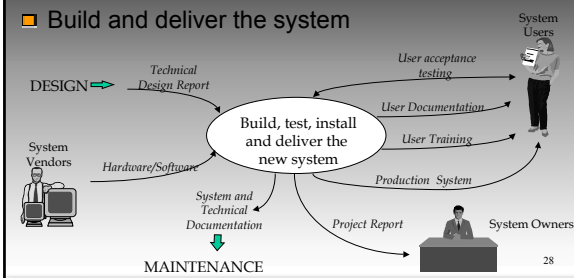


Design – 'how will it happen?'

- Generate a number of design options based on technical, operational, economic, scheduling and tendering constraints (HOW?)
- The client selects the best option for their needs - assess feasibility again
- Acquire the necessary hardware and software
- Design interfaces, databases, networks as required
- Specify integration requirements and software requirements (programs)

Implementation – 'build it'

- Build and deliver the system

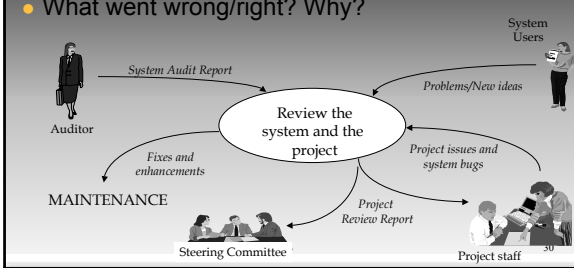


Implementation – 'build it'

- Build/modify databases and networks as required
- Build and test programs
- Prepare users for new system
  - acceptance testing, user documentation, user training, maintenance procedures
- Finalise system and technical documentation
- Install the system

Review

- What went wrong/right? Why?



Review

- How well were the system objectives met?
  - clients requirements met within budget, on time, with required functionality
- Can further benefits be realised?
- Are major changes required?
- How successful was the development process .. what can we learn?
- Review the maintenance effort

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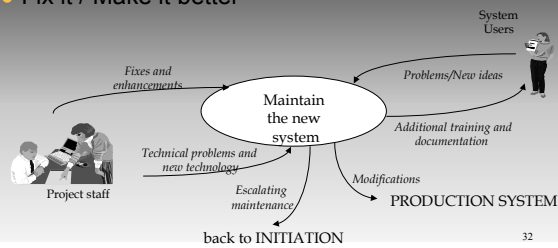
Maintenance

- Fix it / Make it better



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Maintenance

- Corrective - fix errors
- Adaptive - satisfy changing needs
- Perfective - enhance performance
- Preventative - fix potential problems
- If the cost of maintenance is too high consider other options
  - new development, purchase package, re-engineer

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Cross Life Cycle Activities

- Cross Life Cycle Activities are those which overlap many or all of the life cycle phases
  - Quality - must be embedded in the process of systems development to achieve a quality outcome
  - Project Management - to monitor and control the project and ensure it stays on track
  - Documentation - essential at every stage to help ensure project and system viability
  - Ethics - voluntary compliance with guidelines of IS professional societies

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Quality

- Quality is defined as fitness for purpose and concerns both process and product
- Error detection and correction in analysis and design is much cheaper than after the system is implemented
- Achieving quality requires that organisational structures, responsibilities, procedures, processes and resources for implementing quality management are in place
- Total Quality Management (TQM), Continuous Process Improvement (CPI), Business Process Re-engineering (BPR), Benchmarking, Capability Maturity Model (CMM)

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Project Management

- Select systems development methodology
- Plan the project tasks
- Estimate the resources and time required to complete individual phases of the project
- Staff the project team
- Risk Management
- Stakeholder Management

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Project Management

- Organise and schedule the project effort (tasks, time, people, technical resources) and therefore cost
- Control the project development (directing the team, controlling progress, replan, restaff, ...)
- Communication, business, IT and accounting skills

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Documentation

- Documentation is part of the product
- Requirements, technical design specifications
- User, training, systems, operations manuals
- The data dictionary plays an important role during and after systems development
  - a repository for information about and definitions of all "objects" identified during development
  - it supports and is maintained throughout the system lifecycle
  - it provides an important source for other system documentation

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Professional Ethics

- Australian Computer Society (ACS)
- Your reputation
- Your client's interests
- Confidentiality
  - your client's and their competitors'
- Impartiality
- Honesty
- Integrity

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Role of the Systems Analyst

- To understand the business's information needs
  - what information is needed?
  - for whom?
  - in what form?
  - when?
- To describe the business's information flows
- To identify problems and opportunities
- To suggest possible system solutions

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Analysis and Design in the SDLC

- Compare with the role of an architect in building a house
- Analysis - finding out WHAT the client needs
- Design - deciding HOW to meet these needs
- Distinction between the two is not always as clear in practice as it sounds in theory as they tend to merge in practice (compare architect's role)

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Role of the Systems Analyst

- A systems analyst needs to be able to relate well to a wide range of different sorts of people
  - business management
  - system users and owners
  - technical people (programmers, database programmers, systems administrators, operations staff, data communications, and network specialists
  - consultants
  - vendors
- Critical Systems Thinking (CST), problem solving, communication, business and IT skills

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References

Hoffer, J.A., George, J.F. and Valacich, J.S., (2002), *Modern Systems Analysis and Design*, (3rd edn.), Pearson Education Inc., Upper Saddle River, NJ, USA.

Chapters 1, 2, 3

Whitten, J.L., Bentley, L.D. and Dittman, K.C., (2004), *Systems Analysis and Design Methods*, (6th edn.), McGraw-Hill, Boston, MA., USA.

Chapters 1, 3, 4

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