

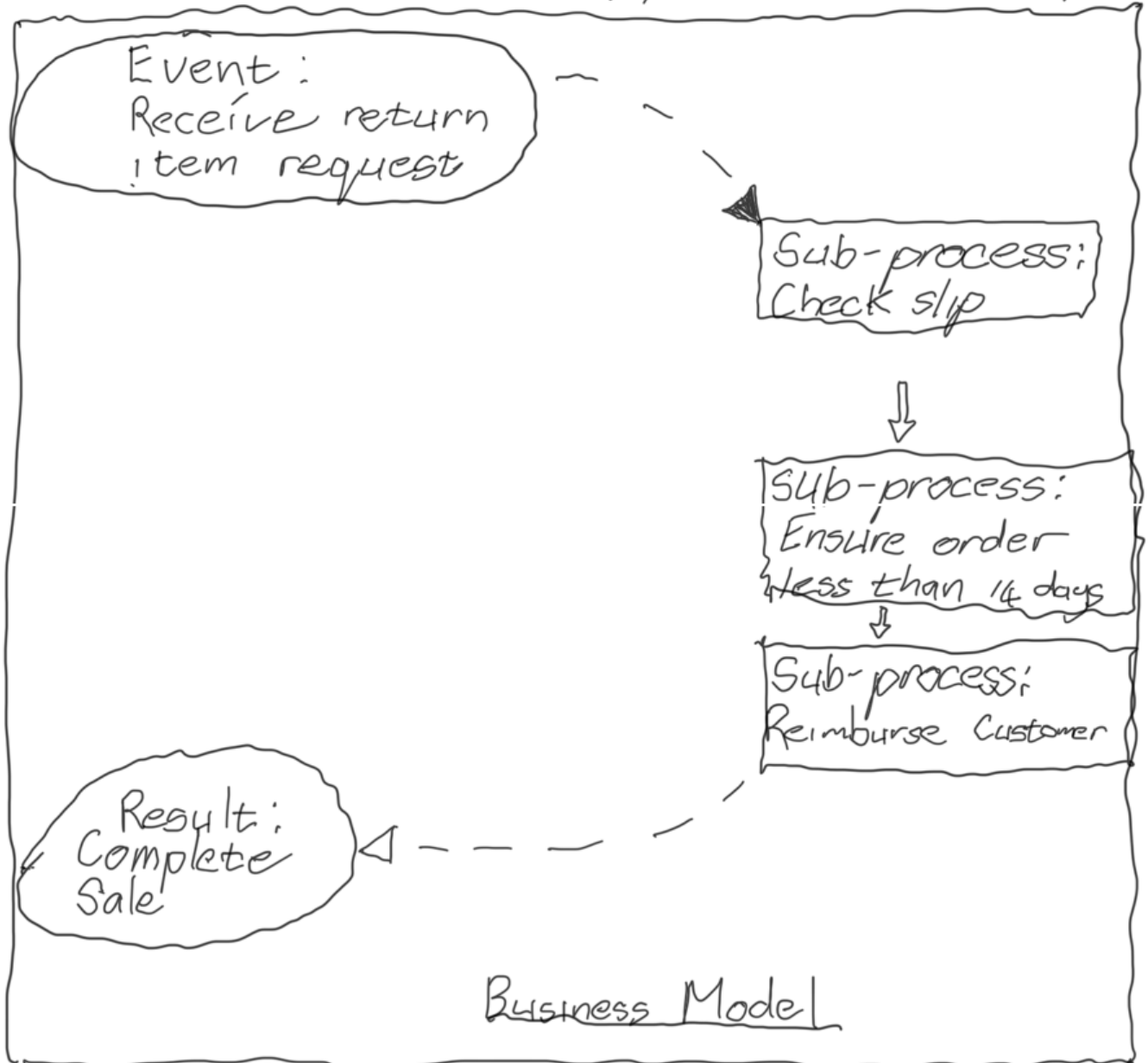
Objectives for Projects

- 1 Define & describe S.D.L.C (5 phases)
- 2 O.O Analysis & design
- 3 Write Usecases & scenarios
- 4 Draw usecase diags
- 5 Diagrams
 - Activity
 - State
 - Sequence
 - Collaboration
 - Component
 - deployment
- 6 Define classes from usecases and scenarios and use CRC modeling to do this
- 7 Draw class diagrams illustrating relationships between classes
 - association
 - Containment
 - Aggregation
 - Composition
 - Inheritance

1.1.4 Business Process Modelling

- Analyst must understand business operation
- Business profile defines
 - Overall business functions
 - What processes, products and services
 - Customers
 - Suppliers
 - Competitors
 - Constraints
 - goals

- Business models made from business profile
 - Business models graphically represent orgs business functions
 - Business process modelling
 - Represent orgs operations and info requirements
- Process: Item return (business process)



- Simplifying business processes reduce costs (business process engineering)

11.5 Information Systems & their components

- Component
 - element that carries out a function.
 - eg. task of updating account is a component of a sys
 - Set of components make up a sys
- System
 - Made up of components
 - Many systems work together to focus on 1 operation, eg turning a TV on involves multiple systems
 - Exists in an environment
 - Boundary separates sys from environment
 - Known as system boundary
 - Indicates sys limits
 - Outside boundary are connections/interactions between env. and other sys
 - Mission critical sys
 - Crucial to operation of org
 - eg. sys monitor life support
- Components
 - people
 - hardware
 - software
 - processes
 - Data
- Processes data to produce useful info

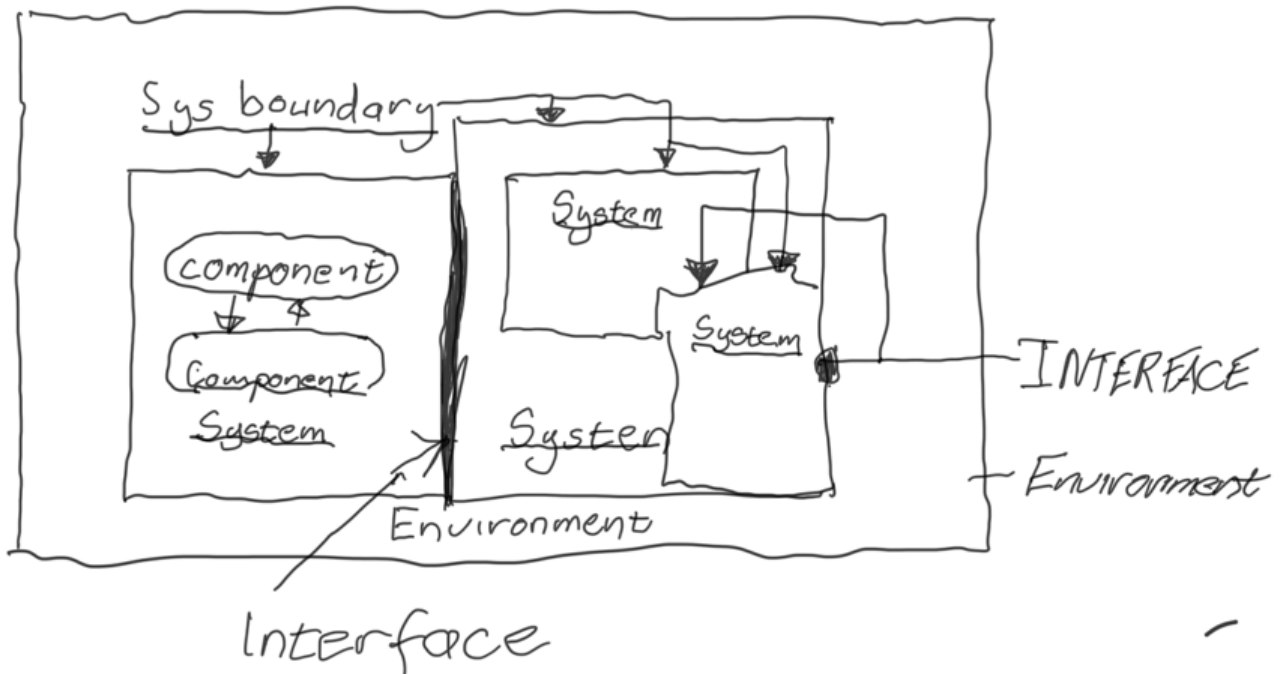
1.1.6 Business information sys.

- To fully understand requirement
 - business profile
 - Show products, services

- Determine sys boundaries
- Special needs
- Size and future growth

1.1.7 Types of orgs

- Production
- Service orientated
- Internet dependant
- Brick & mortar



1.1.10 Types Of Systems

Enterprise computing Sys

- org wide data management

Transactional/operational Sys

- Process data created daily
- Replace manual tasks like payroll
- Transactional processing systems
 - Trigger a set of updates when a certain transaction occurs
- OLTP systems

Business Support Systems

- Provide business related info to all users
- Help with business decisions
- Knowledge management systems (KMS)
 - Known as expert systems
- Make use of fuzzy logic
 - Logical inferences deduced
 - Inference rules ID data patterns & relationships

User productivity systems

- Networking
- Any tool staff use

1.1.1.2 Org Structure

Management

- Top (Strategic Plans)
 - president
 - Vice president
 - Ceo
- Middle (Tactical Plans)
 - Director
 - Manager
- Lower Management (Operational plans)
 - Team Lead
 - Supervisor
 - Co-ordination
- Operational employees (General staff)
 - Sales rep
 - Fin analysts
 - etc

1.1.3 Sys development techniques & tools

- Modelling
- Prototyping
- Case tools
- JAD
- CAD

1.13.1 Modelling

- Reduce sys complexity
 - Models
 - business model - requirements mod
 - data model
 - object model
 - network model
- } Same sys diff viewpoints

1.13.2 Prototyping

- May become final system
- decision could be made too early
- If done correctly problems detected early

1.13.3 Computer aided sys engineering

- C.A.S.E
- Automate Routines
- Assist in maintaining information systems
- Supports
 - Structured analysis
 - Object-Oriented Analysis

1.13.4 Joint App Dev & Rapid App Dev

- Previously Info sys developed independently by I.T
- Now involves users, management & IT staff.
 - JAD (Joint App Dev)

- fact finding techniques involving team
- RAD (Rapid App Dev)
 - focus on building app fast
 - Compact version of entire dev process

1.1.13.5 Other Dev Tools

- Popular dev tools like ms visio to draw diagrams
- Other tools including case tools

1.1.14 Overview of sys dev methodology

- Structured analysis
 - traditional
- O-O
 - newer

1.1.14.1 Structured Analysis

- Based on data files on a mainframe
- Process centered technique
 - Demonstrated processes that converted data into useful info
- Includes process modelling
 - organisation & structuring of data
 - Design of relational dbs
 - Uses SDLC
 - planning, analysis, design, implementation support
 - Views processes & data as different components
 - Establish data flow into process
 - Business rules act on data, transform it
- Relies on process models

1.1.14.2 O-O analysis

- or -

- Objects
 - Combo of data processes manipulating data
`$data[key]; // value`
`$data->getName([id=>3]); // method call`
- Concepts
 - Business processes modelling
 - Operations processes modelling
- When business processes & operations are modelled, objects produced
 - Realworld representation of things
 - People
 - things
 - events
 - transactions
- Objects
 - Belong to a class
 - Collection of similar objects
eg. Car class contains car objects
 - To work with class an instance of class is created
- Also makes use of steps in SDLC
- Can design re-useable components

1.1.14.3 Other dev strategies

Sometimes a hybrid of object orientated and structured analysis

1.1.15 The SDLC (sys dev lifecycle)

- Sequence of phases
 - Used to plan & manage sys
- Planning
- Analysis
- Design

PADIN!

- Implementation
- Operations & support

1.1.15.1 Planning

- 1 System request made
 - New
 - Modification
 - 2 Planning
 - Strategic
 - tactical
 - operational
 - Sometimes results in new hardware
 - Establish
 - Scope
 - description
 - problem
- } Achieved by preliminary investigation (feasibility study)
- Preliminary report contains
 - business considerations
 - Cost
 - benefit
 - recommendations
 - based on
 - Operational
 - economical
 - Technical feasibility
 - Based on this, decision made to proceed with project or not

1.1.15.2 System Analysis

Logical model of new sys built once analyst understands business requirements & processes

First Stage

- Requirements modelling
 - Defines business processes

- Work closely with users to determine these processes & new processes

The investigation that began in planning carries through to this stage with the continued study of current sys.

Once business processes established, data, process and object modelling happens

- Represents logical model of the sys

Deliverables for this phase are sys reqs docs

- Same elements as preliminary investigation with more detail
- Shows user and management reqs
 - The costs
 - Afts
 - Recommendation

1.1.15.3 Sys Design

- Dev inhouse
- Alter current sys
- Purchase new package

Design phase

- Design blueprint of new sys
 - Satisfy reqs found during analysis
- All input, output, External controls, computer and manual tasks must be id
- User & management feedback essential
- Objective: design blueprint of new sys
- Deliverable: sys design spec
 - Contains

- final sys design
- Cost

After this, ^{sys} implementation takes place.

1.15.4 Sys Implementation

- Sys is
 - coded
 - tested
 - documented
 - installed
 - supported on sys
- Tasks are executed both in O.O analysis or structured analysis
- Deliverable
 - functioning sys
 - documentation
 - data migration
 - transition from old to new sys
 - training
- After this, sys evaluation is done, check:
 - Cost and benefit match specification
 - Sys works correctly

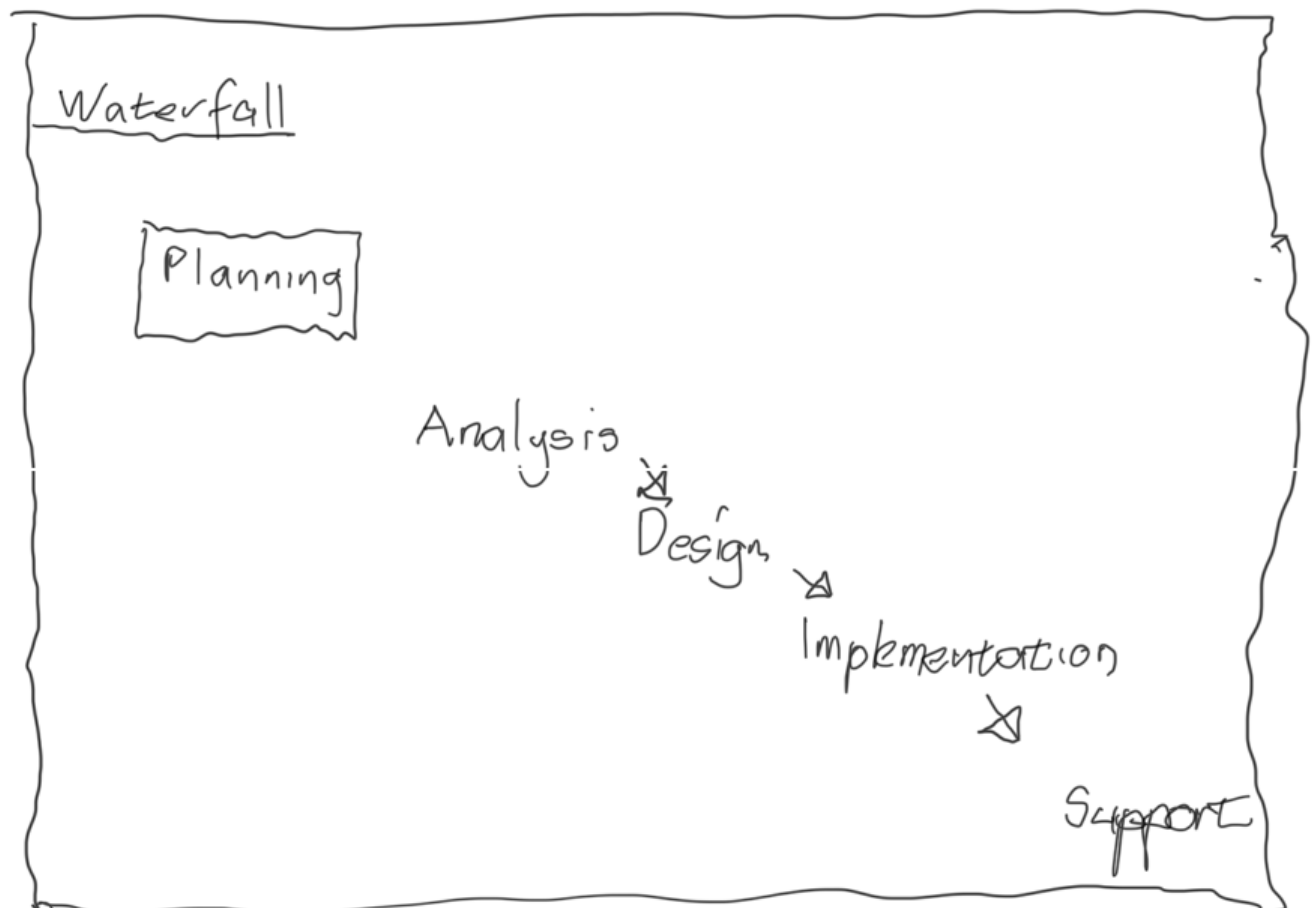
1.15.5 Sys operations & support:

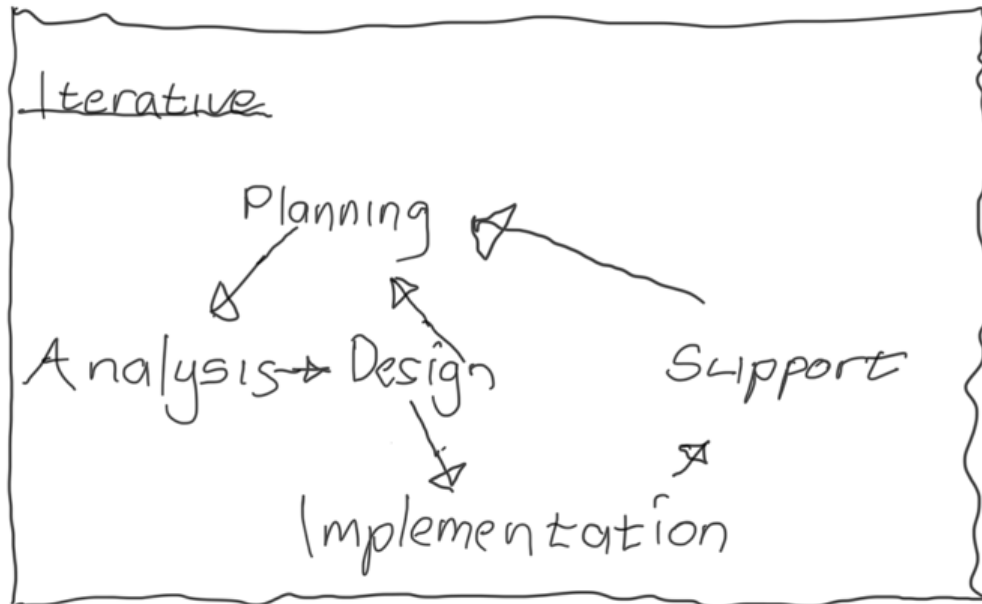
- Sys maintained by IT staff
- Objective is to ensure the sys yields highest results
- Most sys needs to be drastically updated after 7 years

1.1.16 SDLC

- Traditional was waterfall

- At the end of each phase is a thing called an end product (deliverable)
 - Used as input for next phase
 - Once a phase is complete it won't be returned too → phase
- Issue was no system was ever built 100% correctly the first time
- Some requirements may occur in dev stage not just analysis phase
 - As a result analysis and planning may need to be re-visited
- In real world SDLC re-visited multiple times
- Iterative followed
 - In order for phases to be correct there is always input between users, managers and sys devs.





System development guidelines 1.1.17

- Follow overall dev plan
- Involve users as much as possible
- ID major milestones (Epics)
- Establish checkpoints between milestones
- Sometimes tasks overlap multiple phases, be flexible
- Cost & benefit info must be provided, accurate & reliable

1.1.18 IT Department

- App development
- Sys support
- User support
- db admin
- network admin
- web support

Systems Planning - Preliminary Investigation

1.2.3.1 Strategic planning

- Long term goals

- How to achieve above
- Establish needed resources
- Sys analyst needs to know long term goal
- Strategic planning
 - Strength
 - weakness
 - opportunities
 - threats
- } SWOT
- Helps produce strategic plan
- Makes use of technical, financial, human resources, IT resources
- Orgs should have mission statement
 - Gives stakeholder idea of what org trying to achieve
- Stakeholders are affected by orgs performance
- After drawing up mission statement, org to establish goals to achieve mission statement
 - goals are long term tasks (sometimes years)
 - Broken into objectives (monthly, quarterly, 6 months)
 - Objectives include tactical plans

1.2.4 Factors that affect a systems project

- Internal factors
 - User requests
 - Top management directive
 - IT department
 - Existing systems
- External factors
 - Customers
 - Tech
 - Economy
 - Gov
 - Software & hardware vendors
 - Competitors
 - Clients

1.2.5 Reason to start Info sys.

- 1st step
 - Systems request
 - Could propose new feature
 - Correction
 - New sys.
- Reason for sys reqs.
 - Stronger controls (security)
 - Reduce cost
 - Improve service
 - Better Performance
 - More Info.

1.2.6 Sys reqs forms (Jira Tickets)

- Sys analyst/manager will review requests
 - Do prelim investigation
 - Manager decides on viability of tasks
- If request is critical first restore business operations

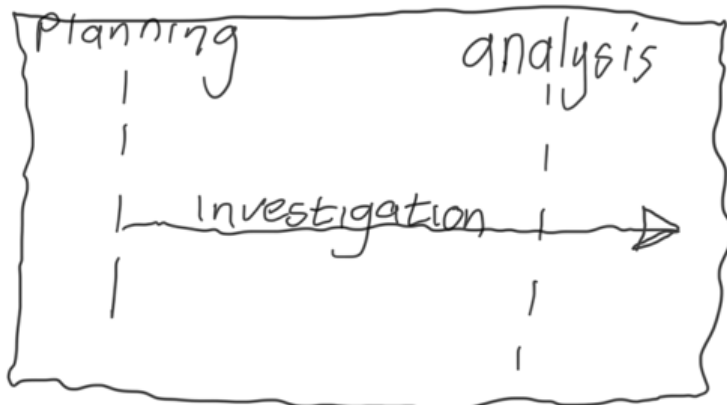
1.2.7 Eval of system requests

- Every org has critical success factor
 - Objectives that need to be met
- Every org has:
 - Key problem areas
 - Opportunities
 - Constraints
- The above will determine priority of tasks
 - Called critical business factors
- Both critical success factors and business issues to be addressed at the same time
- System review committee

- Key managers that review requests
- Close link between IT & business operations in successful orgs.
- Having a committee eval requests rather than individual is better when establishing priorities, however there may be delays
 - Members may however show favoritism to their project

1.2.8 Overview of feasibility

- Need to undergo series of tests
 - Check cost/benefit
 - Called feasibility study
 - Operationally feasible
 - technical
 - Economic
- Is feasible and worthwhile? if yes new investigation will begin and overlap into next phase



1.2.8.1 Technical Feasibility

- Determine if org has tech to do task.
- If org has people to do it
- Will it integrate with current sys
- Performance
- Scalability

Operational feasibility

- Will sys be used properly when complete

- Users should be involved to avoid resistance
- Will training influence current deliverables?
 - Can we re-arrange things to limit interruptions
- All obstacles must be considered (legal etc)

1.2.8.3 Economic Feasibility (cost benefit analysis)

- TCO must be considered
- Tangible benefits
 - Expense decrease / revenue increase
 - Improving sys performance reduce delays
 - Automation resulting in staff reduction
- Intangible benefits
 - Harder to measure
 - Improved image
 - Staff happiness
 - Become more apparent as sys gets used
- Sys review committee to consider
 - costs
 - tangible /
 - intangible benefits

1.2.9 Ascertain feasibility

If hardware / software not feasible, then nothing else will be

- Analysis feasibility is ongoing process

How to eval proj requests 1.2.10.0

- Priorities
 - Least cost
 - Most benefit
 - Short dev time

- Unavailable resources
- Decide if project is
 - Discretionary
 - Not crucial
 - Non-Discretionary
 - No choice but to execute

1.2.11 Prelim investigation

- Compile recommendation
 - feasibility of sys request.
 - Study sys request carefully
 - Get auth to analyse what's needed
- Analyst interacts with management and staff and users
- Explain to above what project entails
 - Responsibilities
 - There may be resistance to sys change
- Ask users what they want instead of highlighting problems
- All info gained in this investigation put in reports.
- Steps
 - 1 Understand problem or opportunity
 - Create business profile
 - 1 change in sys may affect other part of sys.
 - 2 Define scope & constraints
 - Scope = limits & boundaries of sys
 - Needs to be specific
 - Helps avoid scope creep
 - Helps determine how deep prelim investigation goes
 - When defining scope, constraints should also be defined
 - Constraints must have characteristics

defined

- Are they present or future
- Internal or external
- Desirable or mandatory
- Avoid misunderstandings by saying what sys won't do

1.2.12.3 Engage in fact finding

- Can take any amt of time (short-long)
 - Study org charts
 - Interviews
 - Review docs
 - Observe users working
 - Conduct surveys
- At the end of step 3, report handed to management

1.2.12.4 Determine project benefits

1.2.12.5 Step 5 Approximate times & cost

- Cost of analysing the info gathered.
- Entire estimation for all phases should happen here
- Guideline becomes present here (time & cost)

1.2.12.6 Present results & recommendation

A few viable options may be presented

Deliverable: Preliminary investigation report

1.2.13 Format for a preliminary investigation

- 7 Sections
 - Intro
 - Overview

- Short sys desc.
- Who made request & who analyst is
- Sys request outline
 - Summarise what sys entails
- Preliminary findings
 - What investigation uncovered
 - Project scope
 - Feasibility
 - Constraints
- Recommendations
- Time / Cost estimate
 - design & implementation
 - TCO of sys
 - Estimated lifespan
- Benefits
 - Tangible
 - Intangible
 - Timeframe
- Appendix
 - docs that support content of PIR
 - eg. Spreadsheet indicating tco over sys lifespan
 - Doesn't need to be detailed can be list form
- Oral presentation likely

Systems Analysis (Unit 3)

- 2nd phase in SDLC
- Requirements modelling
- Data Modelling

1.3.3 Requirements modelling

- Once sys request granted, next phase, sys analysis
- Sys Analysis
 - 4 main activities
 - Requirement modelling
 - data & process modelling
 - Object modelling

- Make transition to design phase
- Objective
 - Fully understand project
 - Solid foundation for next phase (Sys design)

1.3.3.1 Overview of sys analysis phase

- Deliverable
 - Sys requirements doc
 - Overall blueprint of design of new sys.
- Comprises certain activities
 - Each has an end product or milestone

1.3.3.2 Sys dev methods

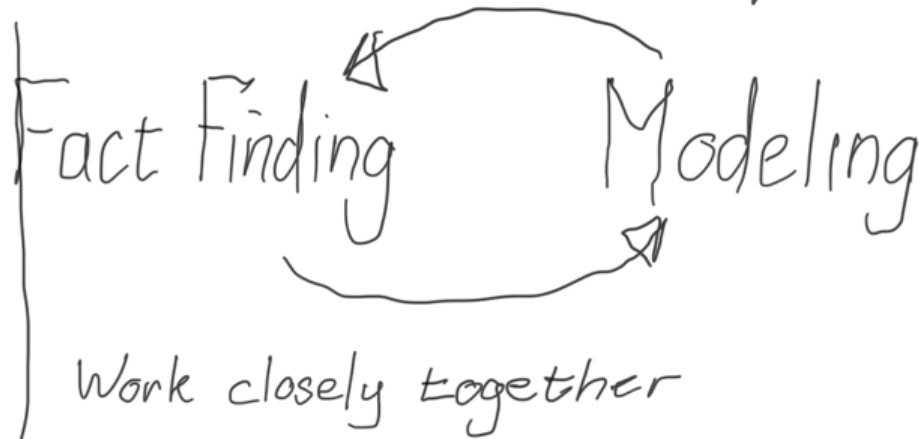
- RAD, JAD, MSF
- JAD
 - Group participation
 - Fact finding
 - requirements modelling
 - Not linked to specific dev methodology
- RAD & MSF
 - provide overall framework for sys
 - More intense than JAD
- JAD
 - Info collecting process
 - Developed by IBM
 - has agenda, structure & roles
 - Team of key users, managers, IT pros.
 - Objective
 - Analyse & discuss current sys
 - Reach agreement on sys requirements & definitions
 - Understand areas of conflict

- ~ Usually meet away from work
- Can be between a day and few weeks
- Usually has project leader
 - Structures agenda
 - Facilitates
 - Lead session
- Top management
 - Provide auth to do JAD
 - Provide support for proj.
- Managers
 - Understand how projects will support business function requirements
- Sys Analyst
 - Observe & learn about issues surrounding user reqs and provide support
 - Ask questions to direct topics
 - Make notes
 - Can enter info directly into case tools from JAD session,
- IT Staff
 - Provide resources
 - Assistance
 - docs etc.
- Scribes
 - doc proceedings of JAD
 - Work with analyst to develop sys model
 - Develop CASE tool docs
- More expensive
- Get greater commitment

1.3.3.5 Modelling tools & requirements

- LIML
- Functional decomposition diagram
- Show interaction between user & sys (LIMI)

- Show how business function and processes defined

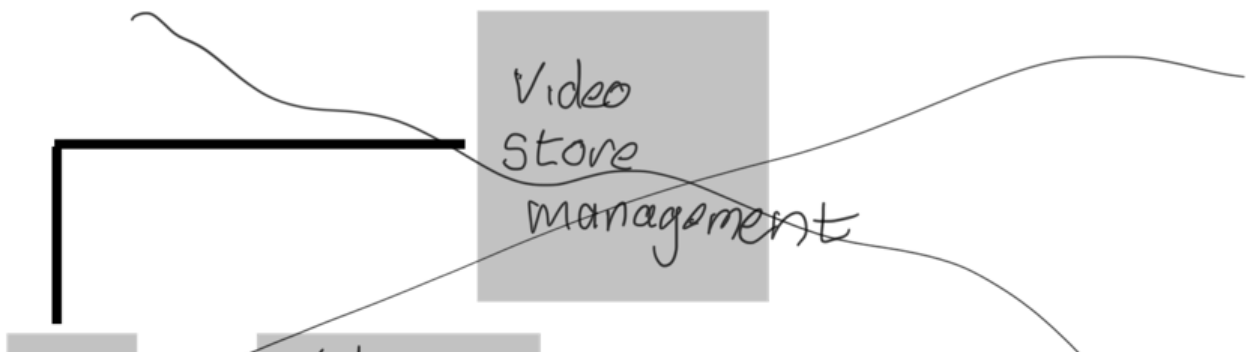


1.3.3.6 UML

- Makes use of O-O design concepts
 - describe business functions
- Independent of lang

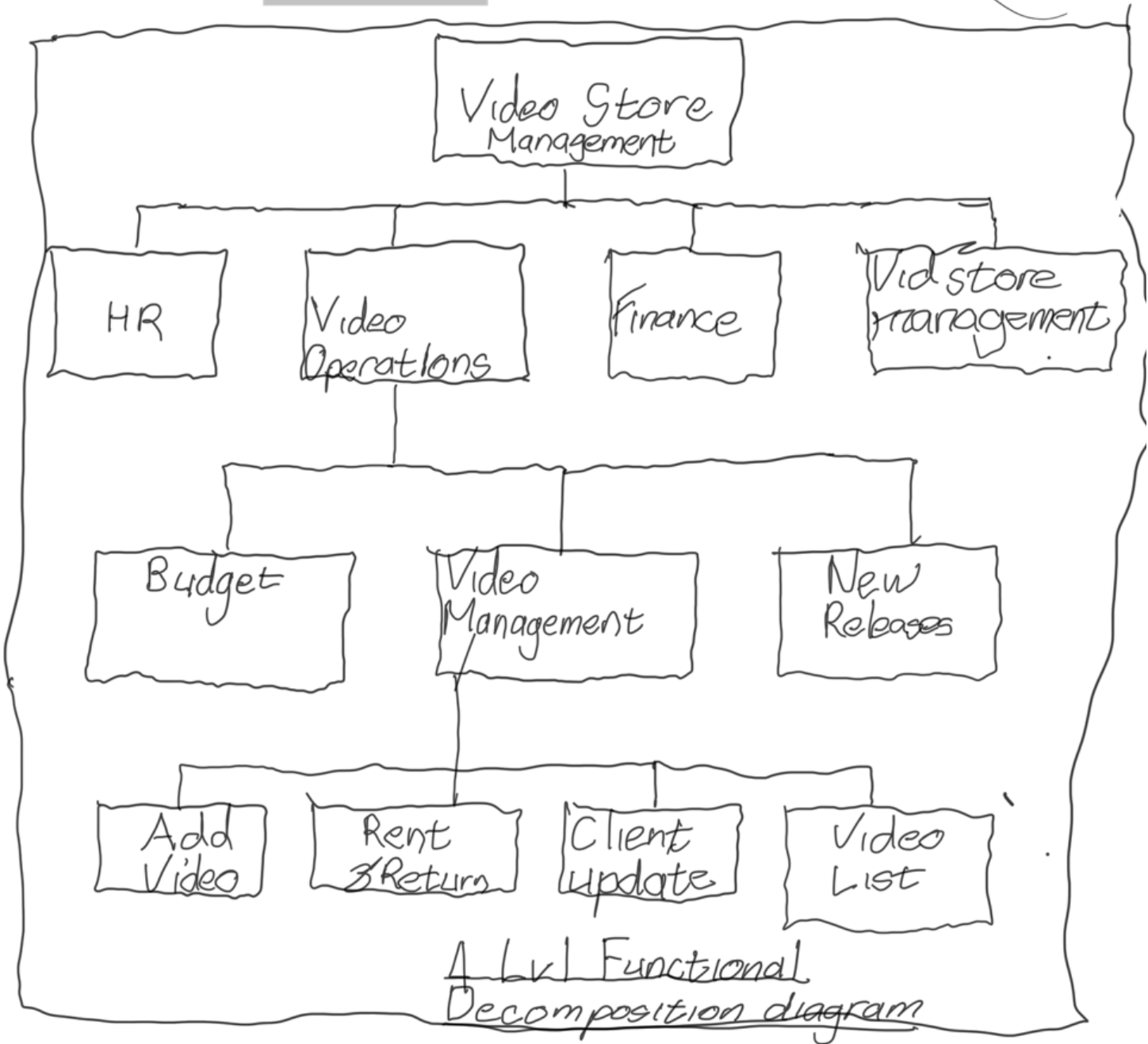
1.3.3.7 Functional Decomposition Diagrams

- Functions & processes can usually be broken down into low-level functions
- Top down desc. of business function
- Used to show functions & how they can be broken down further
- FDD used in any part of dev process.
 - eg. requirements modelling
- All processes are logical representations found during data & process modelling
 - Later converted to program components



HR

Video-
Operations



1.3.3.8 Sys Requirements

- Element^{that} must be included in sys,
- Satisfies business & user requirements
- Check whether or not finished sys would succeed
- 5 Categories
 - Inputs
 - Processes
 - Outputs

- Performance
- Controls
 - login
 - Auth
 - error handling