Concept Modelling with Normal People –
Five Key Lessons From 45 Years of Modelling

45 in 55

Adept Events
Data Warehousing & Business Intelligence Summit
24 March 2026 in Utrecht NL

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///Adept Events

**DATA WAREHOUSING &
BUSINESS INTELLIGENCE SUMMIT**

CLARITEQ

Alec's background…

Alec Sharp, Clariteq Systems Consulting – *asharp@clariteq.com*

- 45 years global experience as an independent consultant:
  - Data Modelling and Management   My roots!
  - Business Process Modelling &
    Business Process Change – discover, scope,
    analyse, and design/redesign processes
  - Application Requirements Specification
  - Facilitation & Organisational Change
  - Project Recovery

- Awarded DAMA's global Professional Achievement Award for contributions to "human-friendly" data modelling

- Author of "Workflow Modeling"
  - best-selling book on process modelling & improvement
  - second edition – a complete re-write

Process   Business Process Modelling

Application   Use Case Modelling
               Service Specification

Data   Concept Modelling

WORKFLOW MODELING

*Check out the nice reviews
on Amazon - http://amzn.to/dHun1o*

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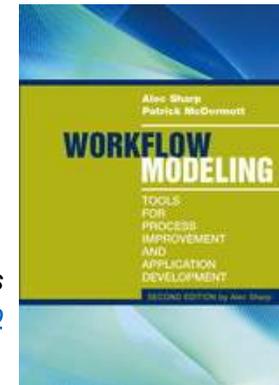
Clariteq – small, husband & wife company, global clients

ABB (ASEA Brown Boveri)
Aflac
American Honda
AMP (Australia Mutual Provident)
BackOffice Associates
Bank of Finland
Bellrock
Booking.com
Brisbane City Council (Australia)
Canadian Natural Resources Ltd.
City of Seattle
Civica UK
Clearwater Paper
Corvias
Dell
DHL Express
Dutch National Bank
Elisa
Ericsson
Essity
Eurojust (European Justice Comm.)
European Central Bank
Fortum
Gofore
Helse Vest - Norway
HM Land Registry - UK
Home Depot
Idaho Transportation Dept.
Intel
ISO New England

ING Bank
JP Morgan
Kal Tire
KONE
LGM Financial Services
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Livestock Improvement Corp.
MacDonald Dettwiler
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Microsoft
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MTS Allstream
Nexen
Novo Nordisk
Nusenda Credit Union
OP Bank
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Roche Diagnostics/Pharmaceuticals
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Carnegie Mellon University
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What we'll cover…

★	**Five Key Points**

1. Start with a nice conversation

2. Understand the "what" vs. "who and how" distinction

3. Patience is a virtue (so are Simplicity and Consistency)

4. Be fearless yet vulnerable - you don't know it all

5. Graphical design principles matter

6. and along the way…
   we can use Concept Models for so much more

The presentation slides provide a structure, but mostly I plan to *tell stories.*

1 – Start with a conversation

Don't begin with a lecture on data modelling

"Before we begin our data modelling session, let's go over some key points about data modelling. First, *an Entity is any uniquely identifiable person, place, thing, event, concept, or organisation of interest to the enterprise about which facts may be recorded.* Any questions? I didn't think so…"

"Before I begin my speech, let's cover a few of the basic rules of grammar. *A noun is any...* "
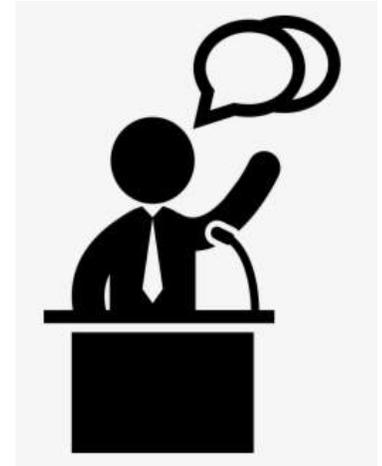
If you **avoid** starting with the theory and practice…

Modelling sessions go better

Allows use of concept modelling in non-typical situations

If you can, don't even call it "data modelling"

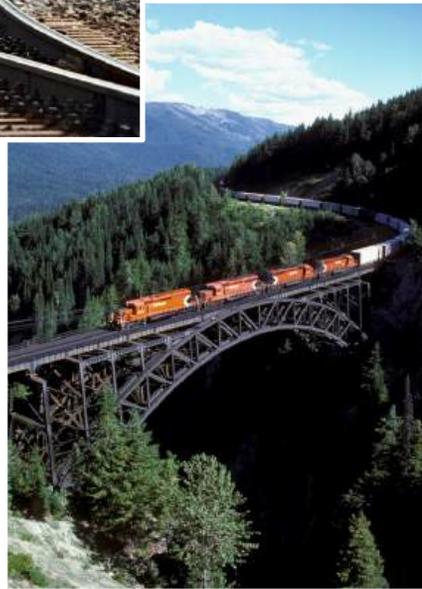**JUST DO IT.**

Painful but useful learning experience

The assignment –
facilitating a Concept Modelling
session for a railway's
Track & Structures group

I began by explaining
data modelling...
"An entity is a uniquely
identifiable person, place,
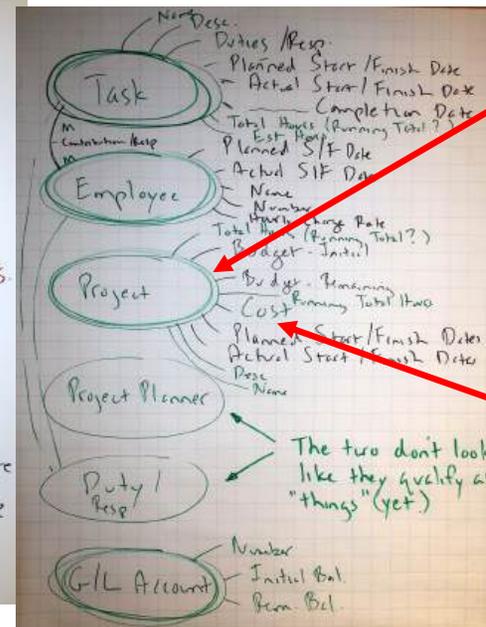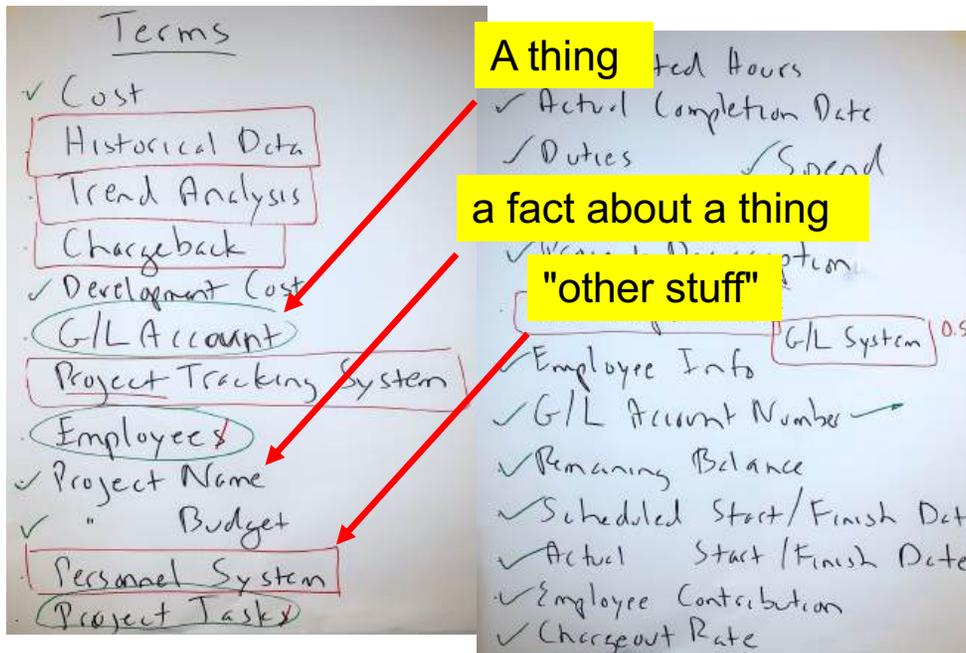thing, event, ..."
Bad idea!!!
"I can't stand you IT guys!"

It all begins with language

"Why don't you learn *our* language?" *"Fair point!"*
- Brainstormed over 200 terms –
  Track, Structure, Line, Siding, Mileboard, Segment, Sector, Route, …
- Oh-oh... *"Now what?" An idea!*
- Is this "a thing, a fact about a thing, or other stuff?"
- Here's a Project Management example…

A thing

a fact about a thing

"other stuff"

Things

Facts

Track & Structures were VERY happy with the 40 entity concept model *they* built.

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Or, start with one-on-one interviews

1) Interview business representatives about their area:
mandate and activities, goals and objectives, issues and opportunities,
needs and wants, likes and dislikes, etc.…

   Nod sympathetically, but ignore it all (almost!)

   Instead, capture "terms" – anything that goes by a name.

2) Later, write each term on a large Post-it

3) In a facilitated session, participants sort terms into categories:

   • Things (entities, but don't use the term… yet)

   • Facts about things (add new "thing" if it's not there already)

   • "Other stuff"

   As needed, introduce criteria to
   be a"thing" (an entity)

"Other stuff" includes:
• Metrics
• Organisations, departments, jobs, roles, …
• Processes, functions, activities, tasks, …
• Systems, tools, equipment, mechanisms, …
• Reports, forms, screens, queries, …
• Other – too vague, only one instance, a "fact of life," not a thing we track, etc.

Or, start with an email (or other) survey

- *Virtual* first, *in-person* later
- Via email, we gave a "homework assignment"
  - Please spend ~10 minutes listing terms you use daily.
  - Please identify information you need but can't get, or don't trust it
  - No right or wrong – goal is familiarity with your terminology
- The actual text of our email…

Before the session, it would be very helpful if everyone could do two things:

- Spend up to 10 minutes or so listing any terms that come to mind that you use on a frequent basis. Each item in your list could be the name of some thing you need to track, a fact about a thing, a spreadsheet, a report, a metric, a system, a database, or anything else that comes to mind. I'm hoping everyone can list thirty or forty things. There is no "right or wrong" – this helps me learn the language and provides clues to what the most critical terms might be.

- Think of one to three examples of information you'd like to be able to get, but either you can't, or you're not sure how accurate it is. For instance, at a US university last week, a Vice-Provost said she would like to know "How many non-resident, tenure-track Faculty do we have." Of course, this means agreeing what is meant by "Faculty," "tenure-track," and "non-resident." (I've done a LOT of work in higher education, and can promise you there is not agreement on what those terms mean.)

That's the whole point of our sessions next week. :-)

Some had little to say, others had lots

- What do we consider a Member in reporting?
- What do we consider an Account in reporting?
- How do we determine how many members we have? Is it based on number of individual memberships or unique SSN?

Member Solutions Terms

- Carmpro (collections system)
- ARM (recovery system in Carmpro)
- Promise to Pay (PTP)
- Payment by interval i.e by hour or day
- Call by interval i.e. by hour or day
- Balances saved by interval i.e by hour or day
- Charge off
- Repossession
- Penny loan
- Workout loan
- Fixed Payment Plan
- Loan Extension
- Bankruptcy by chapter 7,11,13
- Delinquency
- Delinquency rate
- 60 day + delinquency rate
- Charge off rate
- Net Charge off rate
- Recovery
- Recovery rate
- Forced closed
- Lexis nexis
- Credit bureau /credit report
- Skip tracing
- Net flow rate
- Leading edge rate
- Roll rate

General Terms

- Member
- Membership
- Individual
- Account
- Services
- Co-borrower
- Primary
- Joint
- Pay off
- FIS (Clientlink)
- Co – op (Springboard)
- DMI
- Past due
- Total due

<u>All</u> were useful

Terms:

- Household income
- Member growth
- Loan originations per member
- Average relationship balance
- Average relationship account
- Fee income per member
- Net income per member
- Marketing expense per member
- Member trends
- Market segmentation
- Mobile/Online banking penetration
- Member investment products
- Member retirement products
- Lending market overview (credit card, mortgage, auto, home equity)
- Benchmarking
- Payment information (how cards are used)

Examples:

- Product/Service adoption based on campaigns
- Track acceptance rates on promotions
- Tracking the new member sales path (similar to what we are doing with the organic growth project)

I went through all the "homework" and selected ~40 terms that qualified as "things"
(or entities, or business objects, or classes, or…)

At the first session - "Here are the 'things' you mentioned"

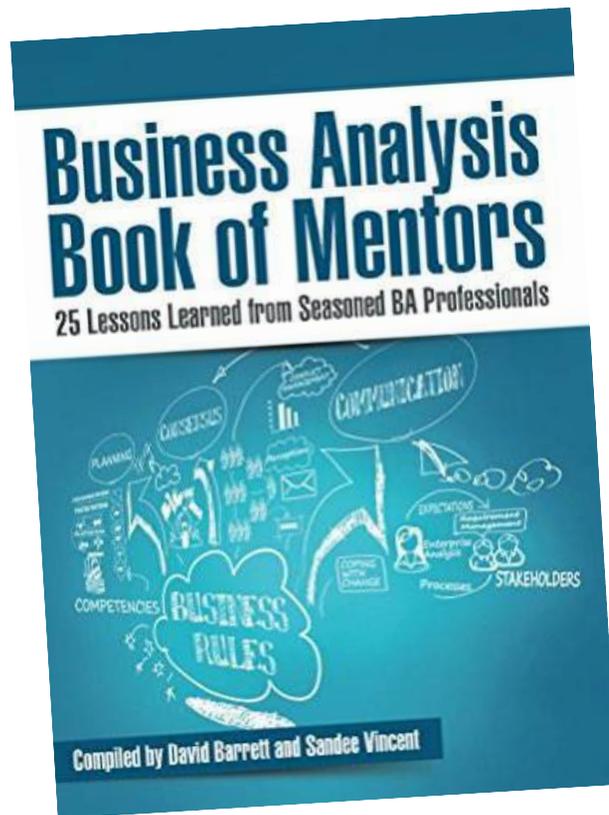## More than enough to work with – here are 30:

They added more…

"Wow – you actually *did something* with our homework!"

2 — Use the distinction between the "what" and the "who & how"

My chapter in the "BA Book of Mentors"

The premise of the book:

- 25 experienced BAs from around the world would each write a chapter on "The Most Important Lesson I Learned in my BA Career.'

- I knew mine instantly – separate the "what" from the "who, how, and why"

- In other words, separate the "essence" from the "accident"

Essence and Accident?

Essential:
1) ~~absolutely necessary; extremely important.~~
2) something's basic or most important characteristics;
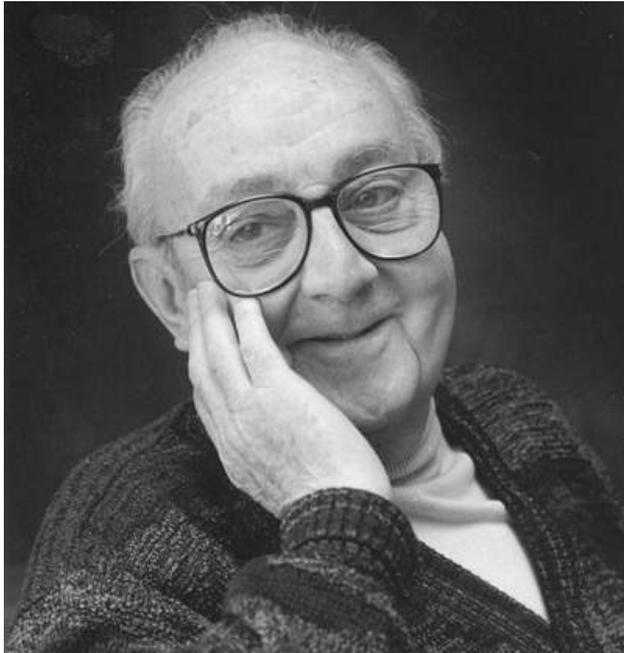   the intrinsic, inherent, or fundamental nature of something

Cup:
The *essential* characteristics:
a round, handheld container
for drinking from.
What it is.

The *accidental* characteristics:
ceramic vs. bamboo, handle or not, …
how it is designed or made and
who it will be used by

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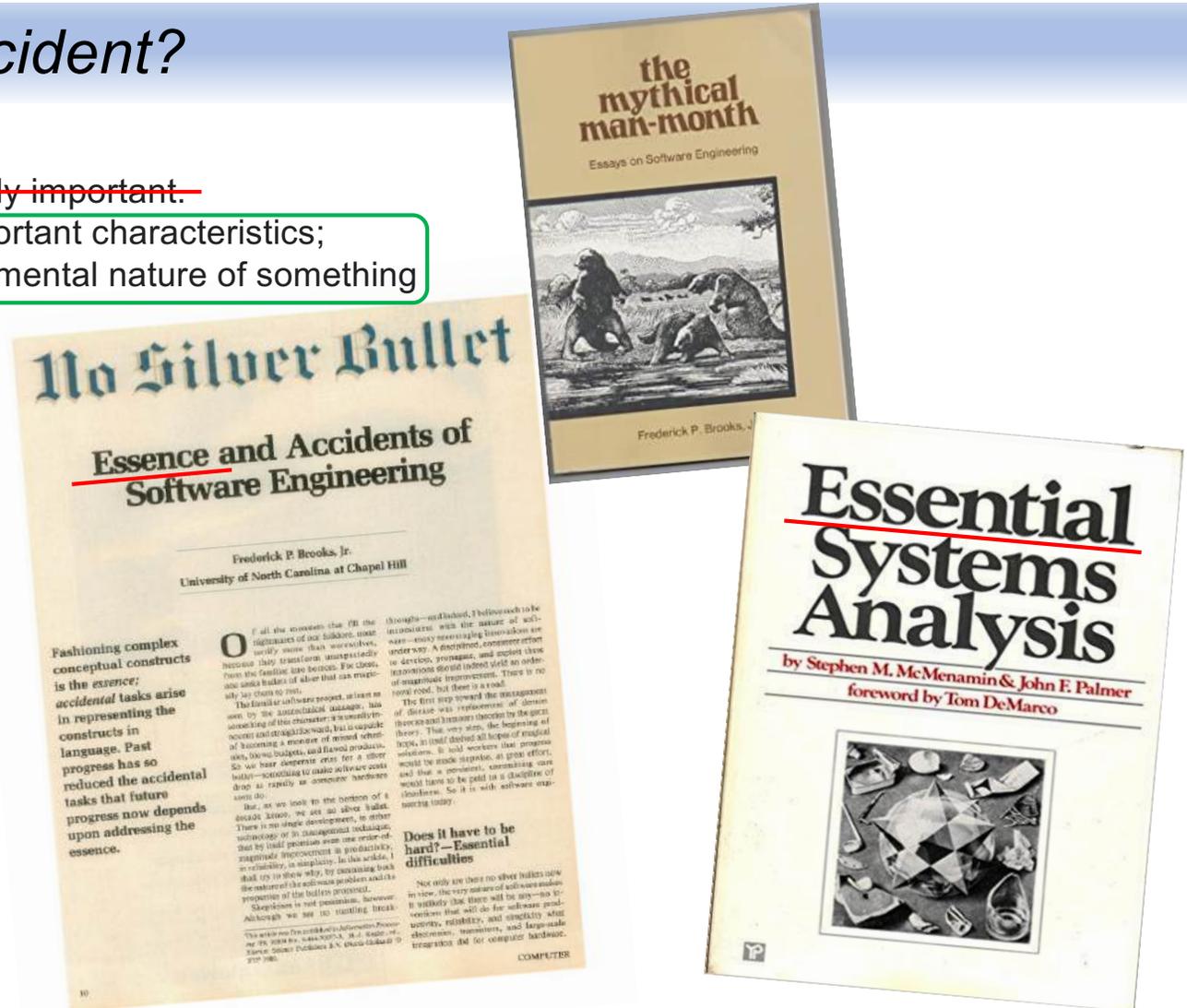
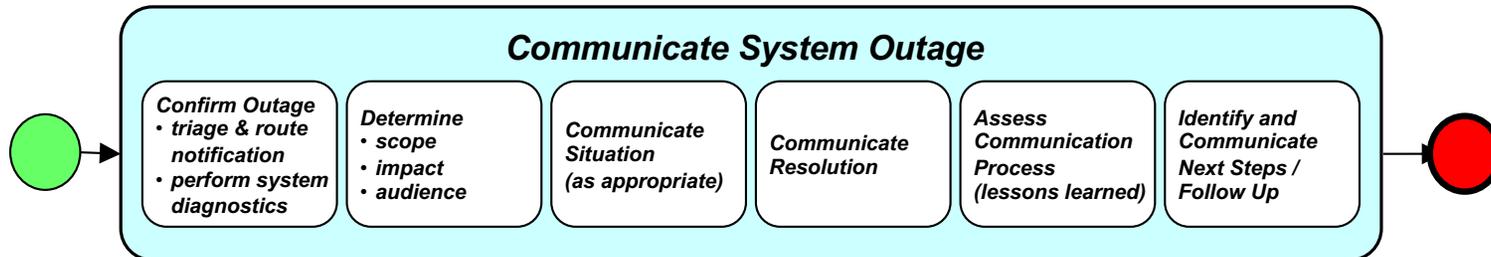# *"All models are wrong, but some are useful."*

George E. P. Box
1919–2013

Two especially useful models

- Business Process Scope Model
- Business Concept Model
  (a.k.a Conceptual Data Model)

Both are "essential" –
they show the essence – the "what" –
of a subject with no reference to who,
how, why, etc.

"What" - a Process Scope Model

Communicate System Outage

Confirm Outage
• *triage & route notification*
• *perform system diagnostics*

Determine
• *scope*
• *impact*
• *audience*

Communicate Situation
(as appropriate)

Communicate Resolution

Assess Communication Process
(lessons learned)

Identify and Communicate Next Steps / Follow Up

Triggering Event:

Notification of degradation or lack of Service
• internal system
• external provider
• calls to Service Desk

Cases:
• new
• recurring

Other factors:
• severity
• key operations periods / areas (registration, summer, course evaluation season)
• time of year
• time of day

Results:
Communications about the Outage and the progress on resolving it are delivered:
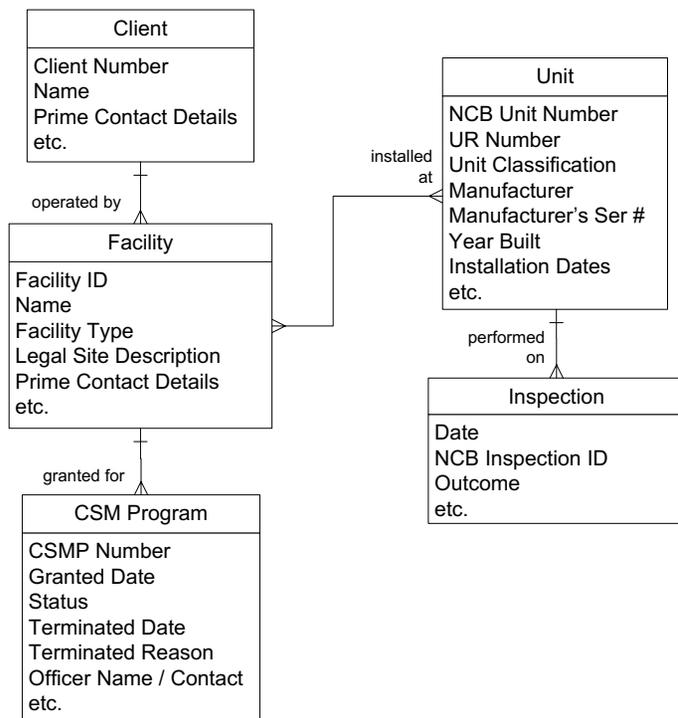• internally and externally
• informally and formally

Final Results:
Service is restored and root cause is known (or is determined to be unknowable) and resolution is communicated:
• Externally ("good news")
• Internally ("cause & resolution)

Process Scope Model using "TRAC" -
what is the Trigger, *what* are the Results,
what are the main Activities
(7 ± 2 milestones, phases, or subprocesses,)
and *what* are the main cases or variations?

Why 7± 2?

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"What" – a Concept Model

Client

Client Number
Name
Prime Contact Details
etc.

operated by

Facility

Facility ID
Name
Facility Type
Legal Site Description
Prime Contact Details
etc.

granted for

CSM Program

CSMP Number
Granted Date
Status
Terminated Date
Terminated Reason
Officer Name / Contact
etc.

installed at

Unit

NCB Unit Number
UR Number
Unit Classification
Manufacturer
Manufacturer's Ser #
Year Built
Installation Dates
etc.

performed on

Inspection

Date
NCB Inspection ID
Outcome
etc.

A description of a business in terms of

- **things** it needs to maintain records of – *entities*

- **facts about those things** – *relationships* & *attributes*

- **policies & rules** – *definitions*, *constraints,* and *assertions* governing those things and facts

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Use a Concept Model to demonstrate what's possible

When Concept Modelling in a university environment,
everyone wants their favourite report (or artifact) show up on the data model.

We need to be ready to show a near-infinite number of reports etc. can be produced from one essential model:

- Class Roster

- Student Transcript

- Instructor Assignments

- …
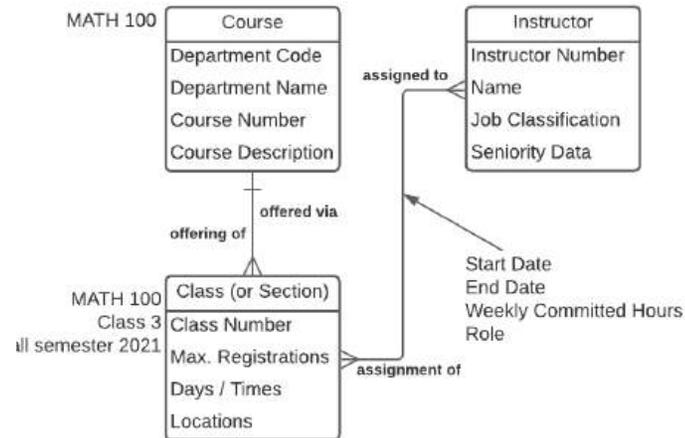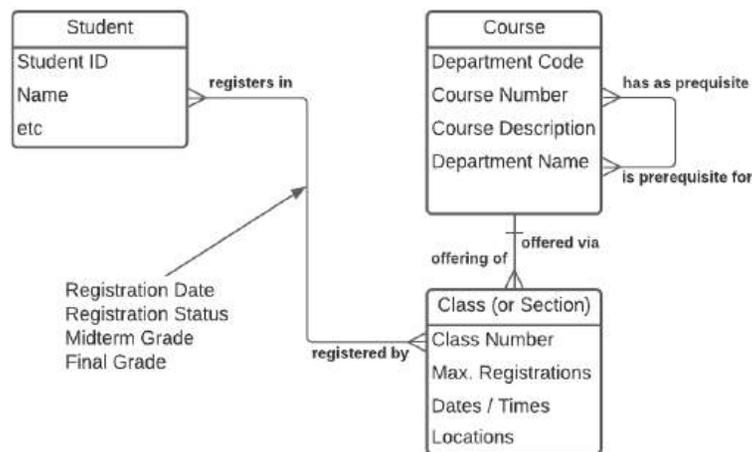
3 – Patience is a virtue

Two examples I'll illustrate with stories:

1. Don't rush people into agreeing on an
   entity definition (the heart of concept modelling.)
   First, establish there are legitimate differences of opinion

2. Don't rush to generalise or create supertypes.
   First, help everyone see the similarities.

Recent student comments -
"I learned modelling should proceed at the pace the group is comfortable with"
and
"Move faster by slowing down"

Entity definition - start by opening minds

"Can anyone think of examples that might surprise someone else –
that is, anomalies or potential sources of confusion."
E.g., how could we legitimately have different ideas what "Employee" means?

Employee

Project

Account

Task

Starting an Entity definition

"Can anyone think of examples that might surprise someone else –
that is, anomalies or potential sources of confusion."
E.g., how could we legitimately have different ideas what "Employee" means?

F/T vs. P/T?

Only IS Department?

Include management,
or only individual contributors?

Still in recruitment (an applicant)?

Onboarded? on probation? active? retirees?

Include contractors, student interns, vendor staff, etc.?

Volunteers?

A type of worker (DBA or tester) or a specific person?

A robotic, automated, or AI agent?

Employee

Project

Account

Task

Starting an Entity definition

*"Can anyone think of examples that might surprise someone else –
that is, anomalies or potential sources of confusion."
E.g., how could we legitimately have different ideas what "Employee" means?*

F/T vs. P/T?	– *Both*
Only IS Department?	– *No*
Include management, or only individual contributors?	– *Yes, everyone*
Still in recruitment (an applicant)?	– *No*
Onboarded? on probation? active? retirees?	– *Yes, all*
Include contractors, student interns, vendor staff, etc.?	– *Yes, all*
Volunteers?	– *Yes*
A type of worker (DBA or tester) or a specific person?	– *No, only a specific person*
A robotic, automated, or AI agent?	– *No, only a real person*

Employee

Project

Account

Task

Defining the Entity "~~Employee~~" – "Worker"

Definition format:

1. A description of which real-world things are within in scope, and any specific inclusions ("This *includes*…" or "This *is*...")

2. Illustrate with examples – 5 to 10 sample instances or types

3. Interesting points – anomalies, synonyms, common points of confusion, etc.
   May include specific exclusions
   ("This *excludes*…" or "This *is not*...")

Worker (renamed from Employee):

A *Worker* is a person, whether or not directly employed by *the company,* but with some sort of employment contract or arrangement, who has been or may be assigned to a Project.

Worker includes:
- Full or Part-time Employees who have been onboarded, including Probation, Active, Seconded, Suspended, Retired…
- Contractors
- Consultants
- Student Interns
- Vendor Staff Persons
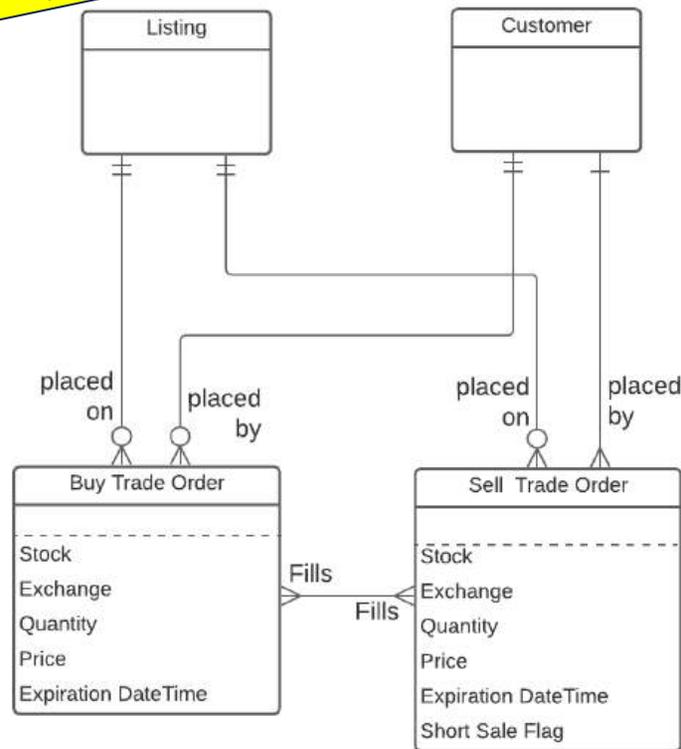- Company Owners and Managers

Key points:
- "Worker" was chosen as the entity name because it is more generalised than "Employee."
- A Worker may not necessarily be billable on a Project, e.g., a non-chargeable Subject Matter Expert or Volunteer
- Worker excludes:
  - Job Roles, e.g., DBA or Technical Writer
  - Robotic, Automated, or AI Agents (this might change)

A real example - specifics first, generalisation later

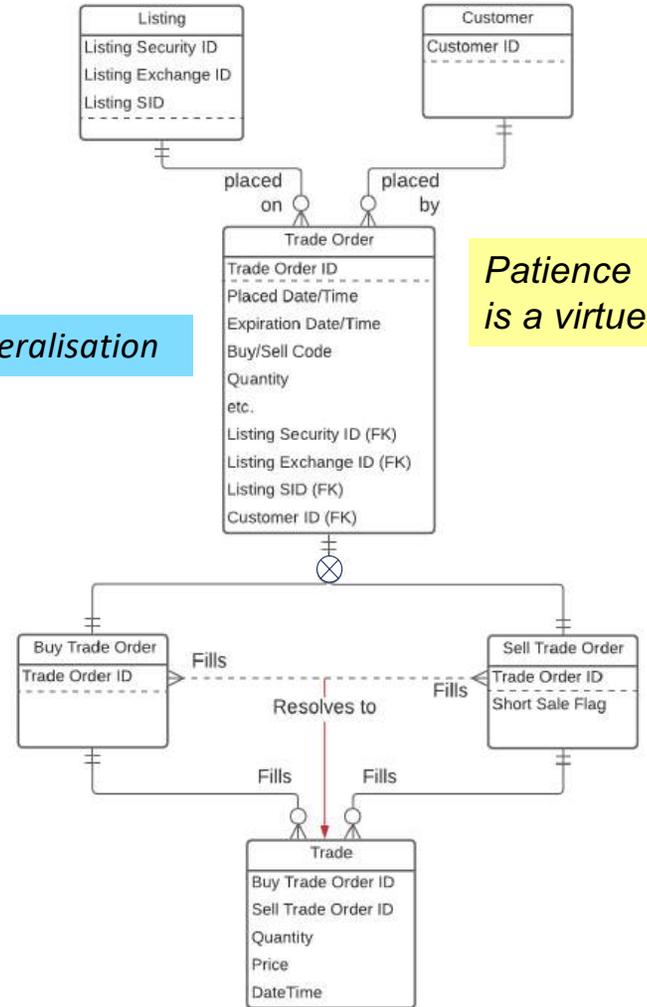**Delaying supertyping/generalisation - a real example**

Generalisation

Patience is a virtue!

Client: "Wow! Buy and Sell Trade Orders look very similar!"

Me: "Omigosh! That's amazing!"

Specifics

4) *The Principle of Constructive Ignorance*

Never be afraid to ask "dumb" questions…

- Myth -

"I've got to have all the answers.
I can't show my ignorance."

- Reality -

- You're not paid to **know** - you're paid to **ask**
- **Someone** will be glad you did
- The number of different answers will surprise **everyone**
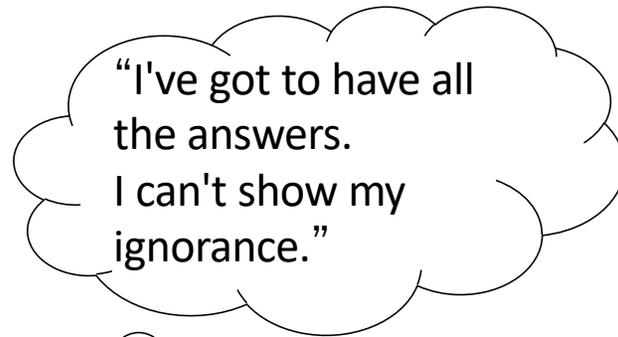
Just one more question, ma'am. Nothing too important...

There's one thing I'm not clear on...

Could we go over this just once more to be sure I've got it right?

Lieutenant Columbo takes up Data Modelling

5) *Graphical design principles matter*

It's learnable! e.g., Gestalt principles (study them on your own)
- how humans instinctively organize individual visual elements
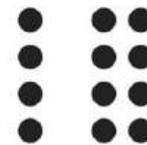- groups, patterns, and unified wholes vs. separate parts.
- key principles:
  - proximity
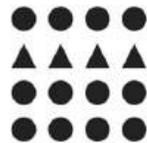 - similarity
  - closure
  - continuity
  - symmetry
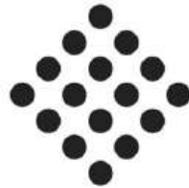
Good Figure
Objects grouped together tend to be perceived as a single figure. Tendency to simplify.

Similarity
Objects tend to be grouped together if they are similar.

Closure
Visual connection or continuity between sets of elements which do not actually touch each other in a composition.

Proximity
Objects tend to be grouped together if they are close to each other.

Continuation
When there is an intersection between two or more objects, people tend to perceive each object as a single uninterrupted object.
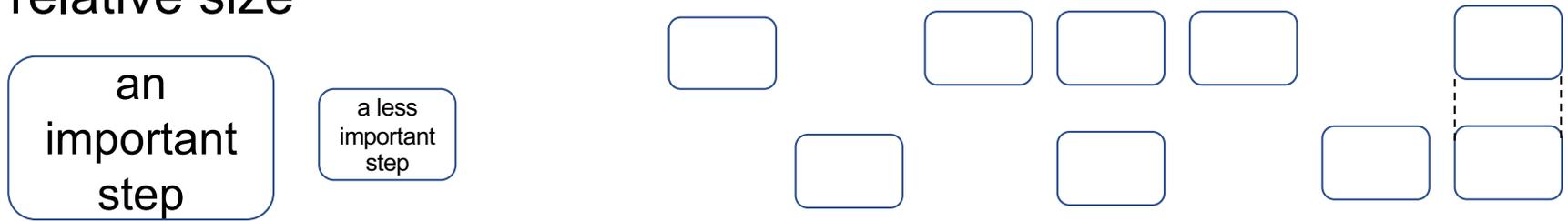
Symmetry
The object tend to be perceived as symmetrical shapes that form around their center.

Cognitive psychology of diagramming - a process example
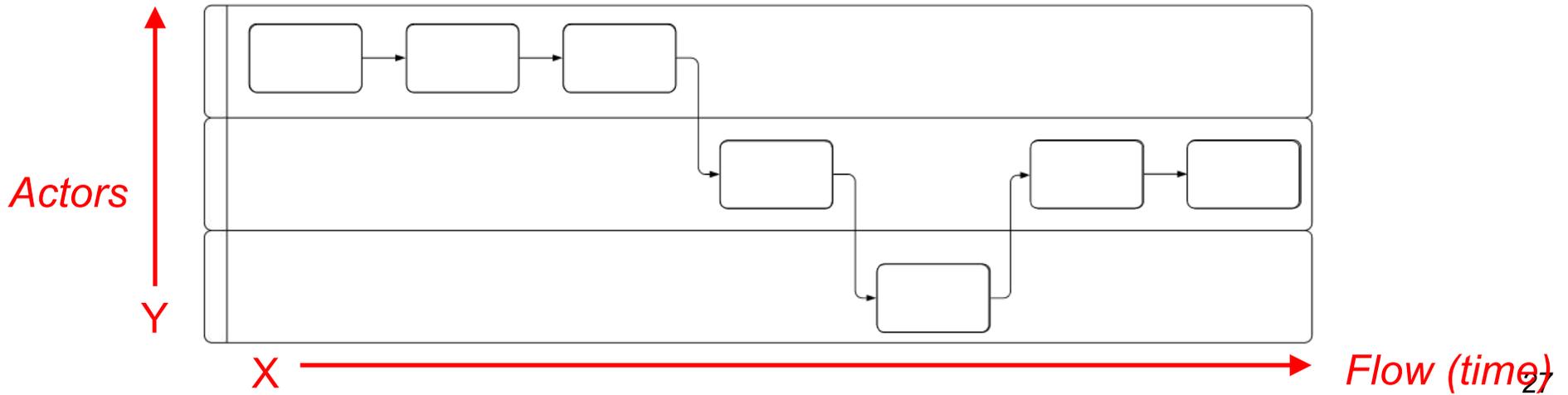
What do people first perceive on a diagram?

1. relative size

| an important step | a less important step |

Make all the steps the same size,
unless you're trying to make a point

2. relative X-Y position

Actors

Y

X → *Flow (time)*

Don't conceal sequence and dependency
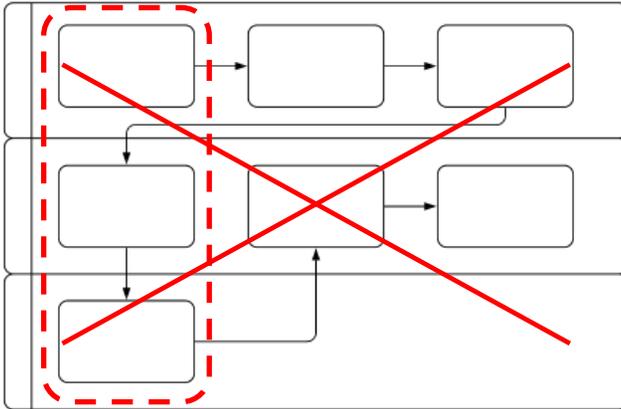
Steps perceived as happening in *parallel*,
even though flow lines indicate *sequential*.

Critical in analysing a process:
- sequential vs. parallel
- dependent vs. independent

A simple guideline:
flow lines *only* leave
the right edge
and *only* enter
the left edge – never
the top or bottom.

And for data…?

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For data models, always draw top-down by dependency

For a Concept Model

Client
- Client ID
- Full Legal Name
- Goes By Name
- Head Office Location
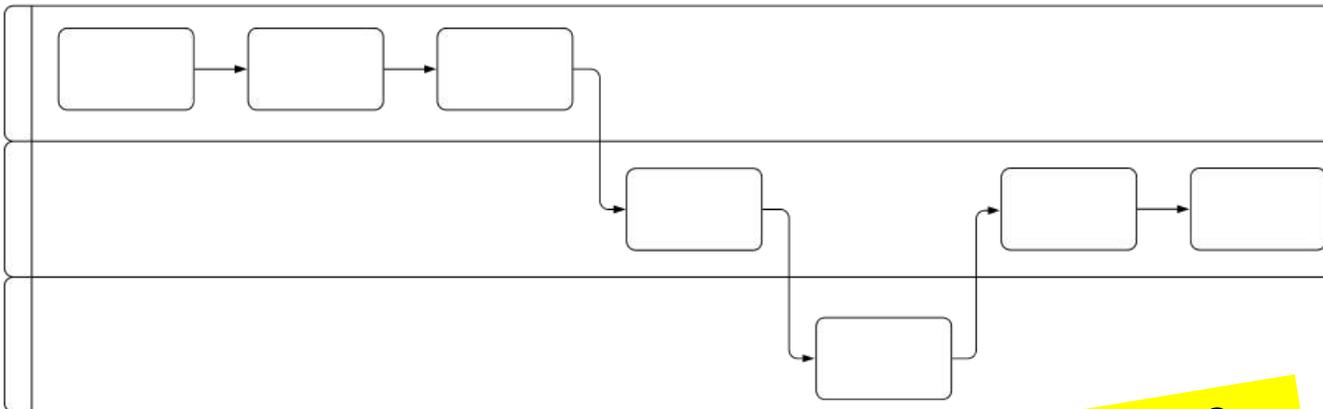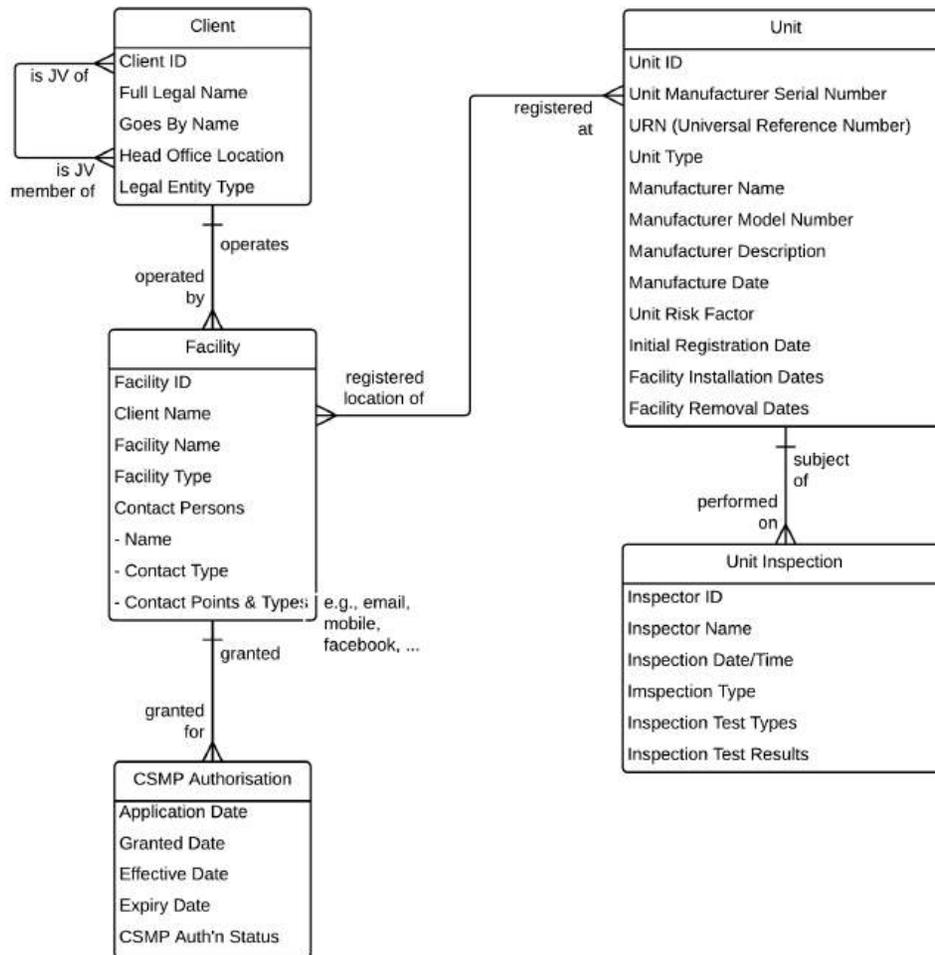- Legal Entity Type

is JV of

is JV member of

operates

operated by

Facility
- Facility ID
- Client Name
- Facility Name
- Facility Type
- Contact Persons
- - Name
- - Contact Type
- - Contact Points & Types — e.g., email, mobile, facebook, ...

registered location of

Unit
- Unit ID
- Unit Manufacturer Serial Number
- URN (Universal Reference Number)
- Unit Type
- Manufacturer Name
- Manufacturer Model Number
- Manufacturer Description
- Manufacture Date
- Unit Risk Factor
- Initial Registration Date
- Facility Installation Dates
- Facility Removal Dates

registered at

subject of

performed on

Unit Inspection
- Inspector ID
- Inspector Name
- Inspection Date/Time
- Imspection Type
- Inspection Test Types
- Inspection Test Results

granted

granted for

CSMP Authorisation
- Application Date
- Granted Date
- Effective Date
- Expiry Date
- CSMP Auth'n Status

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Top-down by dependency

For a Logical Model

Top-down by dependency

For a "halfway-house" model
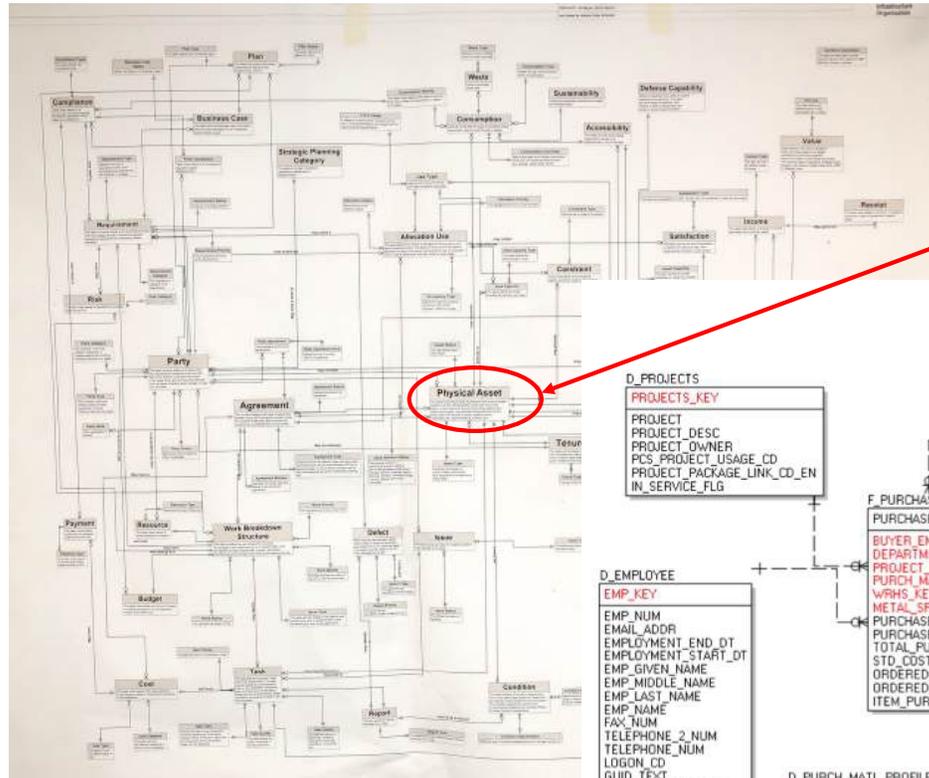
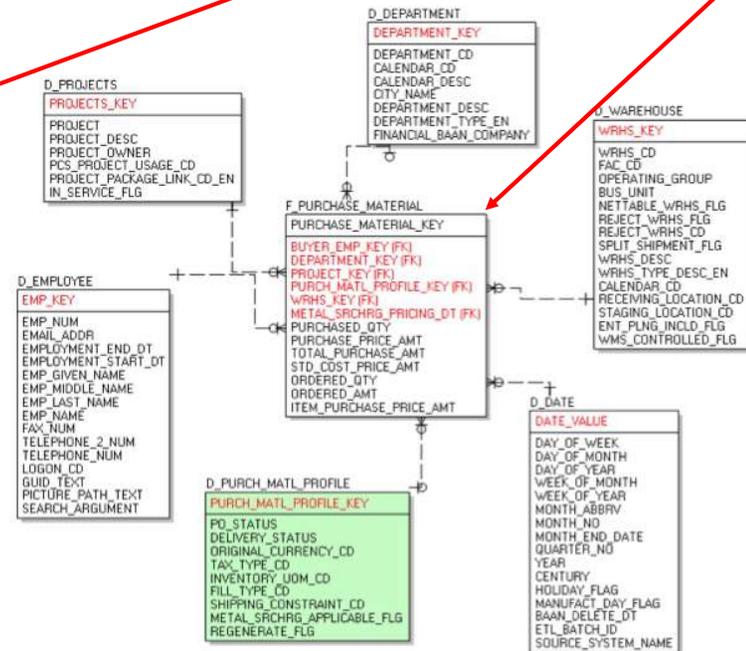# *What works for Dimensional Models doesn't for E-R Models*

A common error –
"the most important entity should go in the centre of the diagram."

An excellent model *structurally*, but very difficult to follow – *no sense of direction.*

Concept Models / E-R Models should be drawn top-down by dependency.

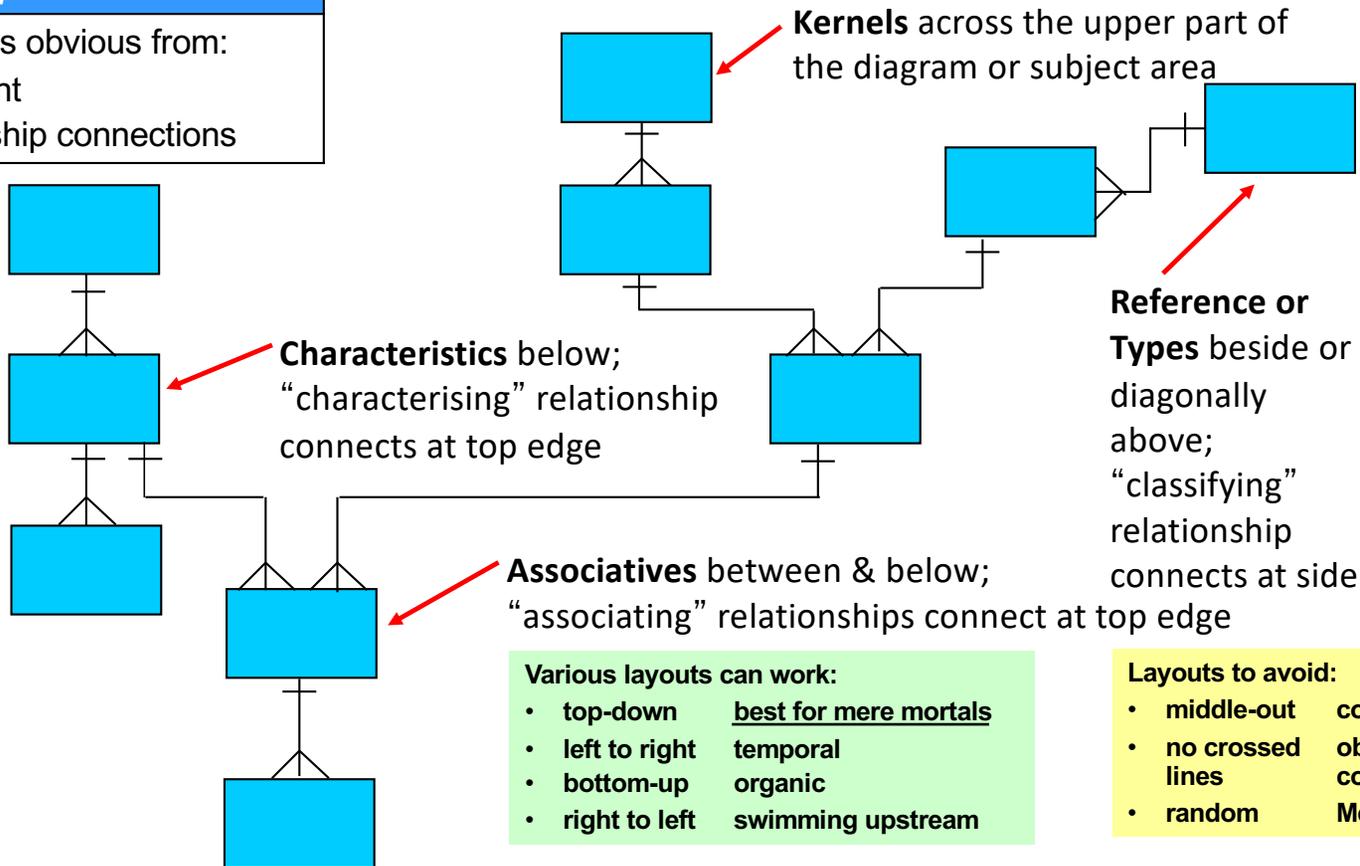"Fact" in the middle - fine for Dimensional, terrible for E-R

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Graphic guidelines – the "no dead crows" principle

!	*Key point*

Entity type is obvious from:
- Placement
- Relationship connections

Kernels across the upper part of the diagram or subject area

Characteristics below; "characterising" relationship connects at top edge

Reference or Types beside or diagonally above; "classifying" relationship connects at side

Associatives between & below; "associating" relationships connect at top edge

Various layouts can work:
- top-down — best for mere mortals
- left to right — temporal
- bottom-up — organic
- right to left — swimming upstream

Layouts to avoid:
- middle-out — cosmic
- no crossed lines — obsessive compulsive
- random — Mensa-only

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In summary – don't forget the four Ds of Concept Modelling

Concept Modelling w. Normal People — 5 Key Lessons from 45 Years of Concept Modelling

1 Definition

- "What *is* one of these things?"
- List common and unusual instances
- "Are there any known anomalies?"
- "What are the potential differences of opinion?"

2 Dependency

- "What type of entity is this?"
- "What other entity does it depend on?"
- Essentially
  - is it a free-standing thing?,
  - is it a type of thing?,
  - is it repeating detail about some other thing?

3 Detail

- Don't dive into detail – keep it in its place!
- GEFN!* HPDL!**

*Good enough for now!
**Hard part, do later!

4 Demonstration

- Assertions / narrative rules
- Sample data values or instances
- Scenarios or use cases
- Props (e.g., report layouts or common documents)

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What we covered

★	*Five Key Points*

1. Start with a nice conversation

2. Understand the "what" vs. "who and how" distinction

3. Patience is a virtue (so are Simplicity and Consistency)

4. Be fearless yet vulnerable - you don't know it all
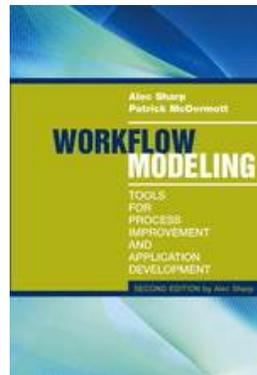
5. Graphical design principles matter

We hope you got some good ideas from this session!

Thank you – stay in touch!

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And most of all, if you have questions or comments…
don't be shy – send me a note!