



SCHOOL OF
**COMPUTING &
DATA SCIENCE**
The University of Hong Kong



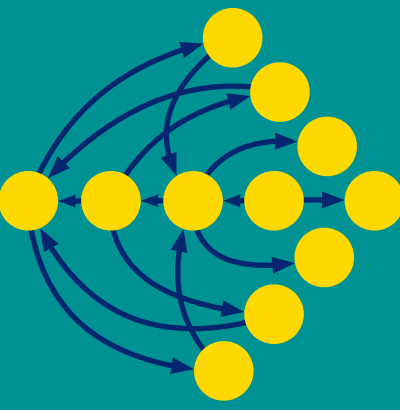
Mock Exam

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Visiting Professor <renato@hku.hk>

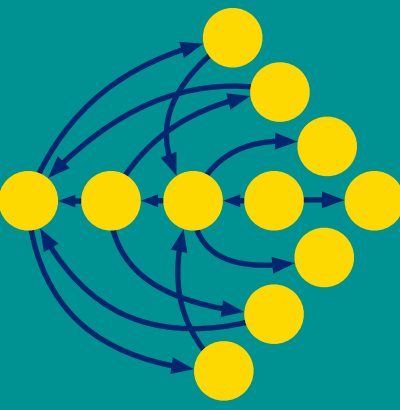
ICOM7128
Knowledge Graphs
1st Semester - 2024/2025

Question #1



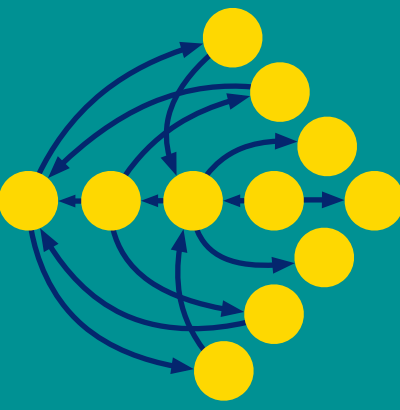
- **List 4 differences between Semantic Knowledge Graphs and Labelled Property Graphs?**
- **[2]**

Answer #1



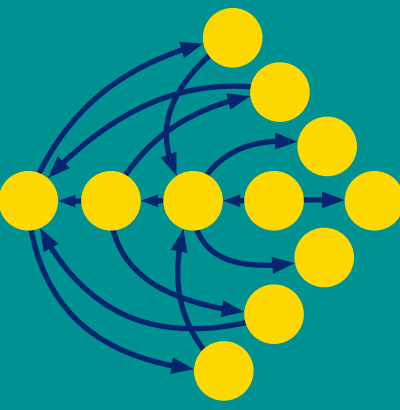
- **LPG has attributes on Nodes/properties**
- **SKG uses unique identity for all resources**
- **SKG supports inferencing**
- **LPG used Cypher query language**

Question #2



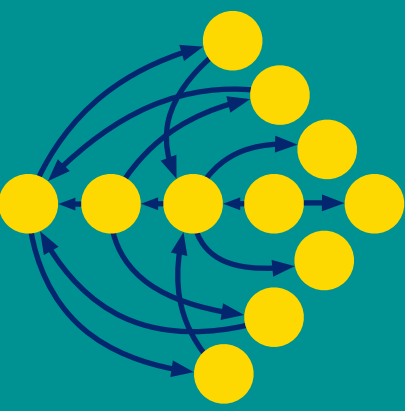
- What does the `rdf:type` property express in a triple statement?
- What then must be the type of the object of this statement?
- [2]

Answer #2



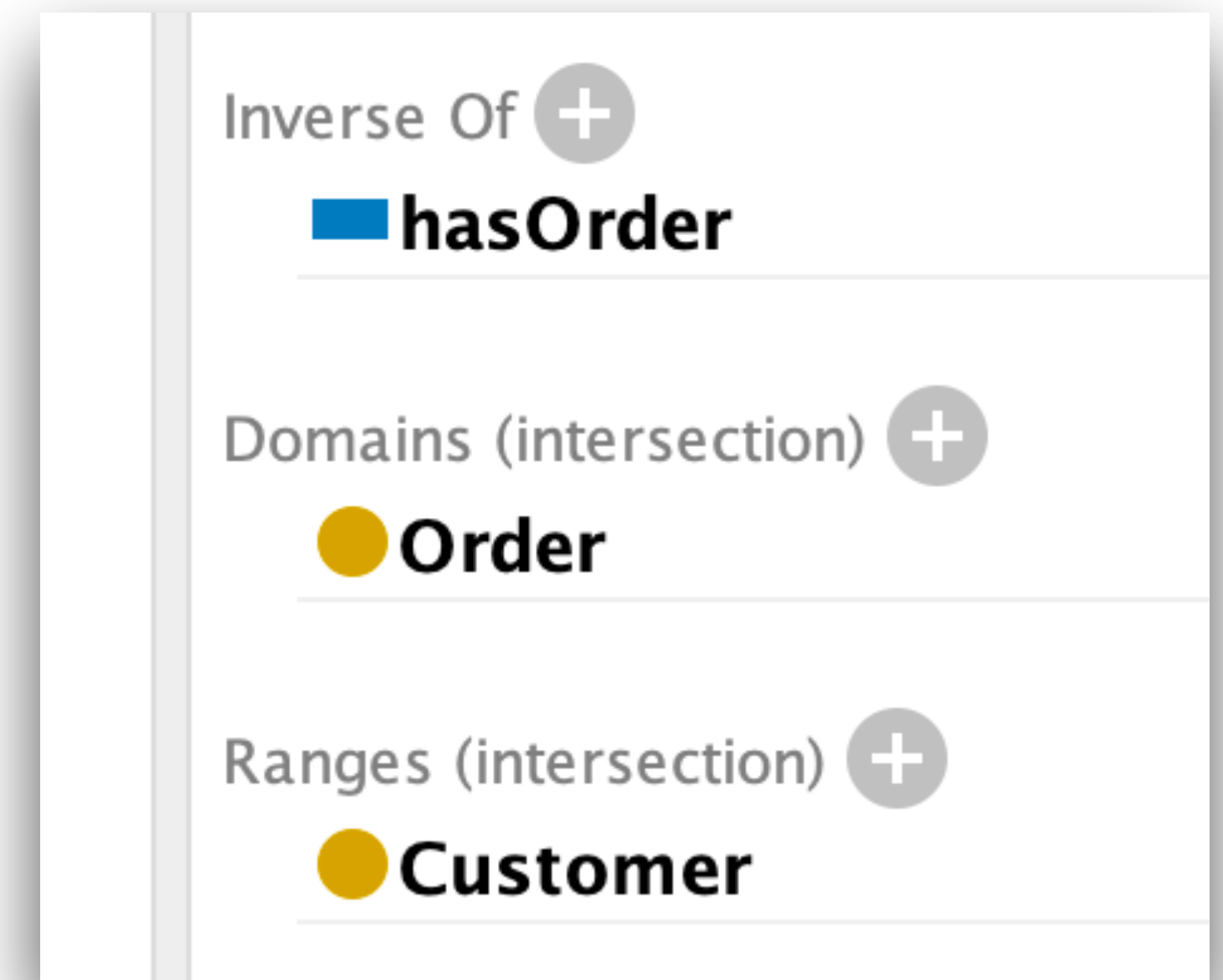
- **rdf:type asserts the class membership of the subject**
- **the object must be an rdf/owl class**

Question #3

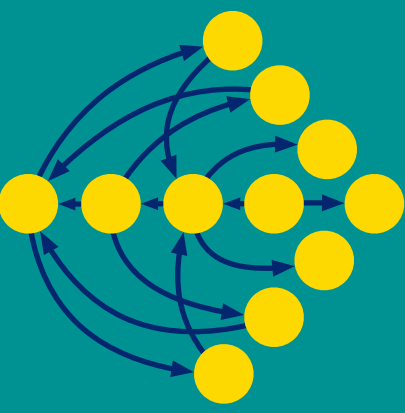


- Given the following definition of the **hasCustomer** object Property, what would be inferred from this statement:
ex:X99 ex:hasCustomer ex:X88

- [3]

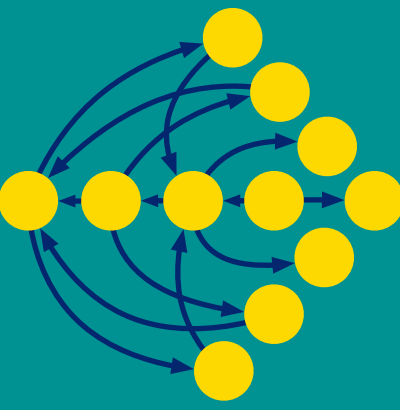


Answer #3



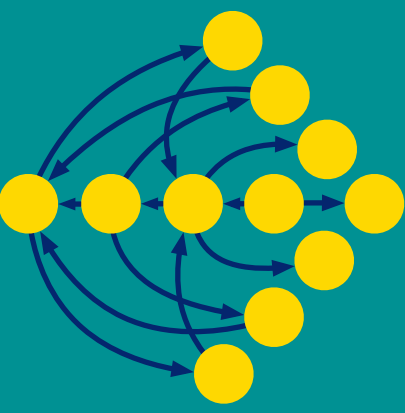
- The inverse property hasOrder between Customer and Order
- The type of the X88 individual is Customer
- The type of the X99 individual is Order
- OR
 - `ex:X88 ex:hasOrder ex:X99`
 - `ex:X88 rdf:type :Customer`
 - `ex:X99 rdf:type :Order`

Question #4



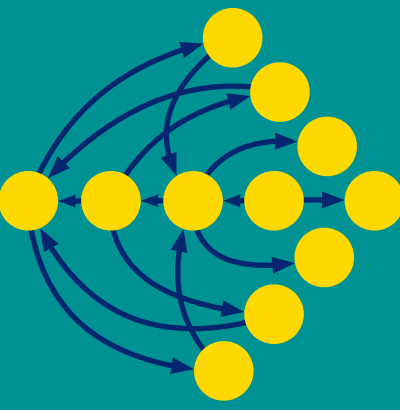
- Using SKOS, how would you express that `a:Cat` is the same concept as `b:Cat`?
- What if they were a similar match?
- [2]

Answer #4



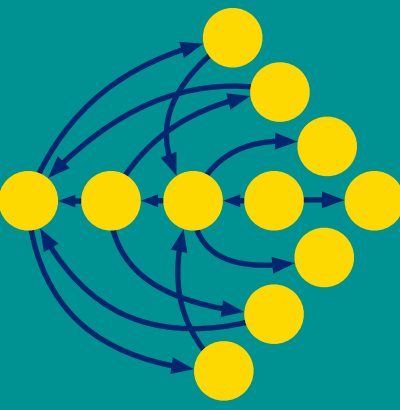
- For the same match use the skos Exact Match property
- For the similar match use the skos Close Match property
- OR
 - `a:Cat skos:exactMatch b:Cat`
 - `a:Cat skos:closeMatch b:Cat`

Question #5



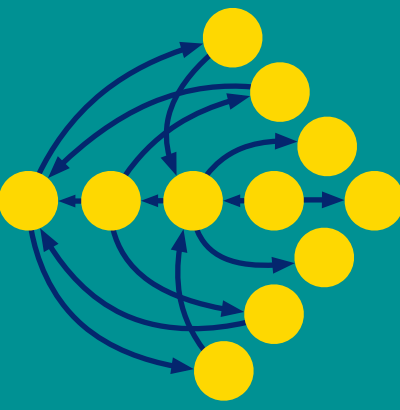
- Describe 2 types of constraints used by SHACL Shape rules
- [2]

Answer #5



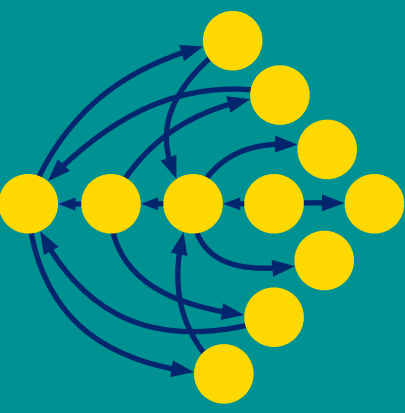
- **Cardinality constraints** - how many times a property can appear
- **Datatype constraints** - property literal conforms to this type

Question #6



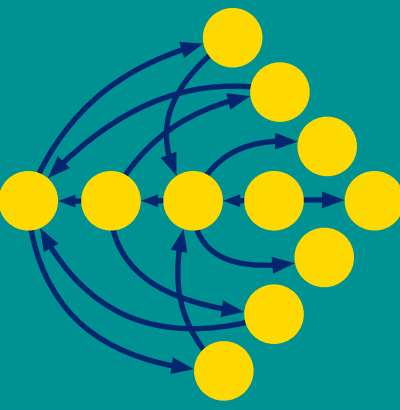
- Explain why you should not use `owl:sameAs` to indicate two SKOS Concepts (from different Schemes) are the same?
- What should you use?
- [2]

Answer #6



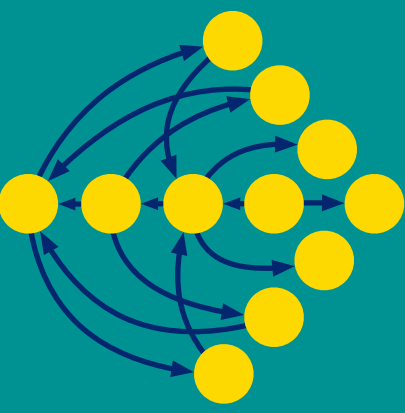
- **owl:sameAs** will then infer that the two Concepts are also in each others Scheme BUT they are not
- use **skos:exactMatch** between the two concepts

Question #7



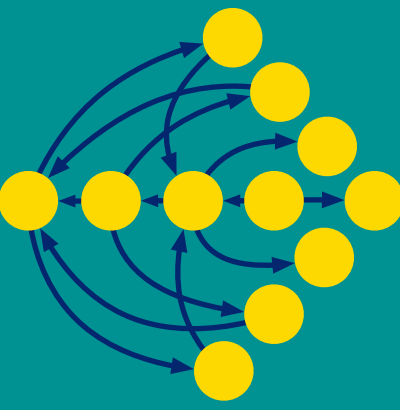
- **What is the difference between the FIBO Ontology and FIBO Vocabulary?**
- **Why is there both?**
- **[3]**

Answer #7



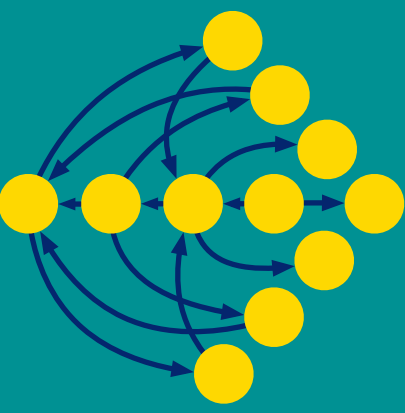
- **The FIBO Ontology is the full RDF/OWL model for Finance and includes Classes, Properties and Individuals to support inferenceing**
- **The FIBO Vocabulary is a SKOS vocabulary describing each FIBO concept in one Scheme**
- **To allow deployment of FIBO at different levels of company maturity - ie Vocab for low level adoption and Ontology for more capable orgs**

Question #8



- **What are two advantages and two disadvantages of LLMs for Knowledge Graphs**
- **[2]**

Answer #8

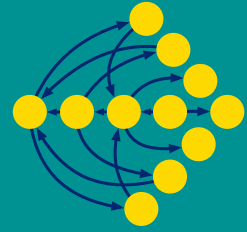


- **Advantages**

- use graph data as source for LLM (graph to text)
- use (genAI) Prompts as query to graph data

- **Disadvantages**

- possibility of hallucination
- no clear explainability of results



- Consider the “Correctional Institutions” data from the HK open data site below. Draw an appropriate Ontology Model to represent this open data with Class, Object and Datatype properties. Indicate any possible Vocabularies.
- 11 Marks

Institution Name	Stanley Prison	Lai King Correctional	Tong Fuk Correctional	Pik Uk Correctional
Establishment Year	1937	2008	1966	1975
Type of Facility	Maximum Security	Minimum Security	Medium Security	Maximum Security
Gender of Inmate	Male	Female	Male	Male
Capacity	1511	200	925	385
Daily Visiting Hours	Start 08:00 End 13:00	Start 09:00 End 14:00	Start 13:00 End 17:00	Start 15:00 End 18:00
Chief Warden	Paul Wang	May Fu	Fred Cheng	John Wu

Answer #9

