knowledge representation

Α	α
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Ζ	ζ
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Θ	θ
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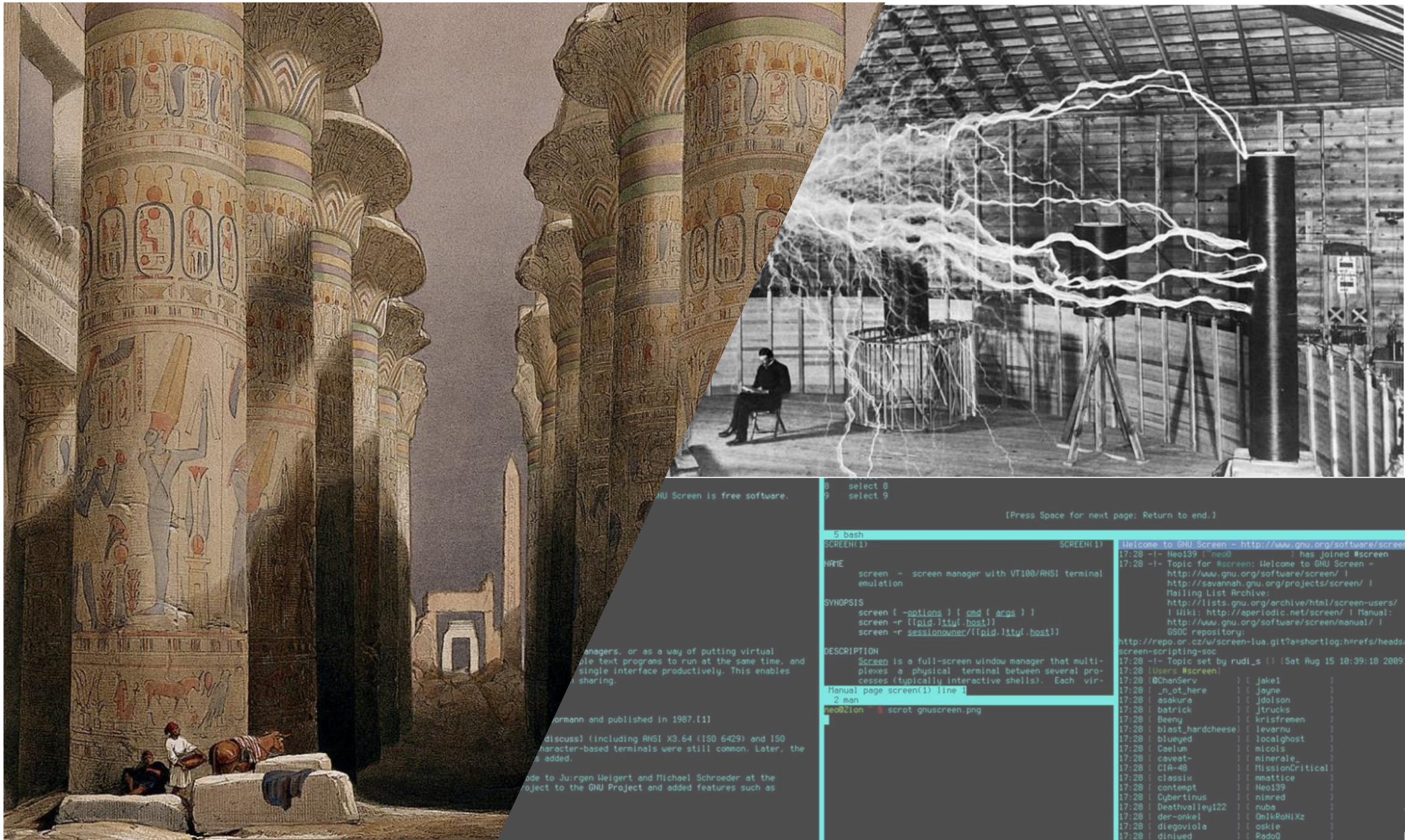
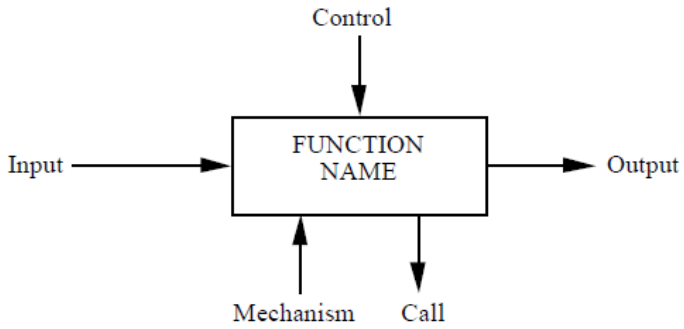


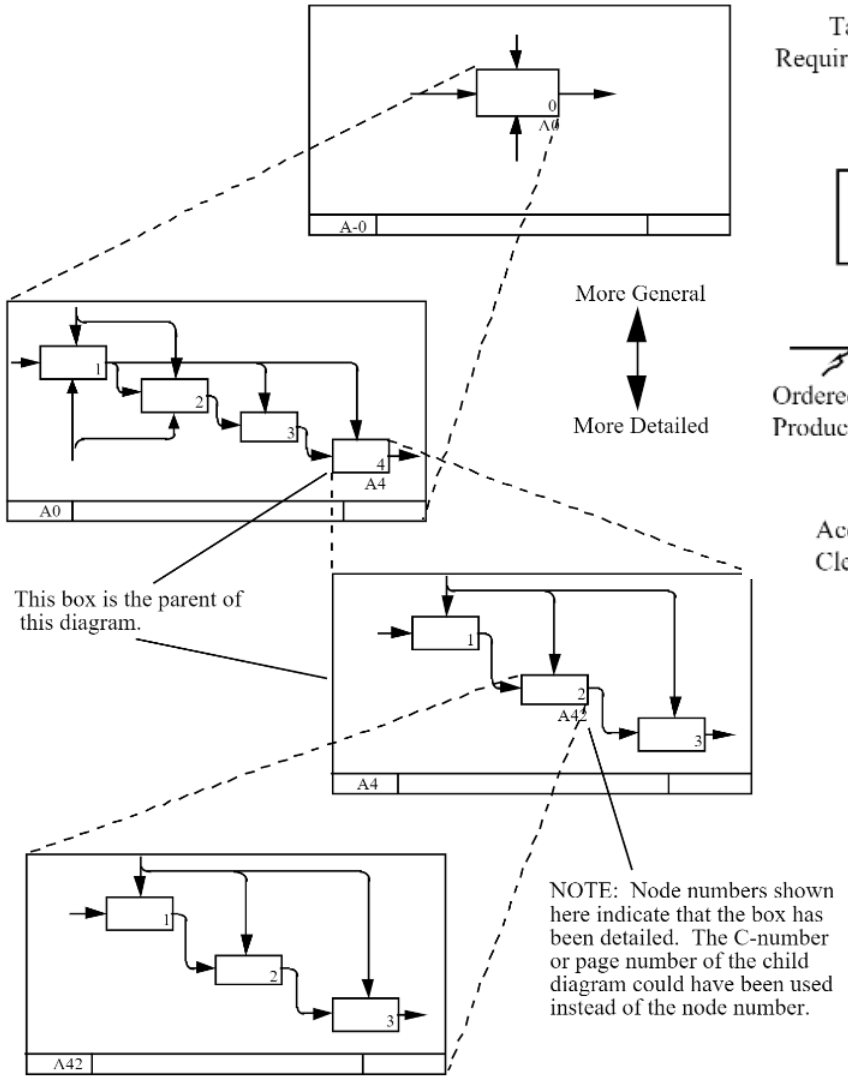
bh.github
b.hogan@snhu.edu

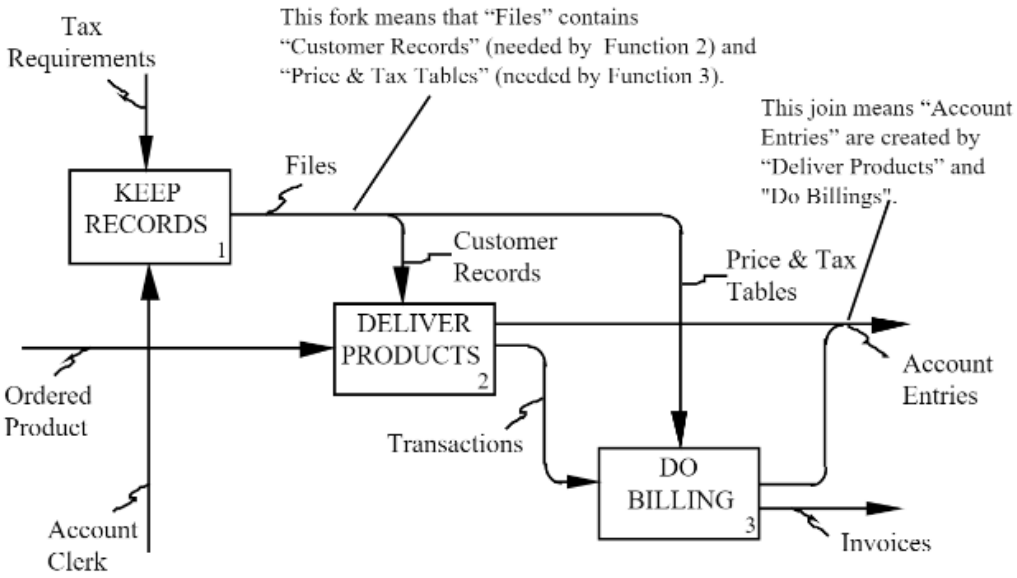
Model.1: IDEF0 <bh.github> <website> <how.to.doc> <how.to.video> <wikipedia>

History: developed in 1970s by U.S. Air Force for improving manufacturing of fighting aircraft.

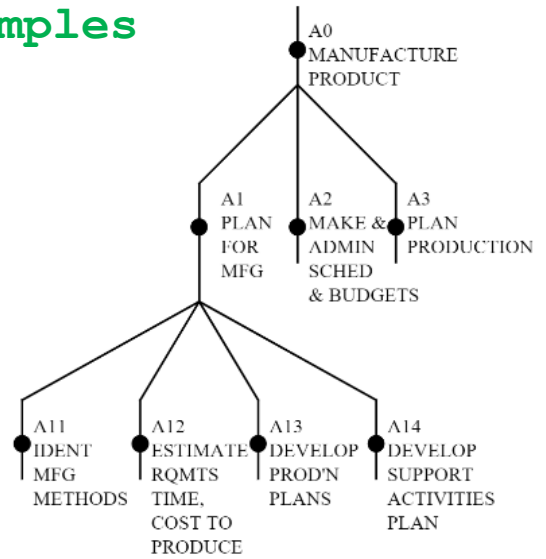
Purpose: gather process inputs, outputs, resources, and constraints to methodically outline a system or specific process.







Examples



Model.2: SWOT analysis <bh.github> <website> <how.to.video> <wikipedia>

History: deep history and university dispute on ownership

Purpose: Apply this versatile model to personal situations and businesses to perform a high-level assessment of the value of performing system analysis work. It is also instrumental in helping to organize an unorganized group discussion quickly.

INTERNAL	**STRENGTHS** Capabilities, resources or attributes that provide a competitive advantage Examples: production capacity, industry experience, financial resources, unique ingredients or packaging	**WEAKNESSES** Capabilities, resources or attributes that need improvement Examples: lack of resources, limited experience, no marketing plan, no food safety or traceability program
EXTERNAL	**OPPORTUNITIES** Circumstances that if capitalized on could have a positive impact on the business Examples: favourable market trends, new technology, government policy changes, potential partnerships	**THREATS** Circumstances that do or could have a negative impact on the business Examples: regulatory changes; new trends, access to ingredients, exchange rate fluctuations

EXAMPLE SWOT ANALYSIS

STRENGTHS	WEAKNESSES
Company: • Food science expertise • Sales have increased 57% in past six months • Low rent due to location (Tofino) • Utilizing low cost, approved, gluten-free, shared commercial kitchen* **Product:** • Contains less sugar and more protein than competitive products • Is on-trend (gluten-free, locally made) • Is listed in local food stores	**Company:** • Lack of financing • Has no business or marketing plan • High distribution cost due to location • Utilizing shared commercial kitchen limits production capacity* **Product:** • Higher priced than competitive products • High ingredient costs • Three month shelf life insufficient for retail sales
OPPORTUNITIES	**THREATS**
Company: • High number of people with gluten sensitivities on Vancouver Island • A higher volume in online purchases of natural health food products all over British Columbia	**Company:** • CFIA's Food Labelling Modernization Initiative may impact the company • Trend for gluten-free on downturn • Crop failure has affected supply of the ancient grains

*Note that a strength can also be a weakness. In this example the cookies are produced in a low cost shared commercial kitchen, meeting food safety requirements and gluten-free status. While a strength for a newly established company, it is also a weakness in that production in a shared commercial kitchen limits production capacity.

Model.2: SWOT analysis <bh.github><website><how.to.doc><wikipedia>

- Note: these models are for class quick reference use only.
- All students in IT.304 purchased and own "the decision book."

THE SWOT ANALYSIS

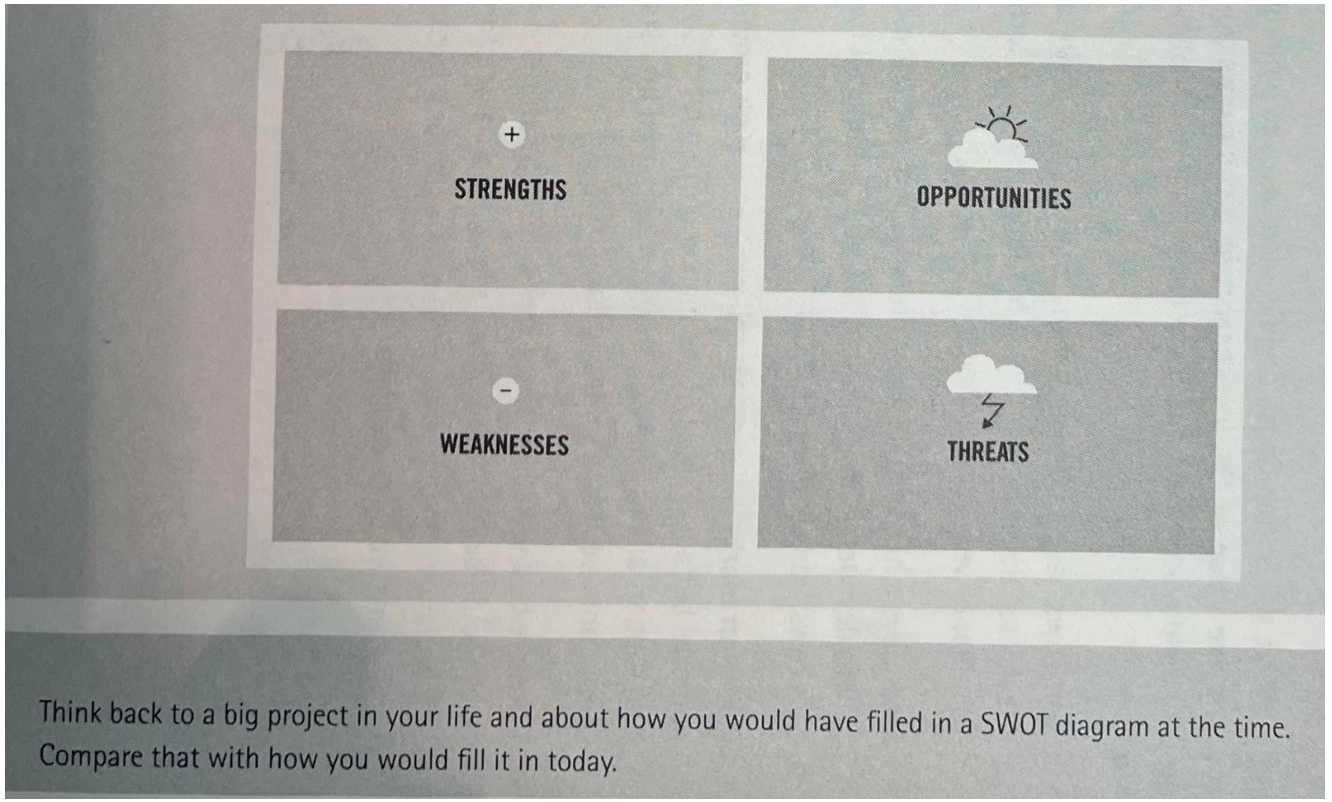
HOW TO FIND THE RIGHT SOLUTION

With SWOT analysis, you evaluate the Strengths, Weaknesses, Opportunities and Threats identified in a project. The technique is based on a Stanford University study from the 1960s which analyzed data from Fortune 500 companies. The study found a 35 percent discrepancy between the companies' objectives and what was actually implemented. The problem was not that the employees were incompetent but that the objectives were too ambiguous. Many employees didn't even know why they were doing what they were doing. SWOT was developed from the results of the study to help those involved in a project to gain a clearer understanding of it.

It is worth taking the time to think about each step of the SWOT analysis rather than just hastily fill it out. How can we emphasize our strengths and compensate for (or cover up) our weaknesses? How can we maximise opportunities? How can we protect ourselves against threats?

What is interesting about SWOT analysis is its versatility: it can be applied to business and personal decisions with equal success.

If you're not failing, you're not trying hard enough. *Gretchen Rubin*



A) Retrieved from: Krogerus, M., Tschappeler, R., and Pienning, J. (2018). **The decision book: fifty models for strategic thinking**. ISBN-10: 0393652378, ISBM-13, 978-0393652376.

- Amazon.com: The Decision Book: Fifty Models for Strategic Thinking: 9780393652376: Krogerus, Mikael, Tschäppeler, Roman, Piening, Jenny: Books

Model.3:
Swimlane diagram

<bh.github>

<website>

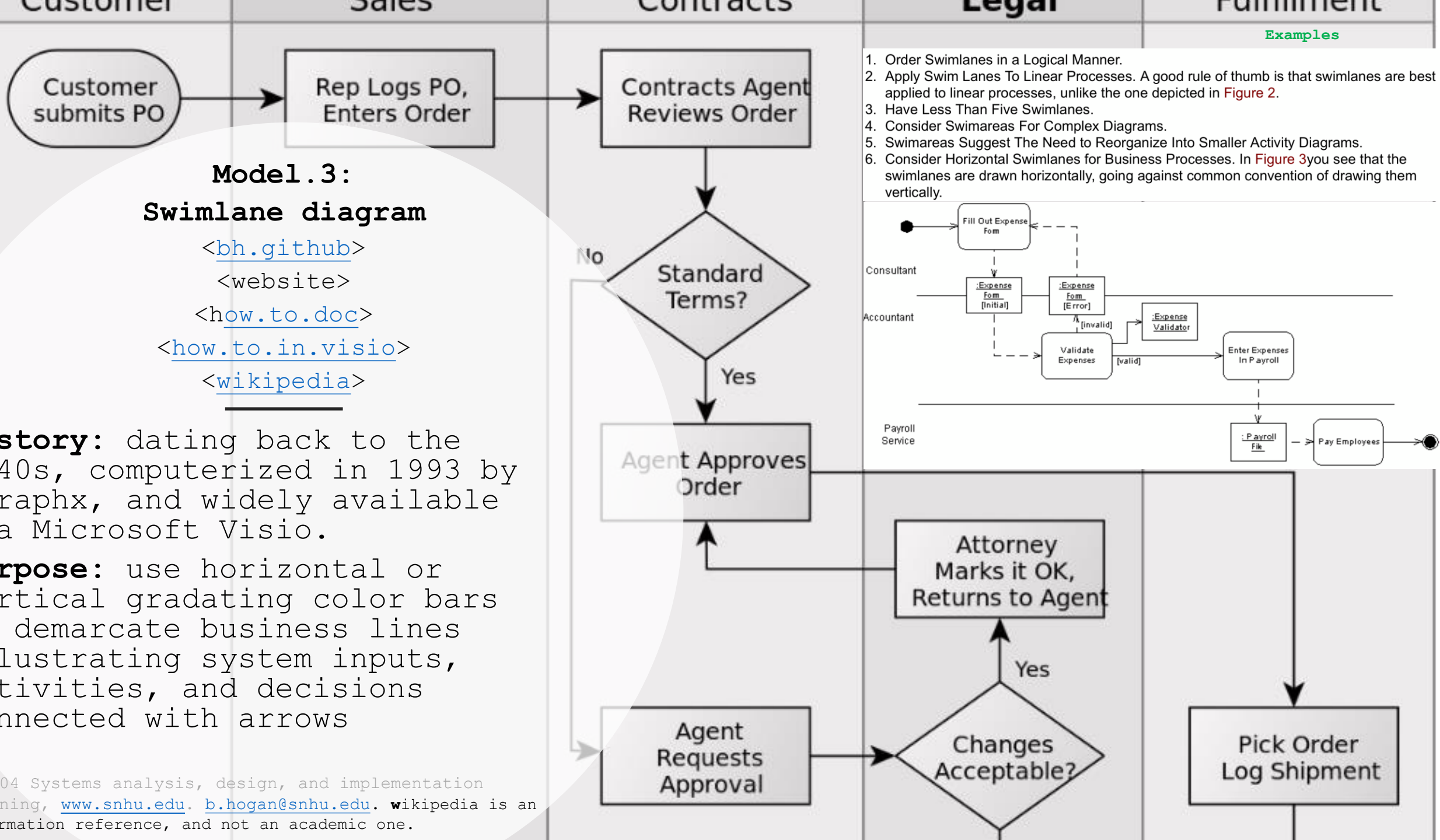
<how.to.doc>

<how.to.in.visio>

<wikipedia>

History: dating back to the 1940s, computerized in 1993 by Igraphx, and widely available via Microsoft Visio.

Purpose: use horizontal or vertical gradating color bars to demarcate business lines illustrating system inputs, activities, and decisions connected with arrows



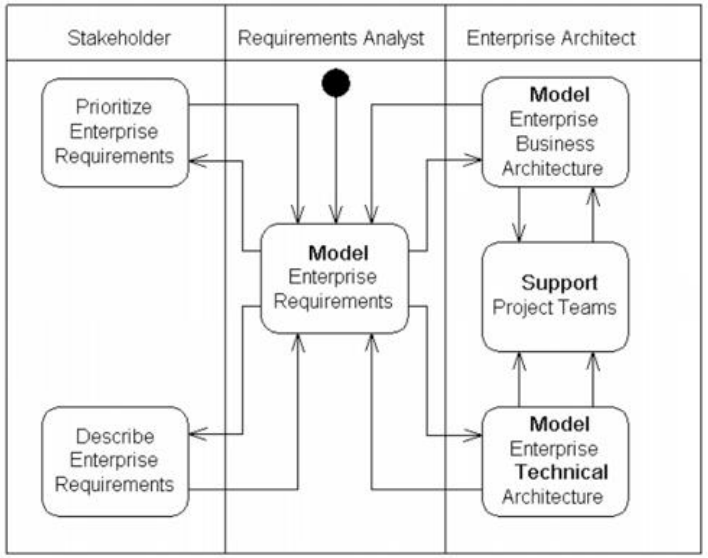
Examples

1. Order Swimlanes in a Logical Manner.
2. Apply Swim Lanes To Linear Processes. A good rule of thumb is that swimlanes are best applied to linear processes, unlike the one depicted in Figure 2.
3. Have Less Than Five Swimlanes.
4. Consider Swimareas For Complex Diagrams.
5. Swimareas Suggest The Need to Reorganize Into Smaller Activity Diagrams.
6. Consider Horizontal Swimlanes for Business Processes. In Figure 3you see that the swimlanes are drawn horizontally, going against common convention of drawing them vertically.

6. Swimlane Guidelines

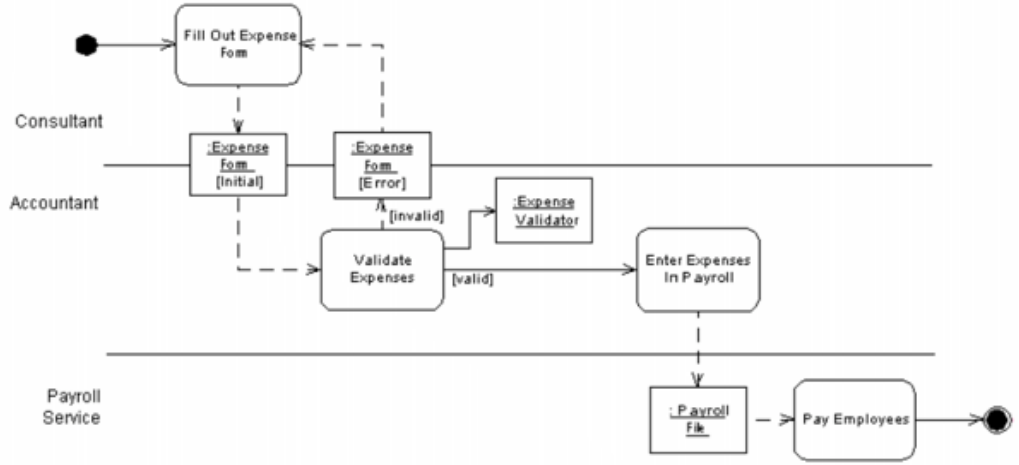
A swimlane is a way to group activities performed by the same actor on an activity diagram or to group activities in a single thread. Figure 2 includes three swimlanes, one for each actor.

Figure 2. A UML activity diagram for the enterprise architectural modeling (simplified).



http://www.agilemodeling.com/style/activityDiagram.htm#Swimlanes

Figure 3. Submitting expenses.



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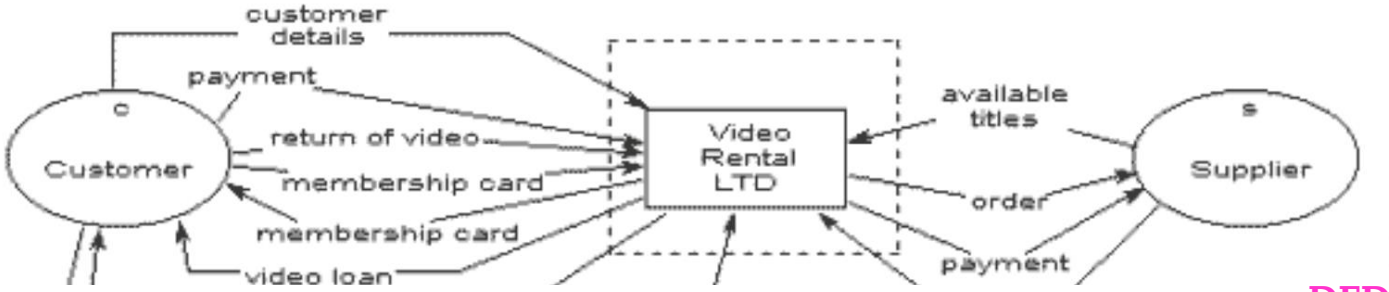
7 Action-Object Guidelines

Activities act on objects, In the strict object-oriented sense of the term an action object is a system object, a software construct. In the looser, and much more useful for business application modeling, sense of the term an action object is any sort of item. For example in Figure 3the *ExpenseForm* action object is likely a paper form.

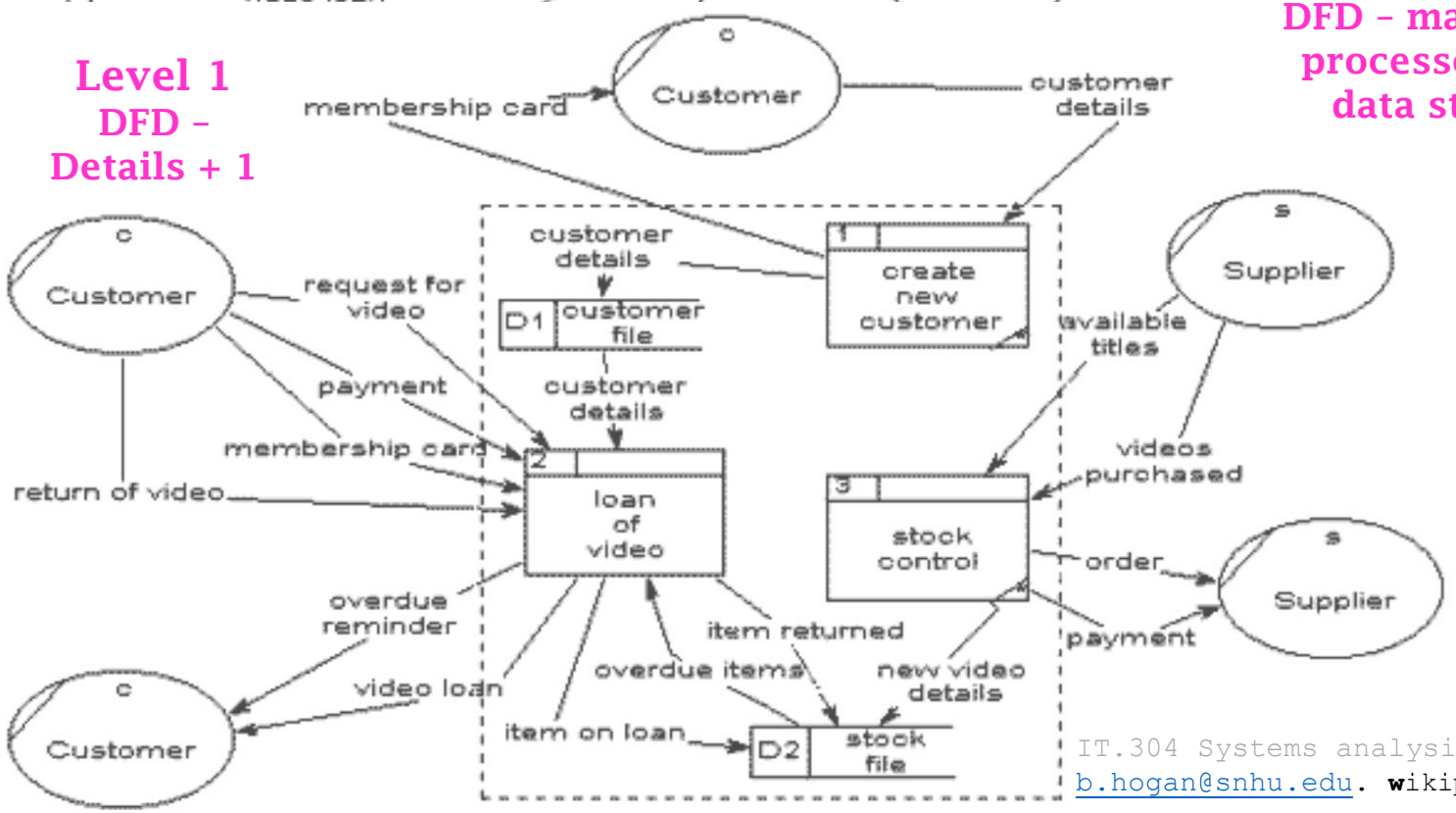
Model.4: Data Flow Diagraming <sparx-models> <website> <how.to.doc[VG]> <how.to.video> <wikipedia>

Purpose: proess of representing simplified data transactions to help process and stakeholder owners agree on scope and boundaries of a systems analysis and design reengineering effort. Level 0 is the highlevel context. Key tasks are detailed in level 1 indicating storage medium and transactions. Level 2 specifies transactions and their storage.

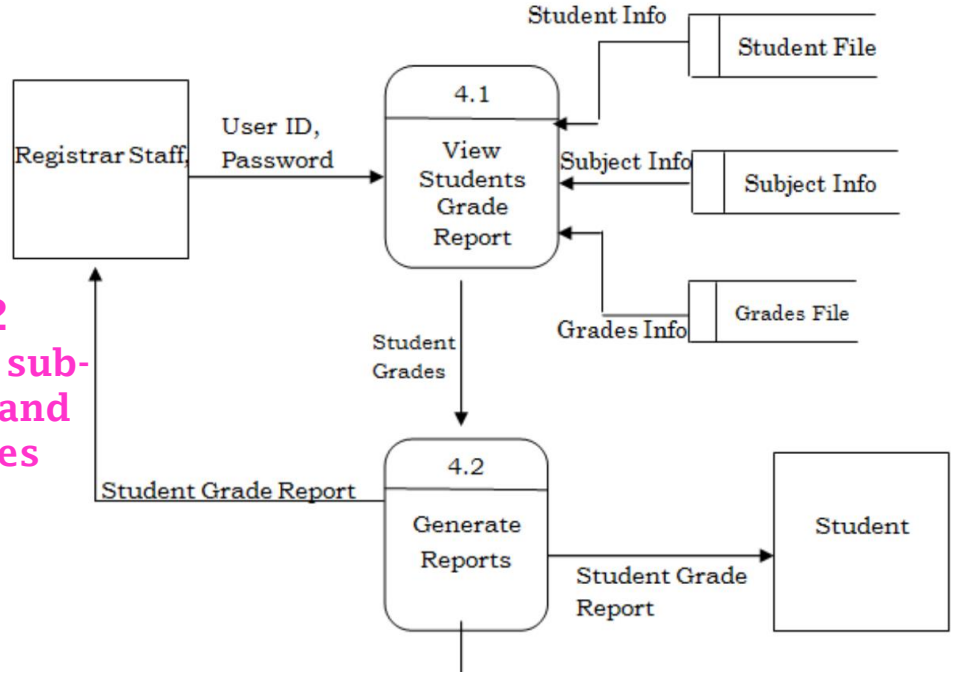
Level 0 - DFD - Context Diagram



Level 1 DFD - Details + 1



Level 2 DFD - main sub-processes and data stores

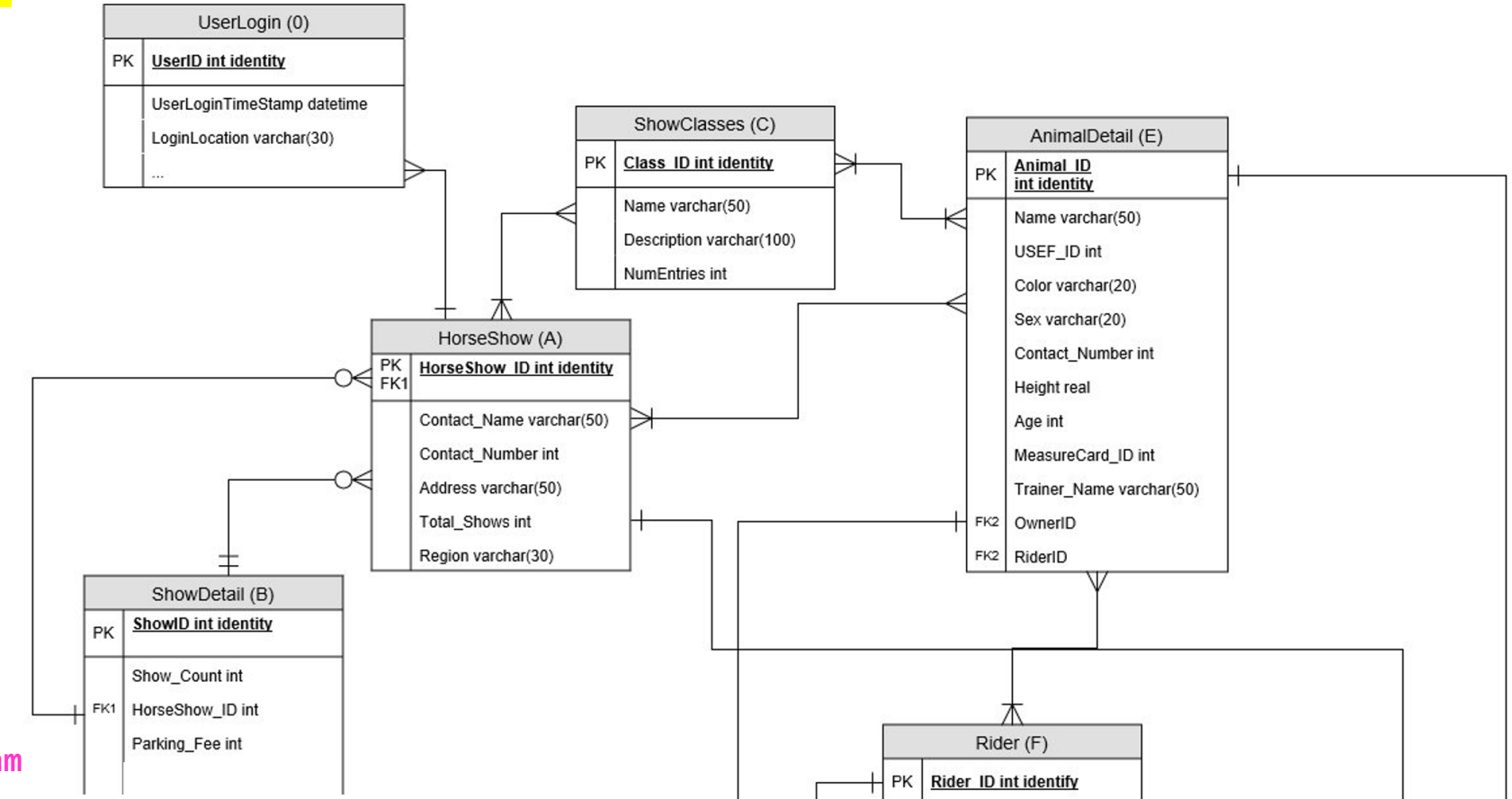


- **Context diagrams** — context diagram DFDs are diagrams that present an overview of the system and its interaction with the rest of the "world".
- **Level 1 data-flow diagrams** — present a more detailed view of the system than context diagrams, by showing the main sub-processes and stores of data that make up the system as a whole.
- **Level 2 (and lower) data-flow diagrams** — a major advantage of the data-flow modelling technique is that, through a technique called "levelling", the detailed complexity of real world systems can be managed and modeled in a hierarchy of abstractions. Certain elements of any dataflow diagram can be decomposed ("exploded") into a more detailed model a level lower in the hierarchy.

Model.5 Data Flow Diagram combined with data table normalization:<bh.github>

History: abc

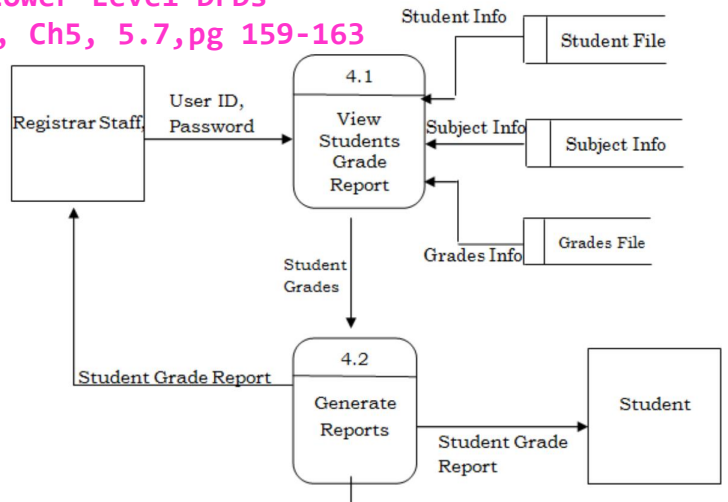
Purpose: abc



Level 2-Data Flow Diagram

Lower Level DFDs

Tilley, Ch5, 5.7,pg 159-163



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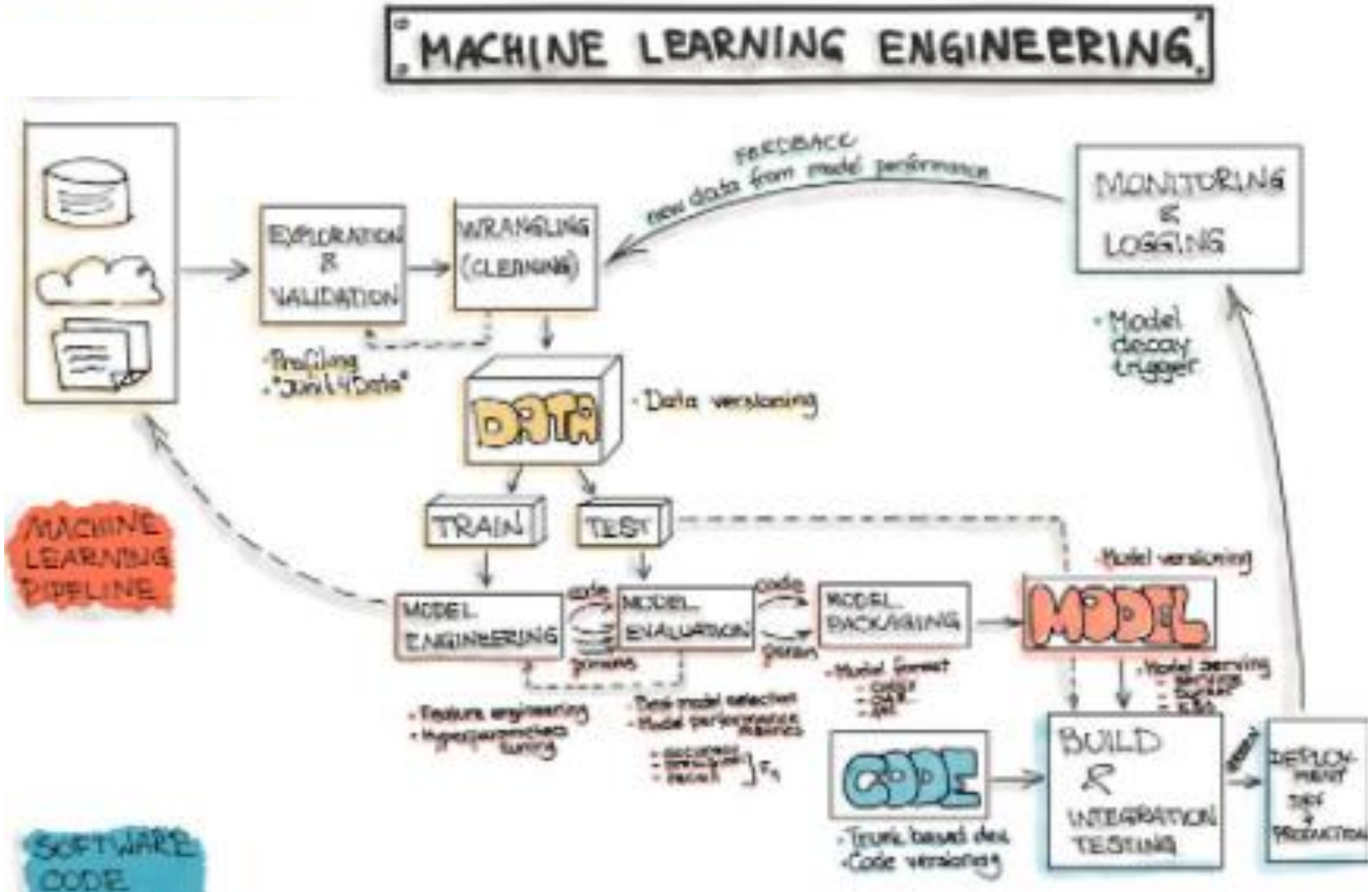
[databas](#)

Model.6: Machine Learning <website> <how.to.doc> <josh.Gordon.how.to.video> <wikipedia>

Purpose: data pipes execute in parallel or time-sliced fashion providing new clickbait or similar transaction behavior for an established ML model. New data kicks off further analysis as captured in the graphic. From a high level, if more people like you find a new Amazon "whizzy" somewhat of a "tizzy," then ML should indicate your profile as a potential buyer to provide you a link on your search screen. Welcome to modern business 101.



An Overview of the End-to-End Machine Learning Workflow

Generally, the goal of a machine learning project is to build a statistical model by using collected data and applying machine learning algorithms to them. Therefore, every ML-based software includes three main artifacts: Data, ML Model, and Code.

Corresponding to these artifacts, the typical machine learning workflow consists of three main phases:
1. Data Engineering: data acquisition & data preparation,
2. ML Model Engineering: ML model training & serving, and
3. Code Engineering :integrating ML model into the final product.

The Data Engineering pipeline includes a sequence of operations:
1. Data Ingestion
2. Exploration and Validation
3. Data Wrangling
4. Data Labeling
5. Data Splitting

Model Engineering
The Model Engineering pipeline includes a number of operations that lead to a final model:
1. Model Training
2. Model Evaluation
3. Model Testing
4. Model Packaging

Model Deployment
The final stage of the ML workflow is the integration of the previously engineered ML model into existing software. This stage includes the following operations:
1. Model Serving
2. Model Performance Monitoring
3. Model Performance Logging

from abhishek prasad but the linked in post page was torn

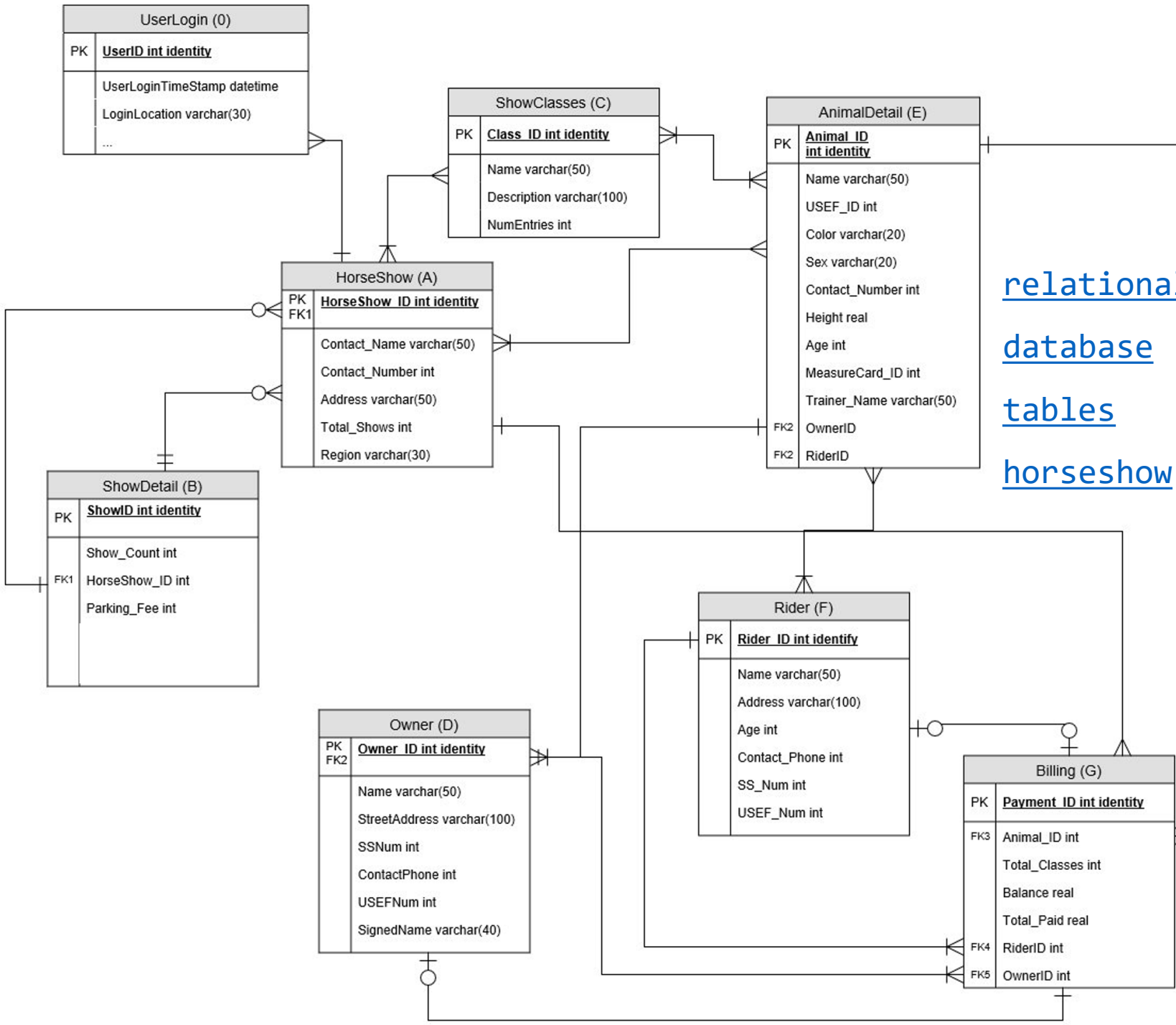
b.hogan@snhu.edu <bh.github> **Note:** Wikipedia is an information only reference. It is not an academic reference.

Model.7 Database Normalization:

<bh.github> <website> <how.to.doc>
<how.to.video> <wikipedia>

History: Kimball, Inmon

Purpose: decompose a data structure into natural structures, ie no redundant data.



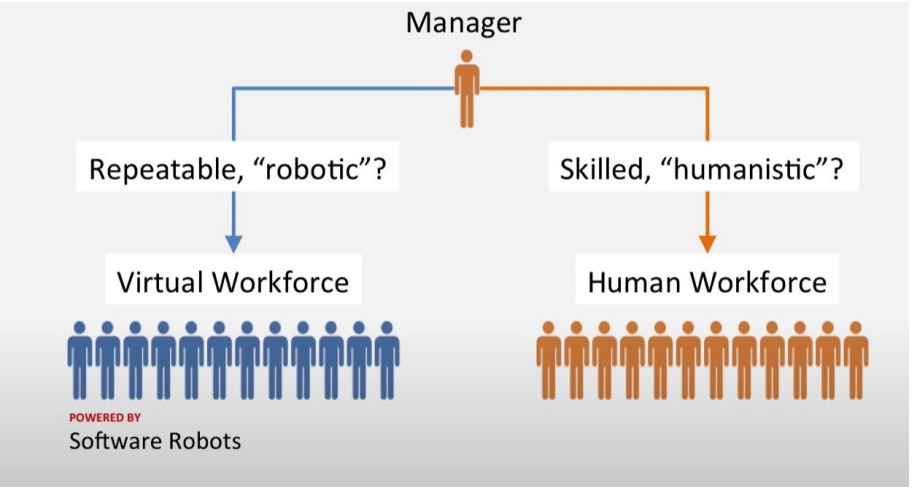
relational database tables horseshow

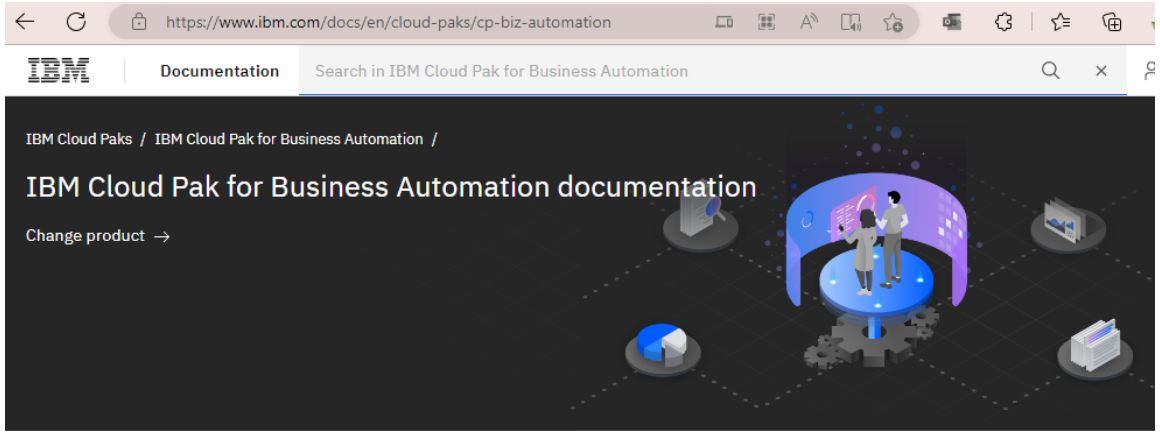
Model.9: Robotic Process Automation (RPA) <bh.github> <what.is> <how.to> <IBM.vid.2022> <wikipedia>

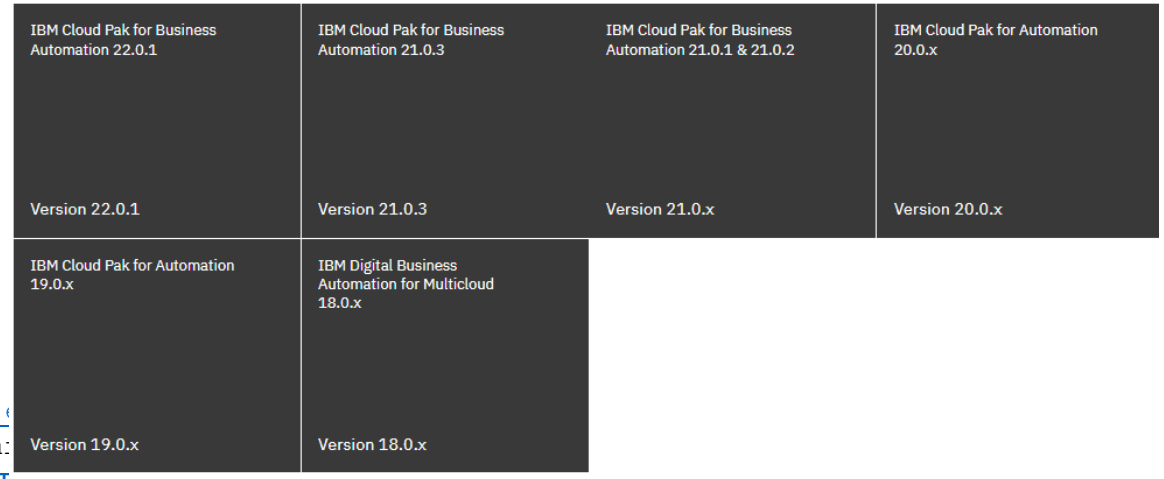
History: Recent form of business process automation using software robots (bots) and artificial intelligent AI-digital workers to perform tasks user do by watching users perform the tasks in the GUI and then replicate it.

Purpose: Use of IT widgets to read emails, forms, to replicate human behavior and eliminate the "digital tape and glue" of cross updating amongst mix-matched current and legacy system applications. AI and machine learning can also help figure out and classify what the newly received information is and suggest where it should go instead of a human orchestrating it because systems have been codified, labeled, and connected to AI-digi-workers.

What are people doing in Reality?





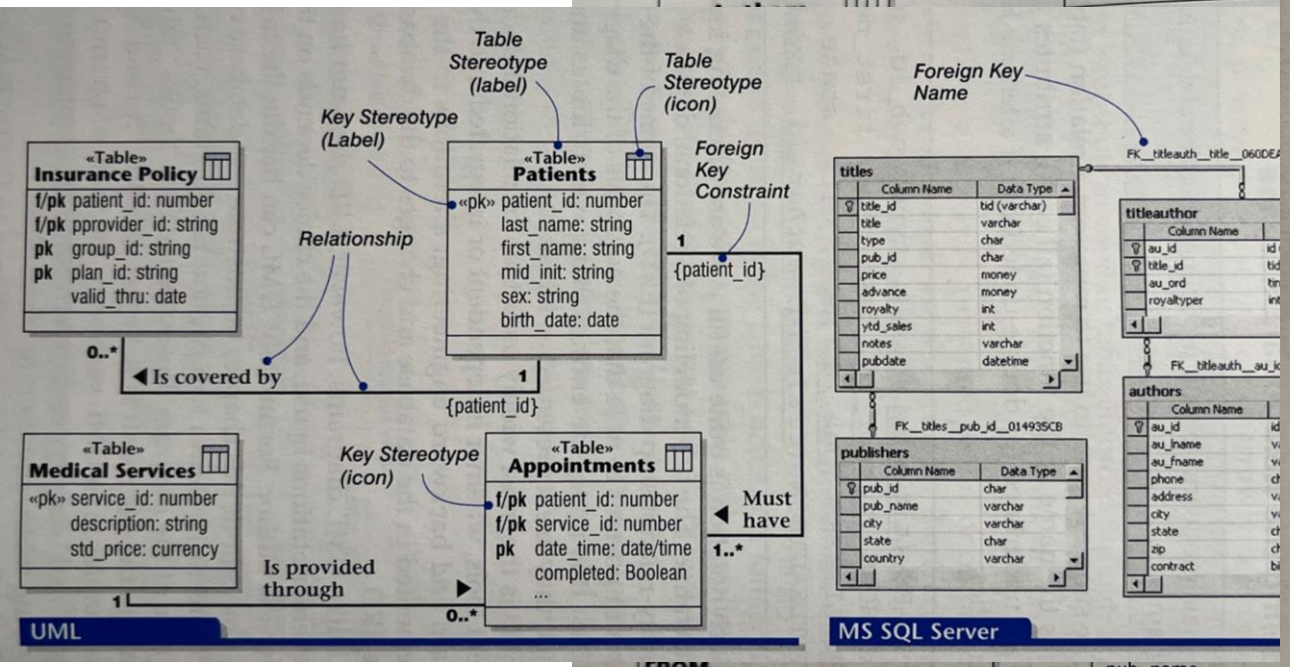


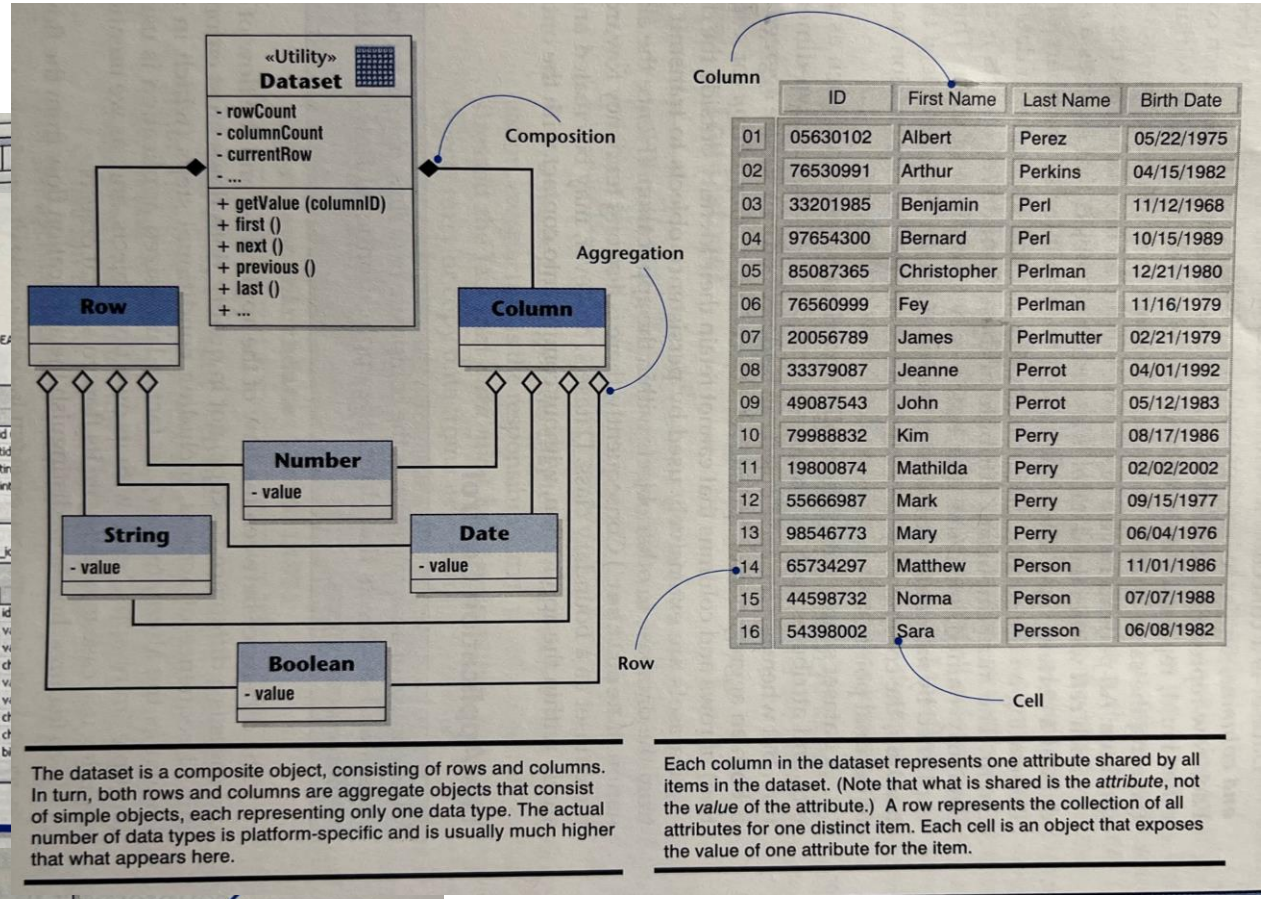
*Retrieved from: White Collar Robots: The Virtual Workforce | David Moss | TEDxUCL – YouT

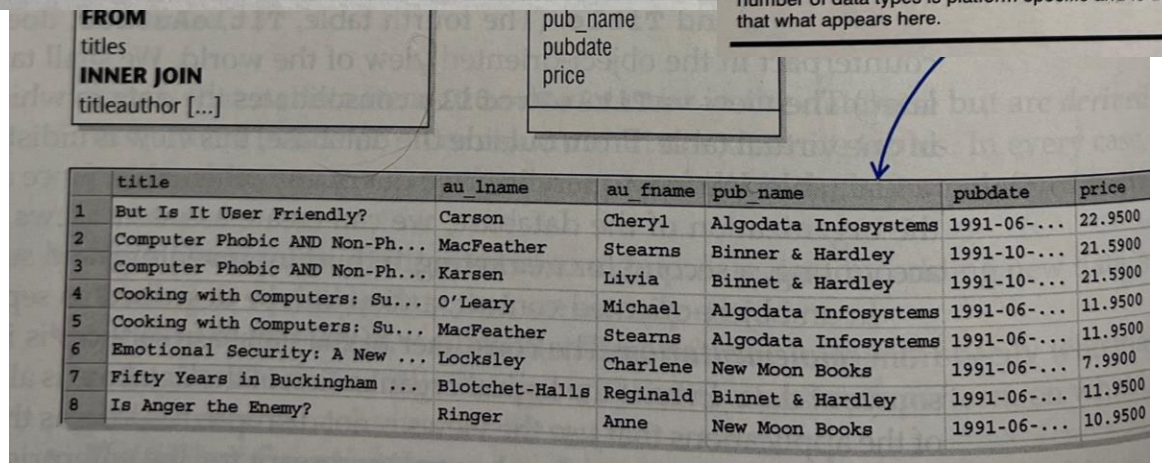
Model.8: Entity Relationship Diagram(ERD) <bh.github> <what.is> <how.to> <IBM.vid.2022> <wikipedia>

History: Rece

Purpose: U



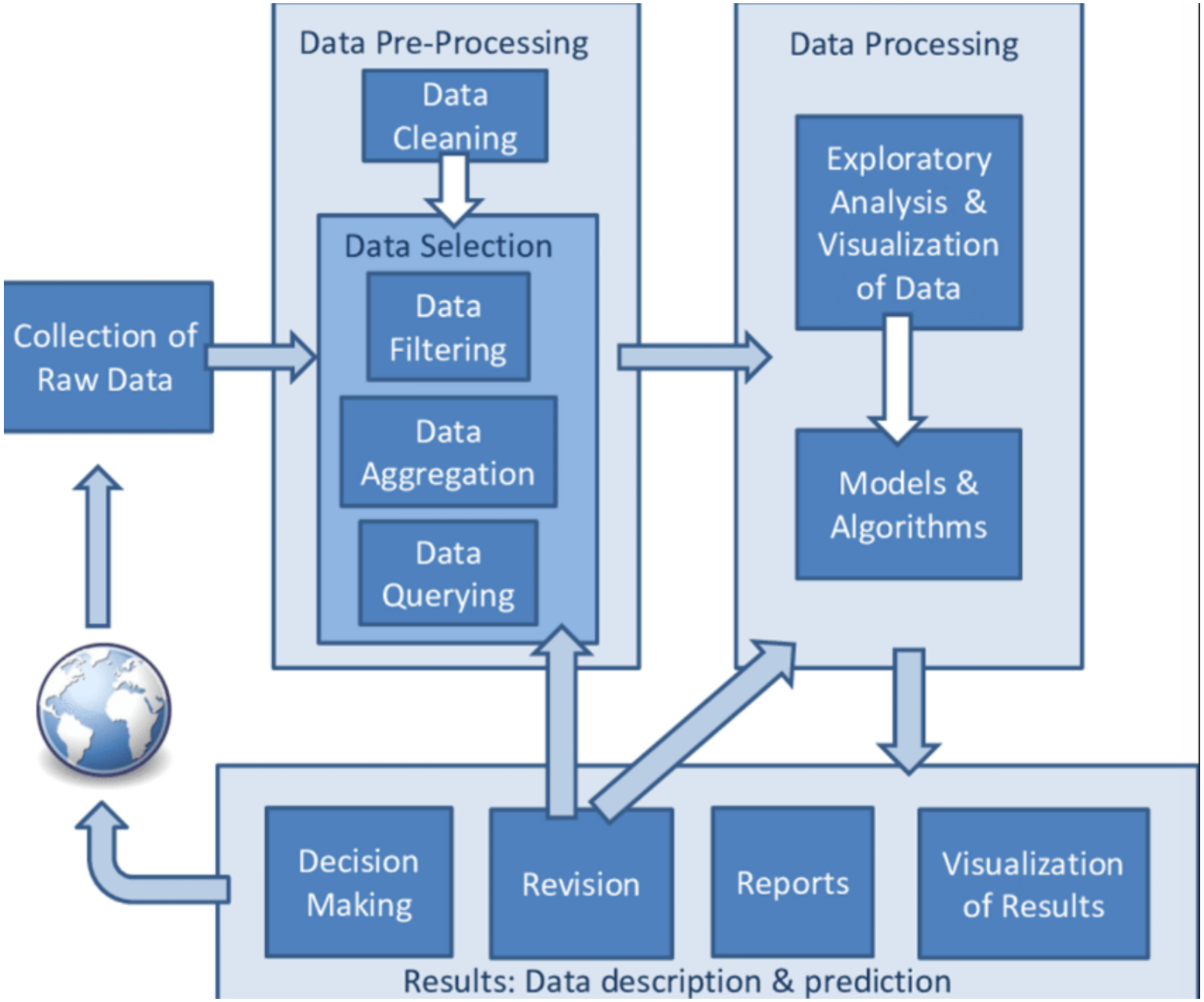




Model.10: Data Pipeline <bh.github> <website> <how.to.doc> <how.to.video> <wikipedia>

History: abc

Purpose: abc

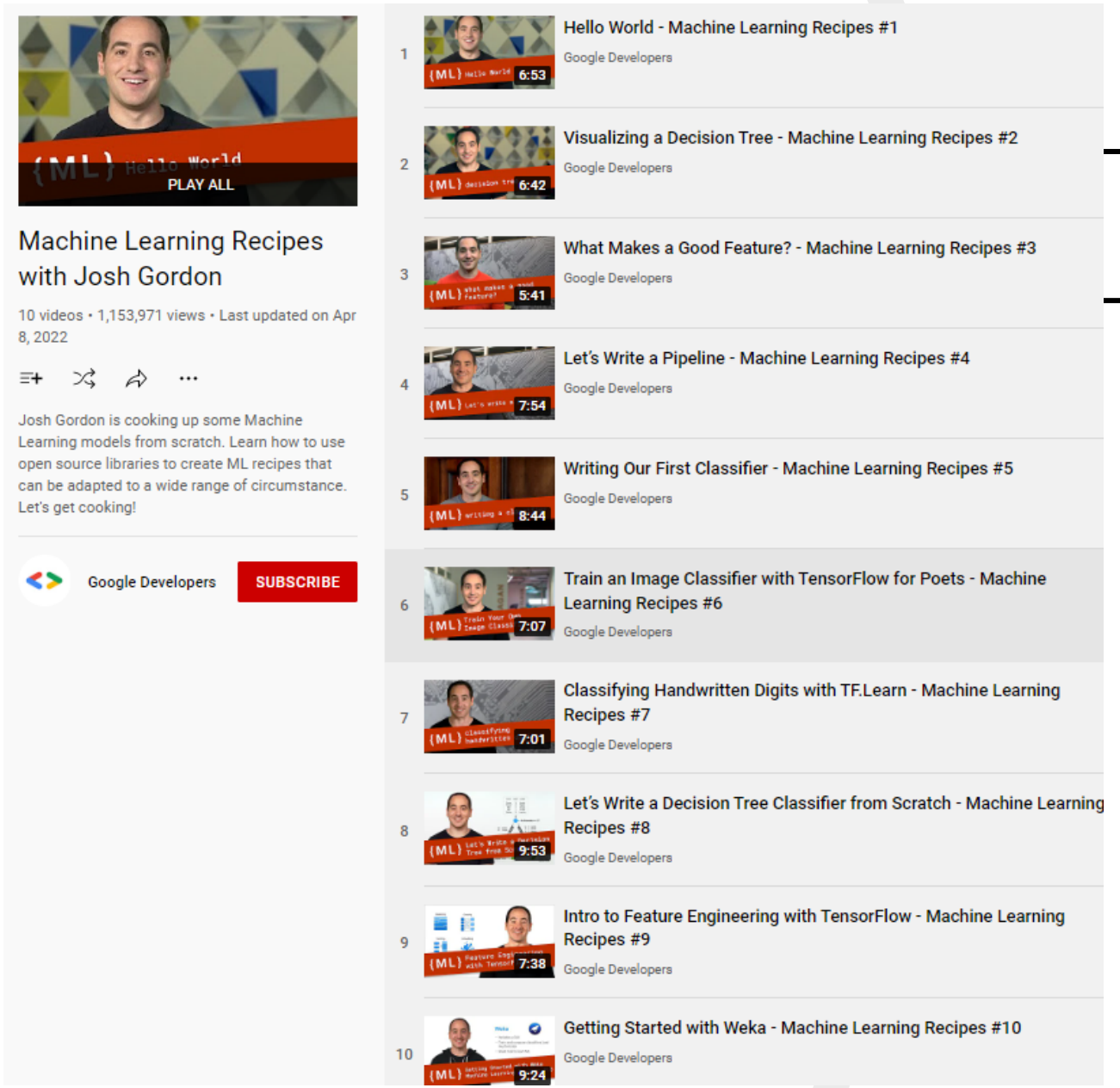


b.hogan@snhu.edu. **w**ikipedia is an information reference, and not an academic one.

Model.10: Data Pipeline Training with google engineer Josh Gordon <bh.github> <website> <how.to.doc>

History: abc

Purpose: abc



https://www.youtube.com/playlist?list=PLOU2XLYxmsIIuiBfYad6rFYQU_jL2ryal