Panel
Meaning and Semantics: Content-oriented Patterns.

THE EIGHTH INTERNATIONAL CONFERENCE ON CREATIVE CONTENT TECHNOLOGIES (CONTENT 2016)
ROME, ITALY, 23 MARCH 2016

Content. Patterns. Meaning. Panel.

Since 1995. Namics.

Dr. Hans-Werner Sehring. Senior Solution Architect.

Agenda.

FIRST **Namics in a nutshell.**

SECOND **Propositions.**

FIRST

Namics in a nutshell.

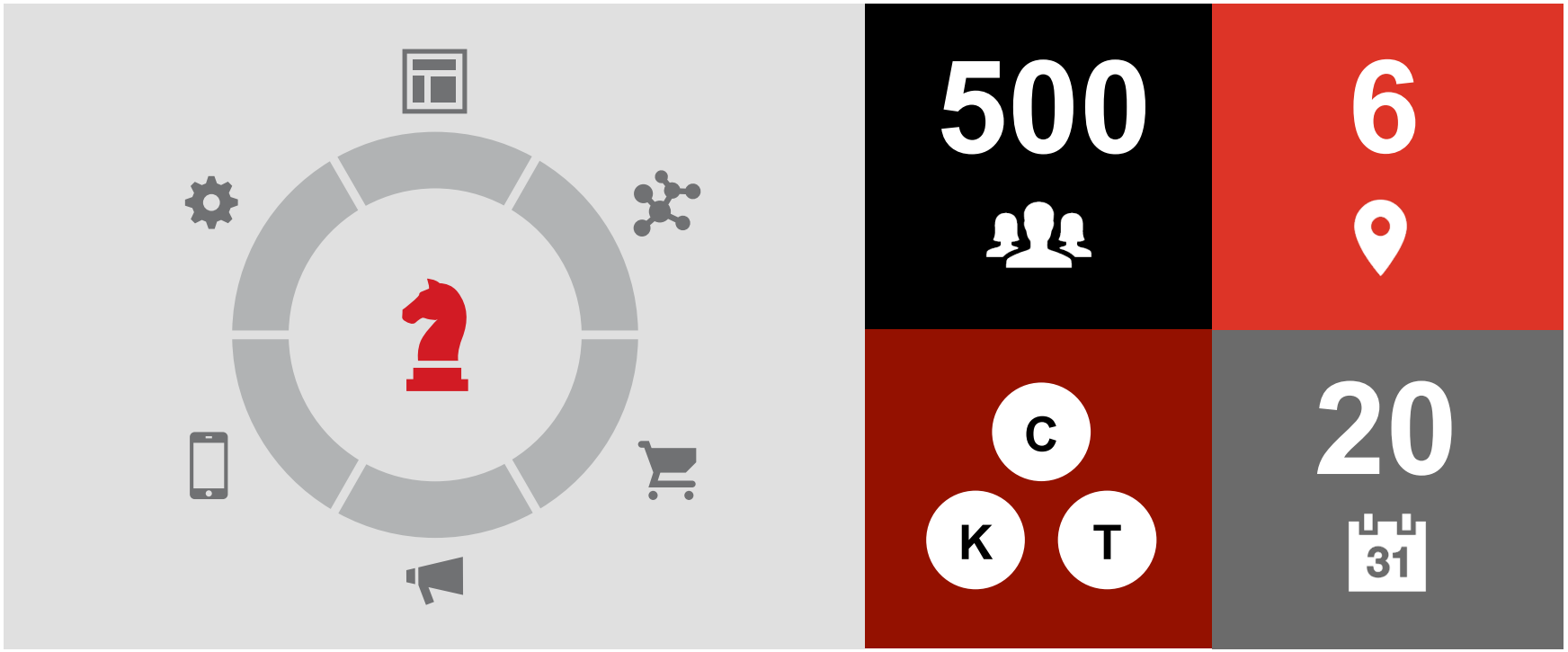
Jürg Stuker

CEO NAMICS

“We are pioneers and experts in the field of digital transformation – and we have been since 1995. As an independent, interdisciplinary full-service partner, we work with you to digitize your business models and critical processes. Your long-term success is the focus of everything we do.”

Our services.

Full-service. Close proximity. Namics.



THIRD

Proposition.

A Quiz.

What is the meaning of this data: “03/23/2016”?

A Quiz.

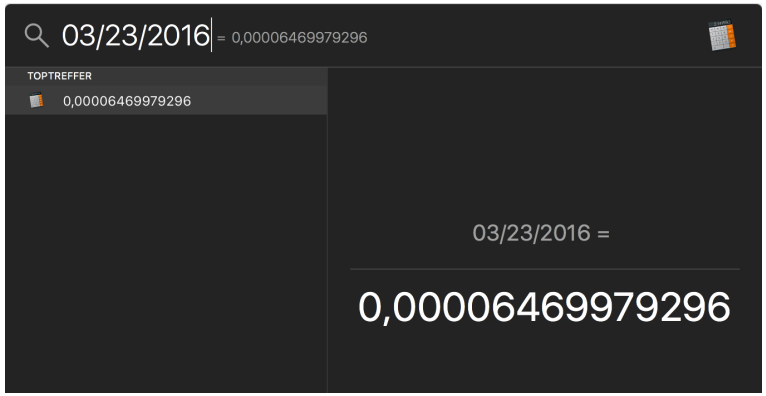
What is the meaning of this data: “03/23/2016”?

Google (here in Italy) says:

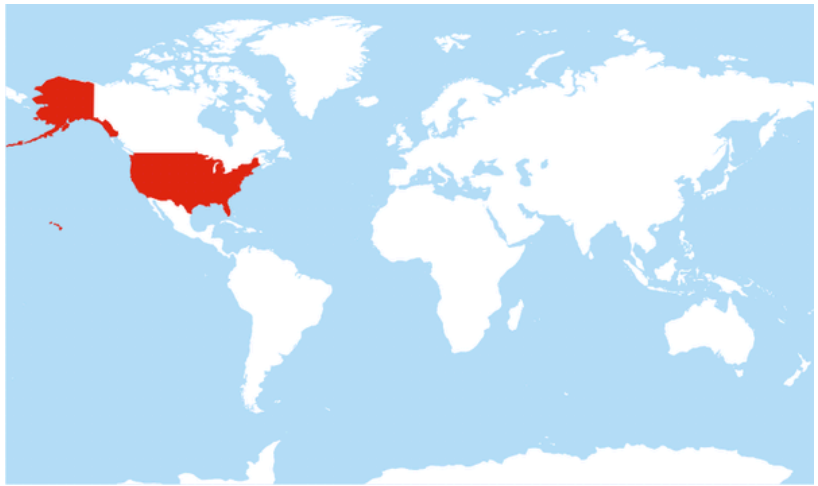
March 23, 2016 — Penumbral Lunar Eclipse – Where and ...
www.timeanddate.com › Sun & Moon › Eclipses ▾ Diese Seite übersetzen
March 23, 2016 — Penumbral Lunar Eclipse. The penumbral lunar eclipse will be visible from most parts of Asia, Australia, North America and South America.

March 2016 lunar eclipse - Wikipedia, the free encyclopedia
https://en.wikipedia.org/.../March_2016_lunar_eclip... ▾ Diese Seite übersetzen
A penumbral lunar eclipse will take place on **March 23, 2016**, the first of three lunar eclipses in 2016. Contents. [hide]. 1 Visibility; 2 Related eclipses; 3 See also ...

My (German localized) Mac says:



Note: “Comprehensive map of all countries in the world that use the MMDDYYYY format” [https://twitter.com/donohoe/status/597876118688026624]



Some Observations on Data/Content Perception and Information Extraction.

Content is perceived by a human consumer. A human being…

- brings her/his own context.
- does not understand things as facts, but as assumptions
  - for the time being (compare non-monotonic reasoning)
    or
  - as results of process steps
    (compare (art) history: not only the artefact is there, but the whole context of its production and usage).
- know how to correct/complete data on the fly.

The right synonyms, homophons, ...: Basis of quite some misunderstandings and jokes; their interpretation relies on context.

see hypothesis from cognitive science: when you recall things, you are in a different context as when you "stored" them

"Tweety"

when you think about the Collosseum you think about gladiators fighting, slaves building it, the glory of the Roman empire, ... but not a building

the boarding pass for my flight to Rome said, take-off is at 00:05, landing at 14:20; knowing it takes about 2 hours, that there are no night flights in Hamburg, ... I didn't go to the airport at night

Claim: Meaning (of Content) is a Matter of Interpretation.

What does this mean for software systems?

On top of syntax and semantics, linguistics and philosophy characterize language also by pragmatics.

Has computer science forgotten about pragmatics?

Example: age field contains number in years.

Look at computer science history / first domains with hard facts:

- scientific computing / number crunching ⇒ math
- databases, information systems (in the DB sense) ⇒ accounting

Content management, knowledge management, … not to mention AI are facing the problem that there is no one meaning, but subjective interpretations.

"In my context, account balance is measured in Eurocents."

Claim: Contemporary Solutions do not Address Subjectivity.

So, where is pragmatics?

Mostly, meaning is assigned relative to context.

Approaches in widespread use on the web today try to classify users by clustering them
– based on their behavior when browsing a web site (segmenting),
– based on their transactions (recommendations), or
– based on their utilization of social media (interests, friends).

Typically, heuristics are the basis of algorithms and interpretations:
No pragmatics of users, but superimposed semantics by provider.

Approaches address clusters (= artificial groups), not individuals.

Proposition: Systems Need to Understand Purpose to Assign Meaning to Content.

What is missing?

- Systems need a better understanding of the users context, task, intention, … as well of that of content, content creators, ...
  Not users need to understand the system!
- Users must be able to expose their context.

Explicit personalization is a first approach.
Should also include schemata and their interpretation by the machine [Sehring: Concept-oriented Content Management].

Systems need to know which information relates to which contexts, how contexts relate, where data might be misleading or inadequte, ...

How to achieve that? Can we identify patterns? **Let's discuss!**

hans-werner.sehring@namics.com. Senior Solution Architect.

Thank you. Namics.

Center for
Human-Computer Interaction
Department of Computer Sciences

UNIVERSITÄT
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Design Pattern Quality

Quality of Content vs. Quality of Writing

Content

- Background and Automotive Design
- Design Patterns – a brief overview
- Assessing Pattern Quality - Methods
- Writing vs. Content and how they can be difficult to distinguish
- Conclusion

Background

Center for HCI, Department of Computer Sciences, University of Salzburg, Austria

Background:

General Philosophy of Science and Science of Consciousness

Interdisciplinary Workgroup *Neurosignaling*, Department of Zoology, University of Salzburg

Since 2012: Center for HCI

Main topics:

(Semi-)autonomous vehicles and persuasive interfaces, interface evaluation (Usability and User Experience), definitions and formal approaches in HCI, in-vehicle UIs, theories of consciousness

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Background – Center for HCI

Univ.-Prof. Dr.
Manfred Tscheligi

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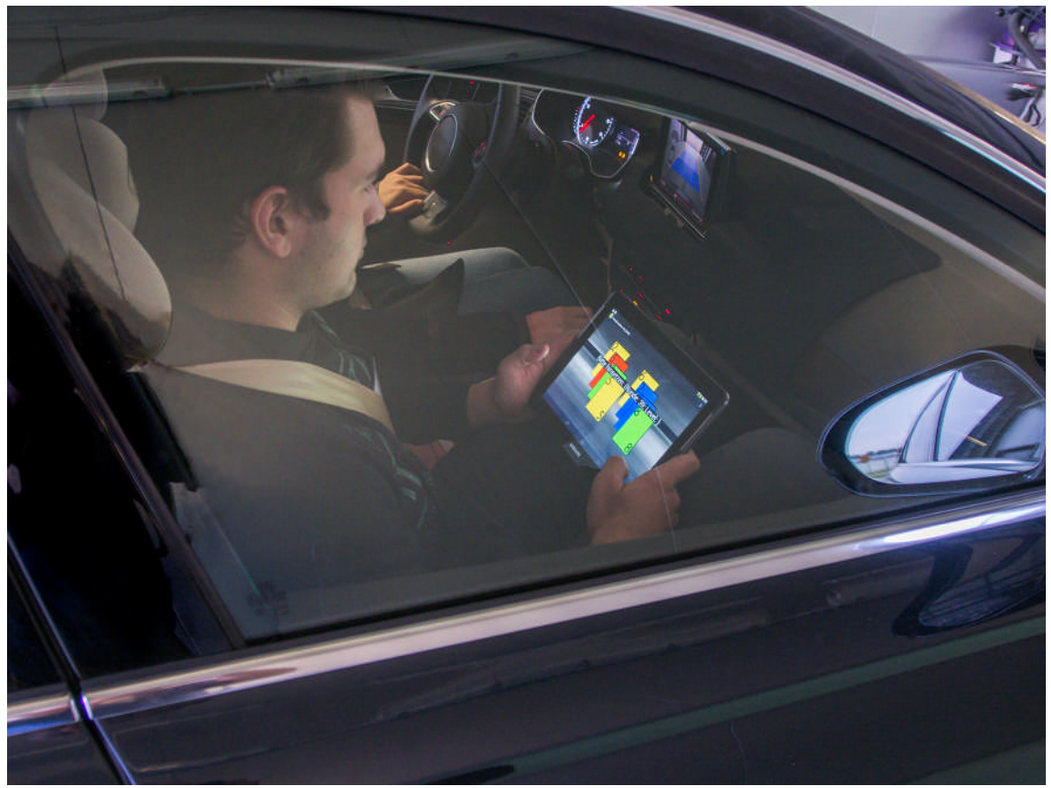
Automotive Design



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Design Patterns - Overview

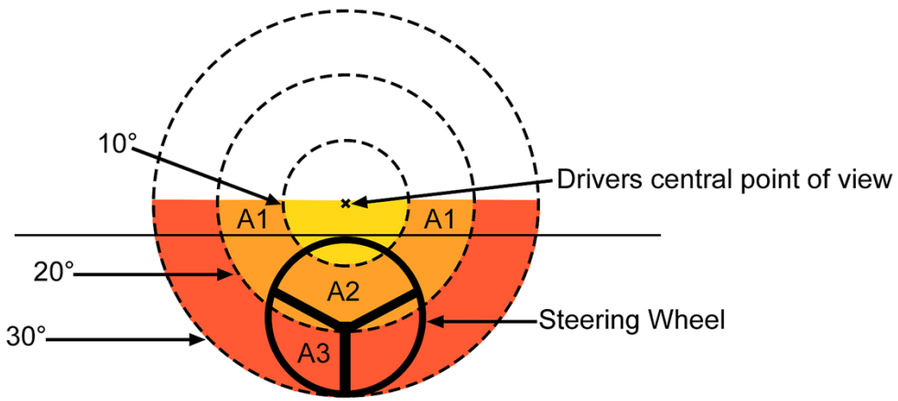
Short Definition:

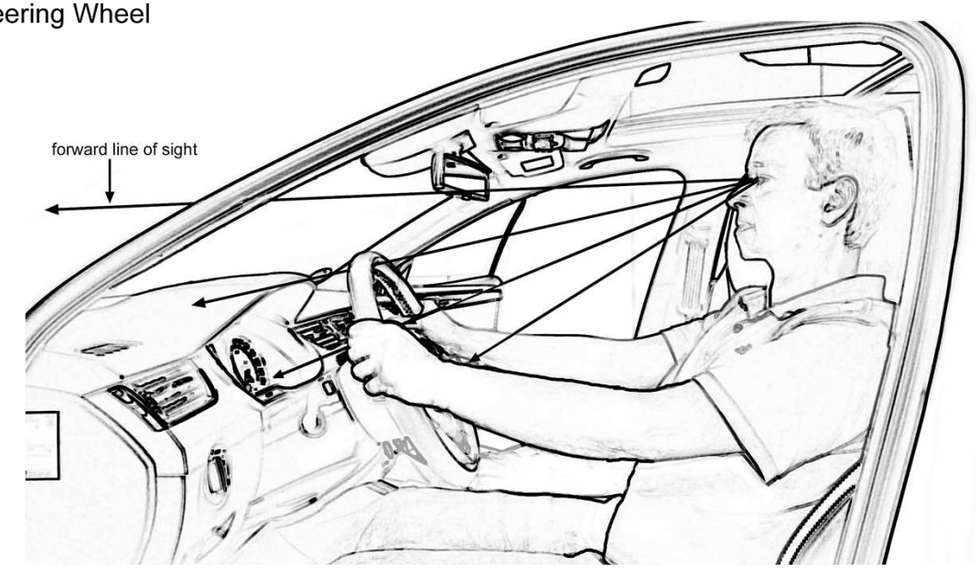
- A (design) pattern is a structured documentation to a proven solution to a reoccurring problem, embedded in at least one of the contexts it occurs in.

Some advantages:

- they capture expertise and make it accessible to non-experts
- their names collectively form a vocabulary that helps developers communicate better.

Automotive Design Patterns





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* © Arno Laminger 2015

Writing vs. Content

- Why is this distinction relevant?

- Well-written pattern describing a bad solution
  - Is beyond improvement as-is.
  - Discard completely and/or look for better working solution
    - Result: no pattern at all or completely new pattern

- Poorly written pattern describing a good solution
  - Can be improved via rewrite and iterations
    - Result: improved pattern

Writing vs. Content

- Why is this distinction relevant?
- Confusing the two could result in either
  - Futile improvements to documentation of a bad solution
  - Discarding a perfectly working solution

Writing vs. Content

- Pattern rating scales and systems usually postulate full competence of the pattern writer(s)
- Sound assumption, as pattern mining/writing ideally happens by or under supervision of pattern experts.
- However, ideal conditions =/= realistic conditions.
- Pattern mining and writing is an iterative process, often a secondary task and not always done by the same individuals throughout a pattern‘s lifespan.

Writing vs. Content - Indicators

- Bad or lacking solution:
  - Disagreement with solution implementation during evaluations
  - Low overall rating
- Bad or lacking writing/documentation:
  - Do not understand solution implementation and/or
  - Low relevance of problem or solution implementation
  - Medium overall rating
- However, these are not 1-1 relations. They are indicators at best.

Writing vs. Content - Discussion

- Do a few discarded solutions or a bit of wasted extra effort really matter that much?
- (I think they do)

- Are there perhaps already methods to easily distinguish the two, perhaps from other disciplines?
- (Quite likely)

Let me know what you think!

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Meaning and Semantics
Content-oriented Patterns

Herwig Mannaert

University of Antwerp
Normalized Systems Institute

PATTERNS 2016
March 23

Universiteit Antwerpen

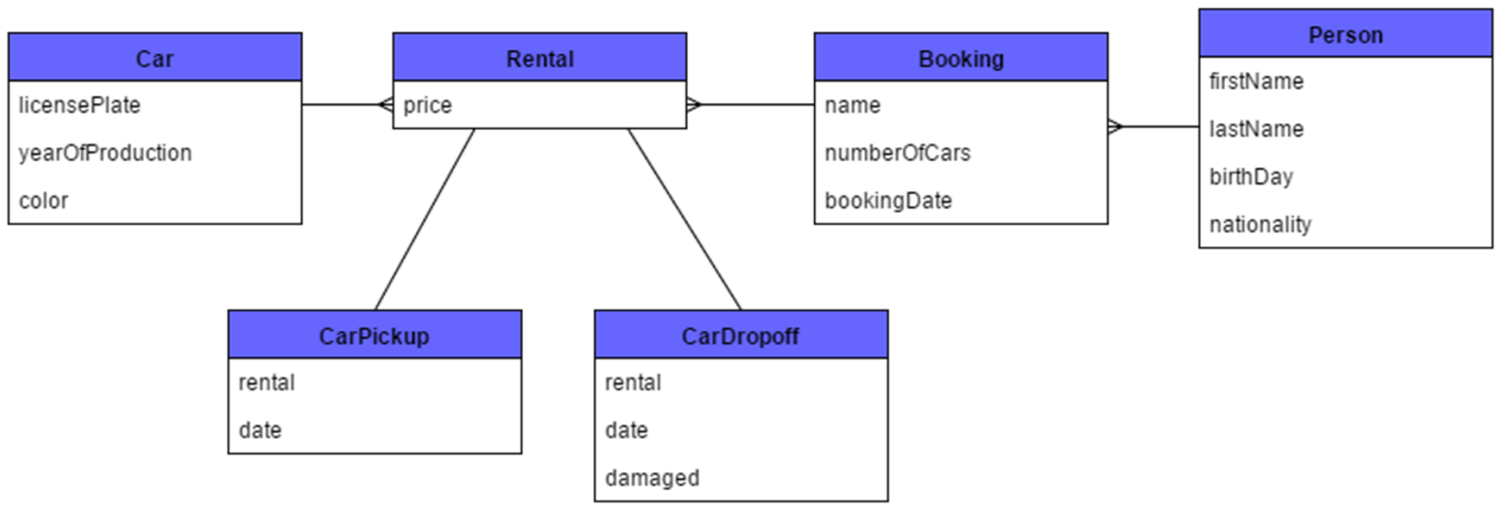
My Research

- Study modular structures under change:
  - using systems theoretic stability, entropy, and combinatorics
  - to avoid "combinatorial effects" that impede reuse:
    - duplications through lack of separation of concerns
    - ripple effects through various types of coupling
- Examples:
  - Software: law of increasing complexity / lack of reuse
  - Education: duplications in content and descriptions
  - Financial: creation of duplicate ledgers due to reporting
  - Legislation: increasing amount of impacts of new laws
  - …

~ Content-Oriented Patterns

- Information Data Modelling:
  - *Same type of domain types* are modeled and/or duplicated again and again
    - E.g. typology, history, location
  - *Same type of domain models* are modeled and/or duplicated again and again
    - E.g relations, addresses

EURent Example



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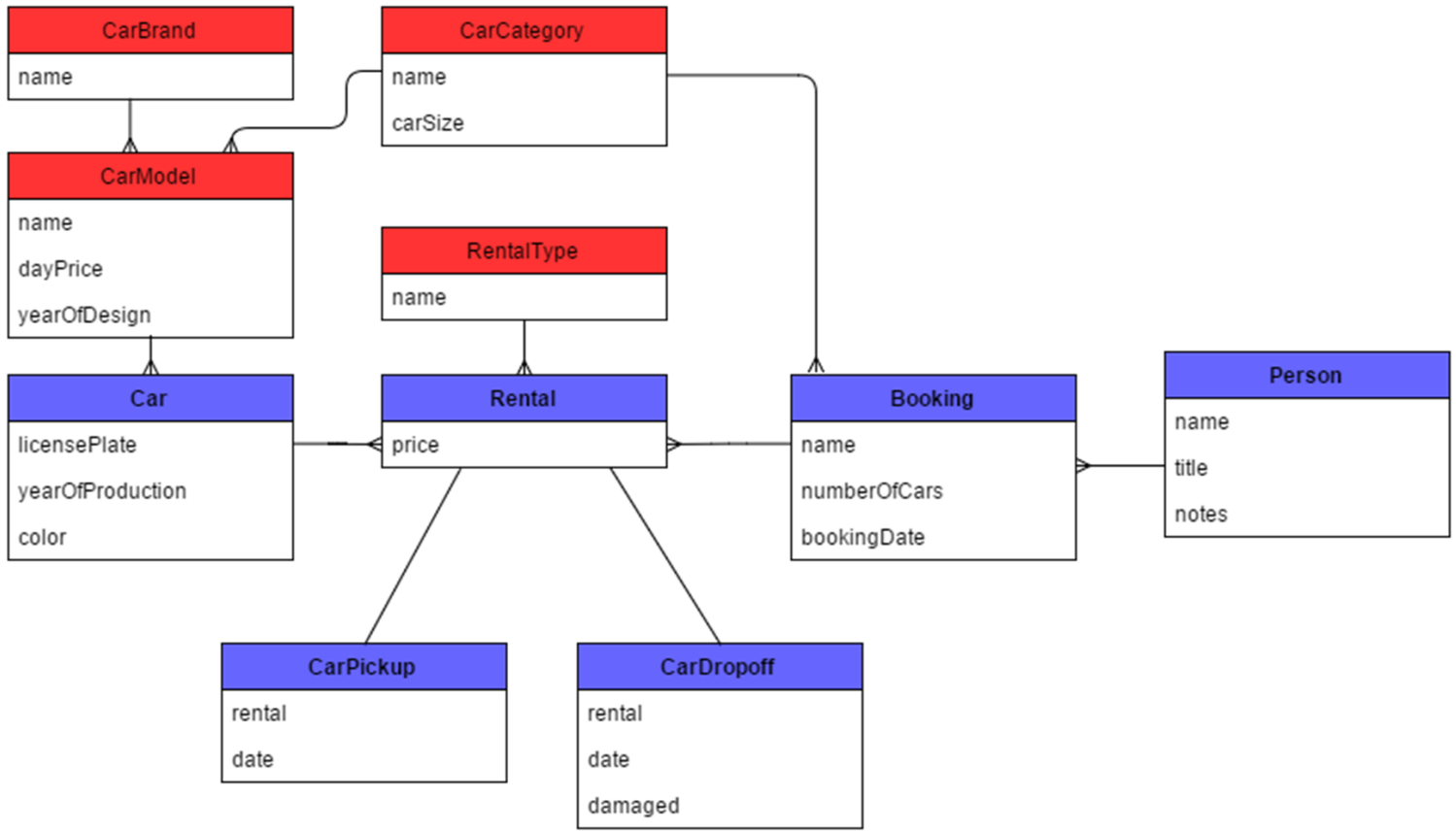
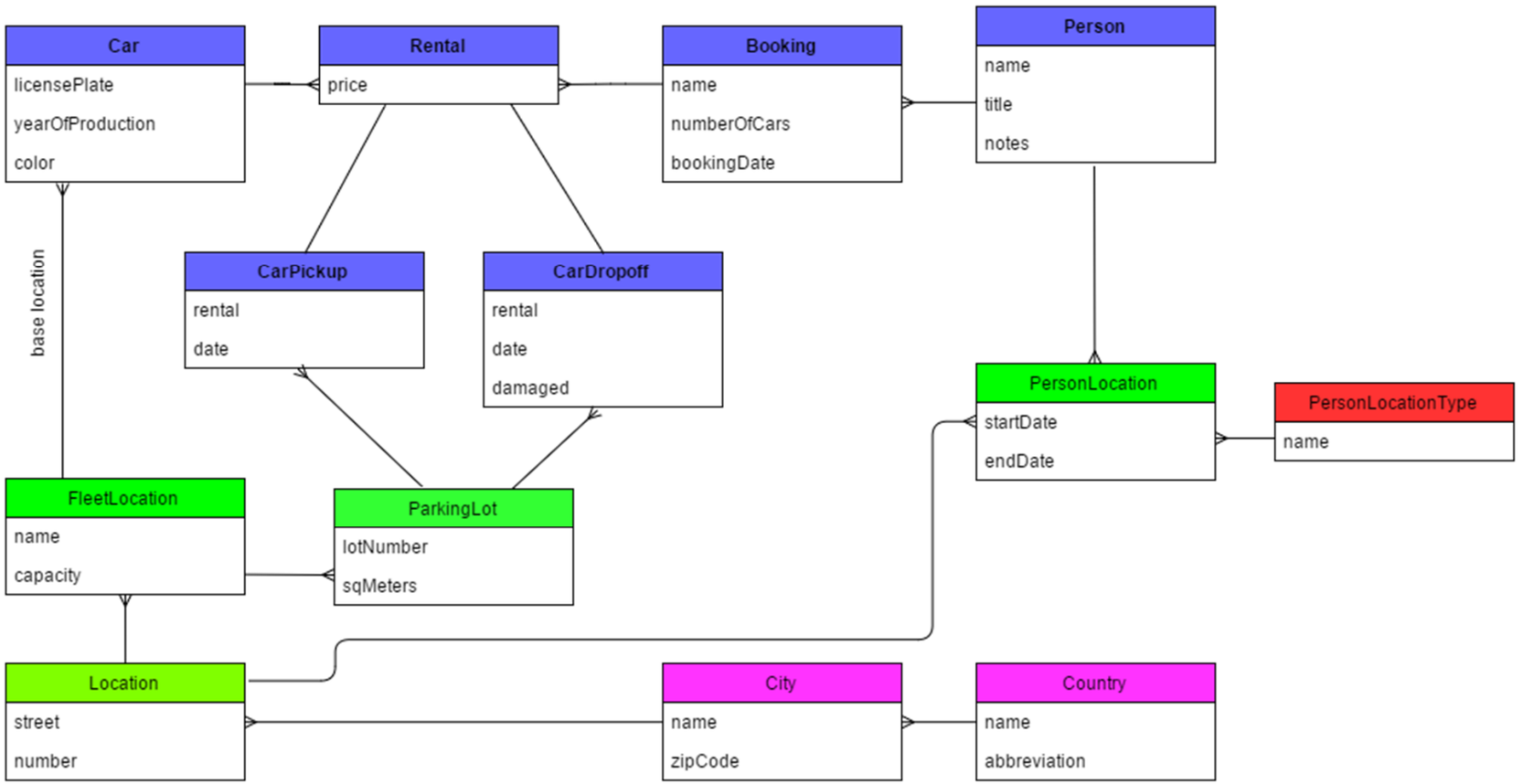


EURent Example



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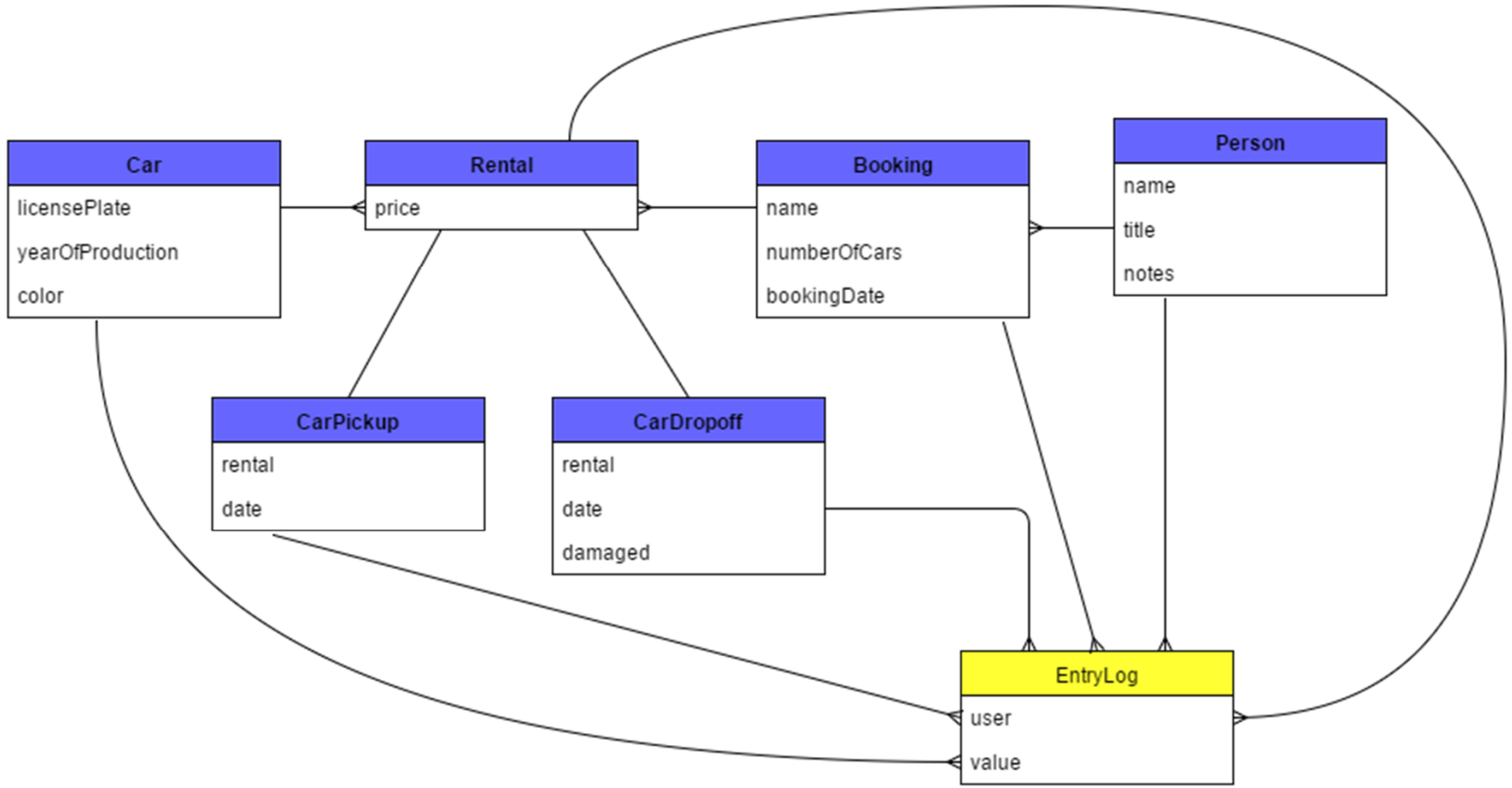

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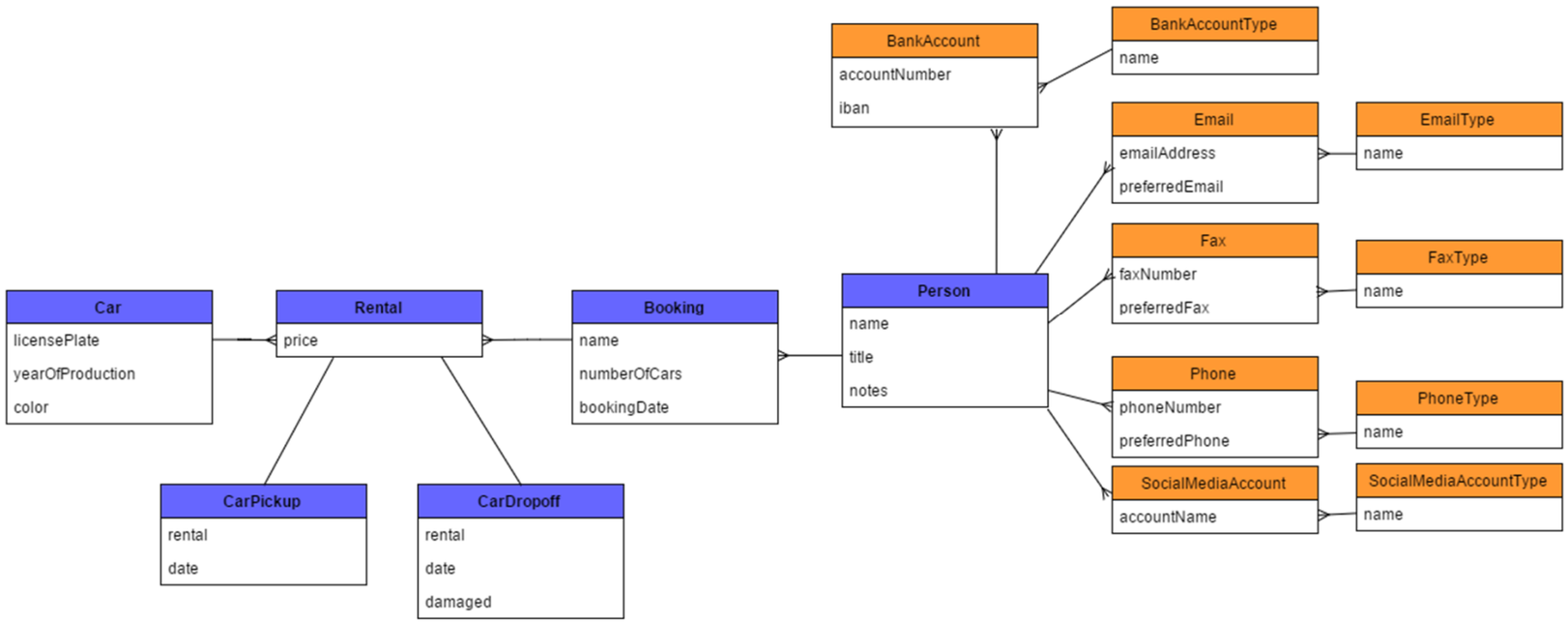

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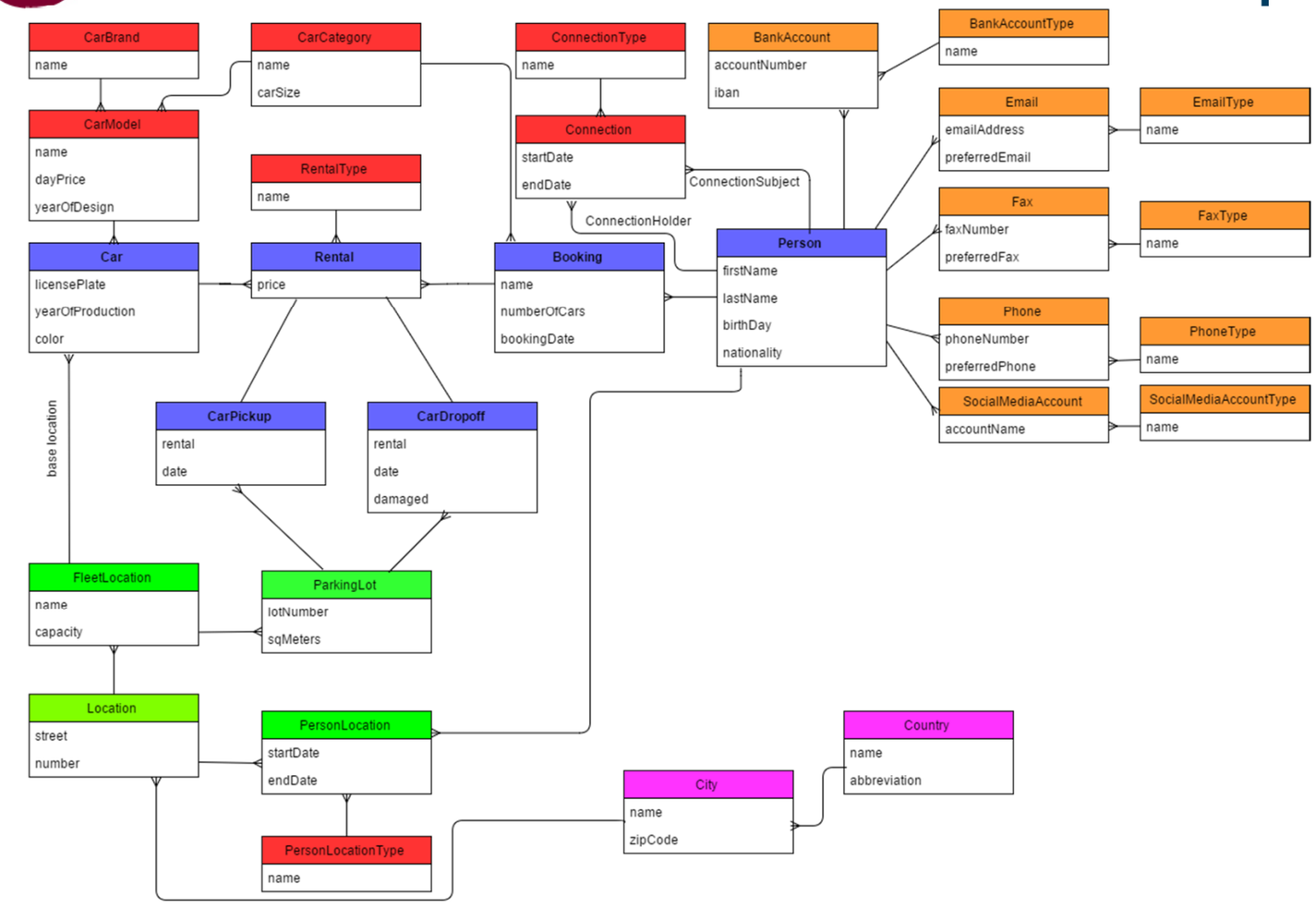


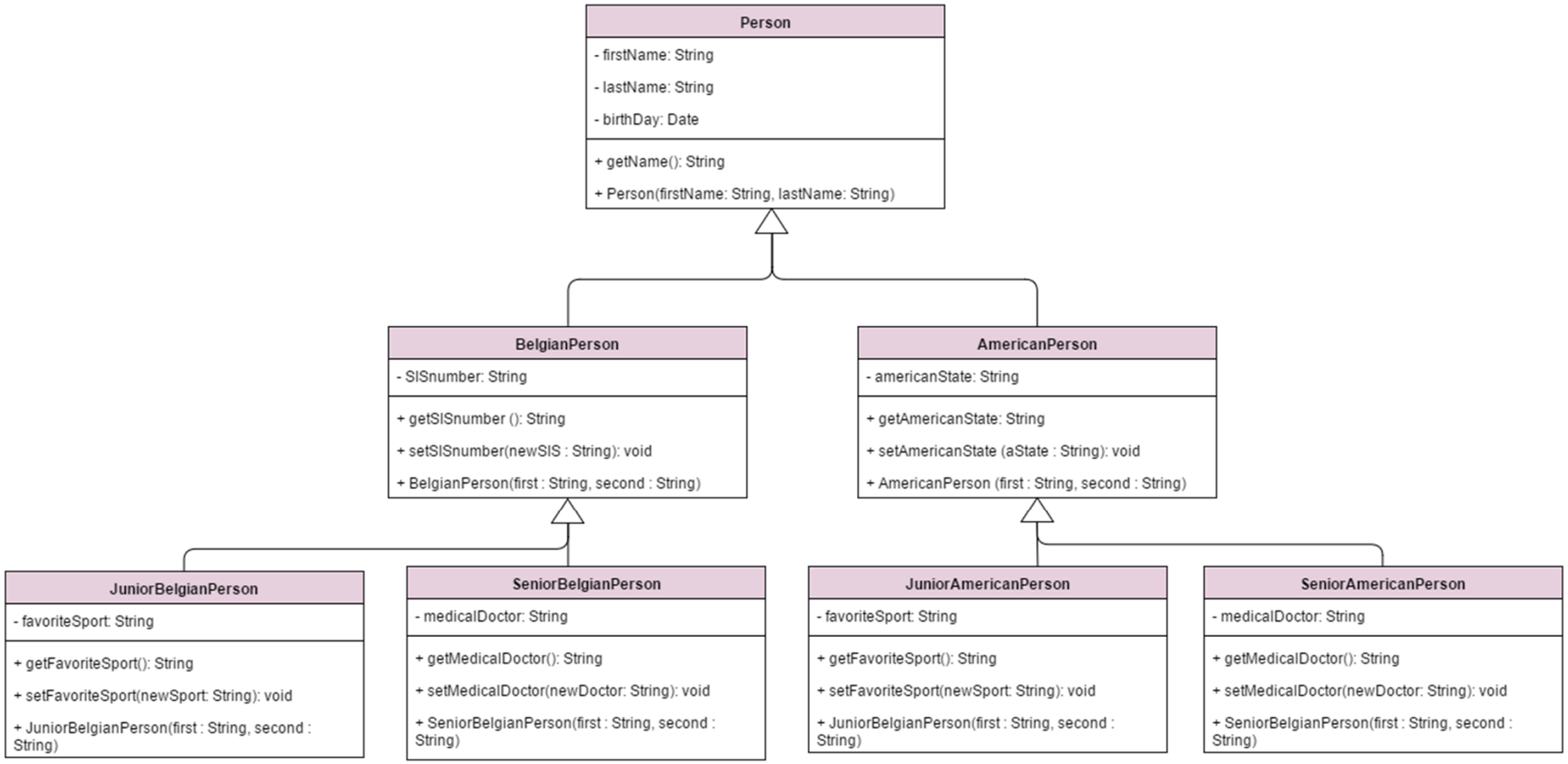
Information Data Modelling

- In order to avoid duplicating current and future efforts over and over again, we need to separate concerns, even in what seems to be already a specific concern like data modelling:
  - (standardized) patterns for various types of domains like typology, history, and location
  - (standardized) models and patterns for basic common domains like relations and addresses

~ Content-Oriented Patterns

- Application of taxonomies:
  - Ontological refinement is in general *multidimensional* and even *orthogonal*
    - every combinations of all types becomes possible:
      - e.g. gender, nationality, age, level education
    - a single tree incorporating all these combinations results in *many duplications*
    - single tree taxonomies result in *counterintuitive classifications*, e.g. whales and dolphins are no fishes
  - Taxonomies are *often intertwined with computational rules* and logic
    - leading to many duplications of the same computation
    - making it difficult to change logic for part of a category

Multi-dimensional Taxonomies



Taxonomies and Computations

```
if (a)
  if (b) rule1
  else
    if (c) rule2
    else rule1
else
  if (d) rule3
  else
    if (e) rule1
    else rule2
```

```
if (a)
  if (b) catA
  else
    if (c) catB
    else catC
else
  if (d) catD
  else
    if (e) catE
    else catF
```

Cat	Rule
A	1
B	2
C	1
D	3
E	1
F	2

Application of Taxonomies

- To avoid duplications, future complications , and counterintuitive classifications, we need to separate concerns, even in what seems to be already a specific concern like taxonomies:
  - (standardized) domain patterns for supporting better multi-dimensional taxonomies
  - (standardized) domain patterns for separating taxonomies and computational rules and schemas

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PANEL
CONTENT/PATTERNS

Brain Activation and Cognitive Extrapolation in Inferring Patterns

Panelist:
Petre Dini, Concordia University, Canada | China Space Agency Center, China
petre@iaria.org

Basic facts

- **Brain activation / cognitive inhibition**
  - **Experience**
  - **Knowledge**
  - **Inferred and extrapolated knowledge**
  - **Disabled knowledge**
- **Analogy / cognitive extrapolation**
  - **Linguistic analogy**
  - **Spelling**
  - **Intuition**

Letter substitution in context/similarity

https://en.wikipedia.org/wiki/Typoglycemia
http://www.click.ro/utile/tech-it/poti-citi-mesajul-acesta-iata-ce-spune-despre-creierul-tau

0D474 1N7R-0 21 D3 V4R4,
574734M P3 PL4J4 0853RV4ND
D0U4 F373 70P41ND 1N N151P,
151 D4D34U 53R105 1N73R35UL
C0N57RU1ND UN C4573L D3 N151P
CU 7URNUR1, P454J3 53CR373 51 P0DUR1.

- real-time shape approximation
- context-building
- based on past-experience
- story-telling sense

Odata intr-o zi de vara, stateam pe plaja observand doua fete topaind in nisip, isi dadeau serios interesul construind un castel de nisip cu turnuri, pasaje secrete si poduri.
No predefined rules… let us see

Odata…..
0 versus O | D → D | a → 4 | t → 7 | ă → 4 | | 1 -> i | phonetic vs. graphic | shape similarity
a versus a^ | 4
7 → T | 5 → S |
21 D3 because 'a versus a^ | 4'
..74… implicit help
scenic context | beach
experience-based | sand castle building | knowledge on 'bridges, tunnels, …'

t ţ
s ş
a ă â
i î â

Spelling vs. relevant word letters

How important the spelling is?
keyboard strokes

http://www.ecenglish.com/learnenglish/lessons/can-you-read

“I cnduo't bvleiee taht I culod aulaclty uesdtannrd waht I was rdnaieg. Unisg the icndeblire pweor of the hmuan mnid, aocdcrnig to rseecrah at Cmabrigde Uinervtisy, it dseno't mttaer in waht oderr the lterets in a wrod are, the olny irpoamtnt tihng is taht the frsit and lsat ltteer be in the rhgit pclae. The rset can be a taotl mses and you can sitll raed it whoutit a pboerlm. Tihs is bucseae the huamn mnid deos not raed ervey ltteer by istlef, but the wrod as a wlohe. Aaznmig, huh? Yaeh and I awlyas tghhuot slelinpg was ipmorantt! See if yuor fdreins can raed tihs too.”

"I couldn't believe that I could actually understand what I was reading: the phenomenal power of the human mind. According to a research team at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter be in the right place. The rest can be a total mess and you can still read it without a problem. This is because the human mind does not read every letter by itself, but the word as a whole. Amazing, huh? Yeah and I always thought spelling was important! See if your friends can read this too.”

- **positional-noise filtering for word letters**
- **quick linguistic local (recursive) jigsaw**
- **necessary letters (this varies based on the reader’s knowledge/skills)**
- **temporary letter weight**
- **relevance of the position of a given letter for a given word**
- **story-telling sense**

Typoglycemia

- **The legend, propagated by email and message boards, purportedly demonstrates that readers can understand the meaning of words in a sentence even when the interior letters of each word are scrambled.**
- **As long as all**

  the necessary letters are present, and

  the first and

  the last letters

  remain the same, readers appear to have little trouble reading the text.

> Necessary letters are the key

Shapes | induced patterns

- http://www.moillusions.com/the-many-faces-of-mountains/

knowledge
context
intuition
imagination
abstraction

… so what? | A real application

- Event patterns; eP0 = [e1, e2, e5, e7, e9]
- Usually eP0 → set of actions [one, none, many]
- However, when describing an event, timestamps are very important
  - ? Clock synchronization
  - ? Transmission delays
- Sometimes, an event has a timestamp at the producer and another timestamp at the receiver
- Sometimes, devices have no clock and, therefore, there are no timestamps for the events issued by those devices
- Sometimes, some events get lost; as a consequence, a monitoring center/application has a partial view on the events sent related to a particular situation
- Yet, a set of actions must be issued

- Then… you see the application … [e1, e7, e2, e5, e9] belongs to a class of patterns {eP0}
  - events can arrive in a different order with respect to the original pattern
  - e5 is a necessary event that should happen before e9 and after e2
  - e1 and e9 are the start and end events of the pattern
    - ?: missing letter vs. missing events → similar vs. identical patterns | patterns hierarchy

Conclusion

- The usefulness of the formal rules for discovering patterns should be revisited
- Capturing the brain enabling/disabling reading mechanisms shodul be studied deeper
- Loose analogy and shape-based intuition should be revisited
- **Brain computing** and **Visual computing**

Thanks

Q

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