

Ontology = Encyclopedia

- Stored in a *knowledge base (kb)*
- Includes:
 - Vocabulary
 - Things, categories, attributes, relationships
 - Facts
 - Basic, complex, entailments, etc.
- *Organizes this information in a useful way*

Holmes and Watson received 9% on Rotten Tomatoes.

Holmes and Watson are detectives.



Holmes and Watson live at Irina's house.

Holmes and Watson live in London.



Holmes and Watson are cats.



Holmes and Watson live in New York.

Holmes and Watson are book characters.

Holmes and Watson chase criminals.

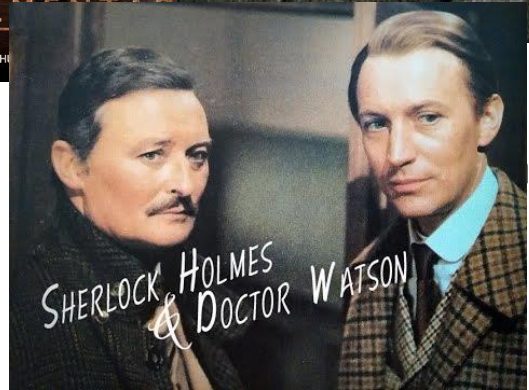
Holmes and Watson chase each other.



Holmes and Watson receive
cases.



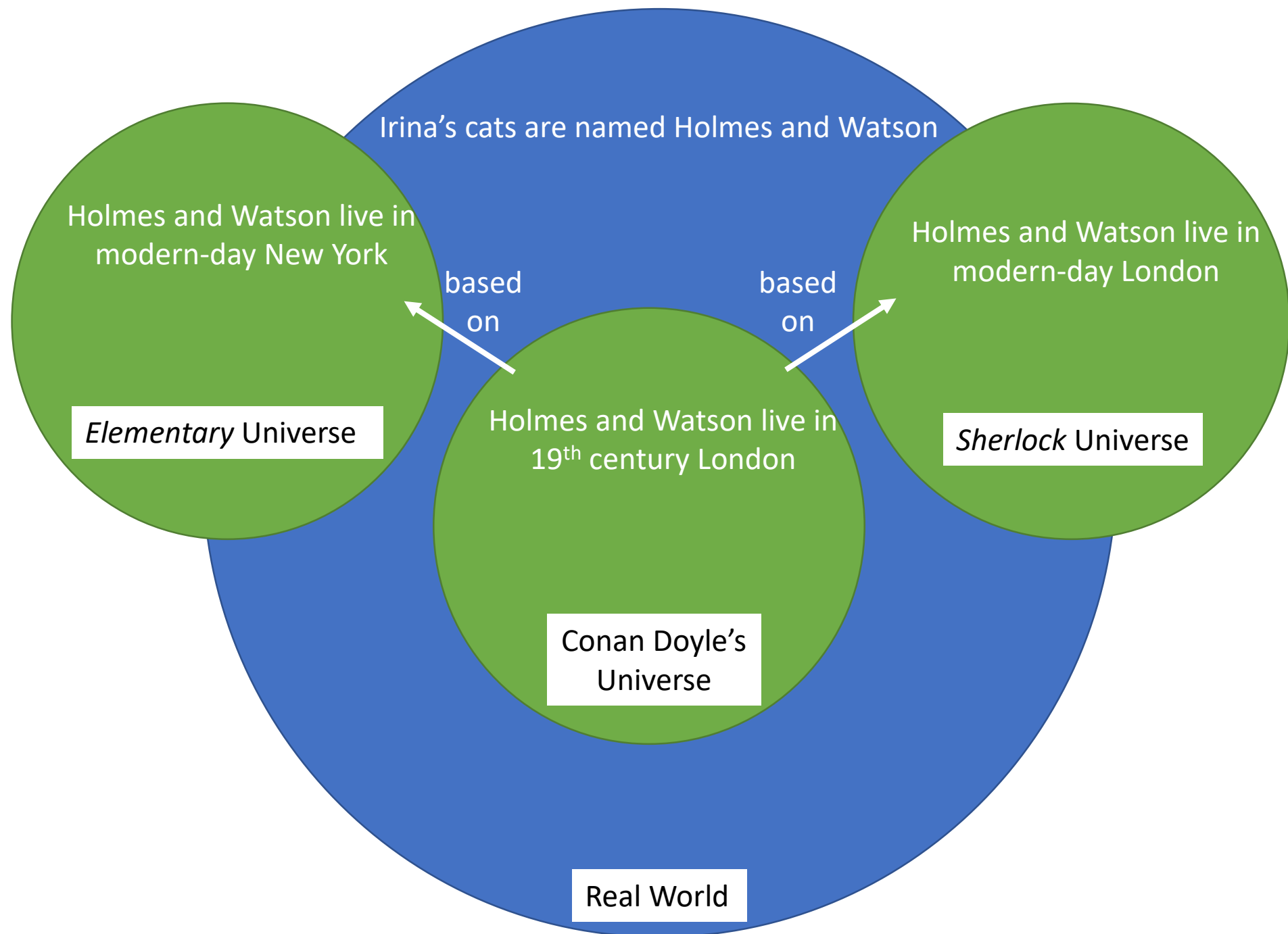
Holmes



se c



on chase each other.



Contexts/Microtheories

- Allow (seemingly) conflicting facts to coexist without affecting reasoning
- Constrain reasoning
 - Only need to consider facts in given context(s)
- Some ways facts can be related:
 - Shared assumptions (e.g., Newtonian vs. Quantum)
 - Shared topic (e.g., history of slavery in the US)
 - Shared source (e.g., Arthur Conan Doyle's *Sherlock Holmes* short stories)
- A fact can belong to multiple contexts

Let's zoom in...

- Friends = symmetric relation
 - Holmes is Watson's friend
 - Watson is Holmes's friend
- Biographer = inverse relation
 - Watson is Holmes's biographer
 - Holmes is Watson's biographee
- Doctor = type

Holmes and Watson live in 19th century London

Holmes and Watson are friends

Watson is Holmes's biographer

Watson is married to Mary Watson

Mary Morstan is a governess

Mary Morstan is also referred to as Mary Watson

Watson is a doctor

Conan Doyle's Universe

Why bother?

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Conan Doyle's Universe

Make Inferences

- Who lives in London?
- Whose friend is Holmes's biographer?
- Who is married to a governess?

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Conan Doyle's Universe

Zooming back out (a little)

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Conan Doyle's Universe

Holmes and Watson live in modern-day London

based
on

Sherlock Universe

Zooming back out (a little)

inherits
from
~~based~~
on

Holmes and Watson live in 19th century London

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Conan Doyle's Universe

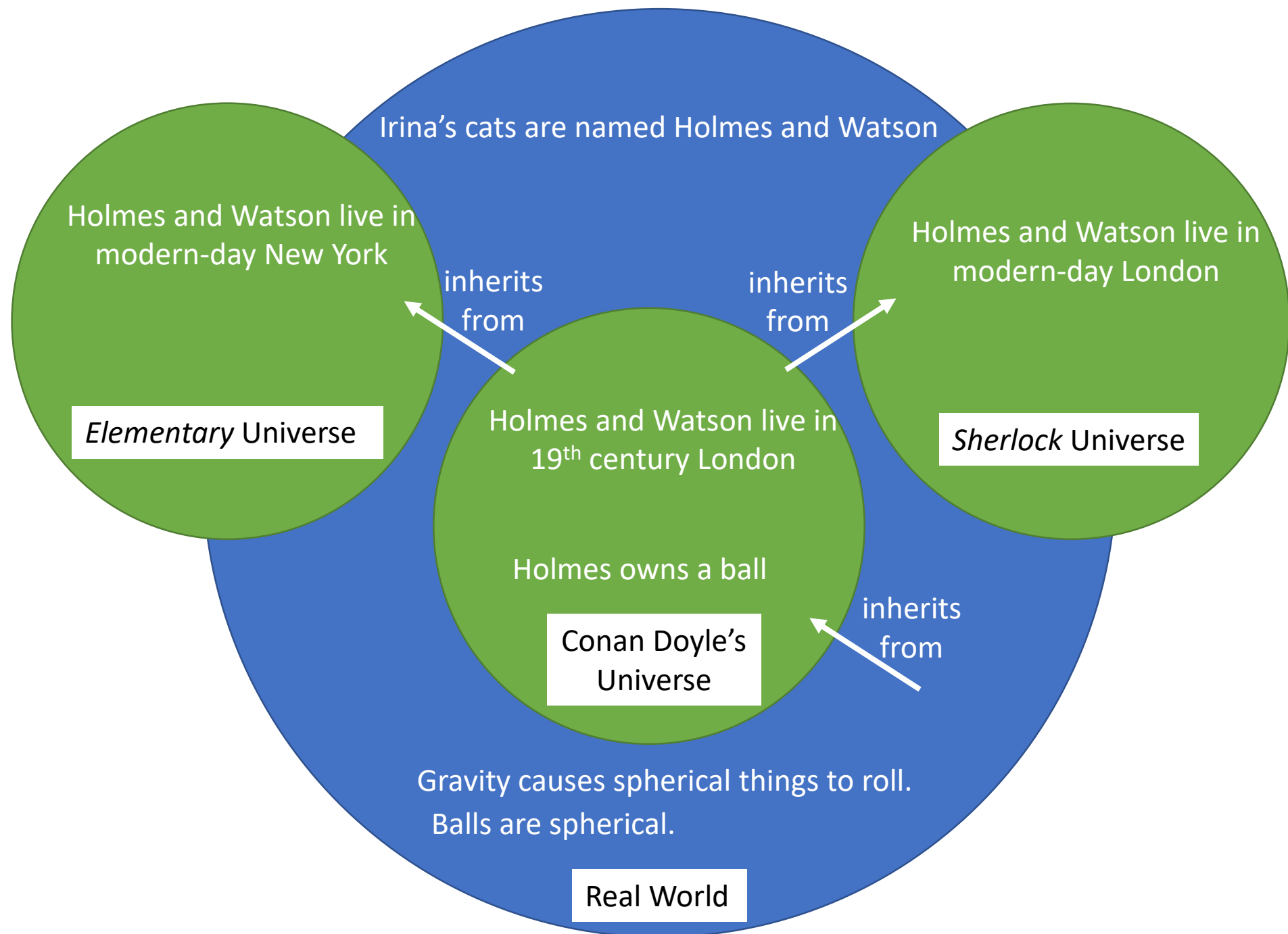
Holmes and Watson live in
modern-day London

Sherlock Universe

- Check the child context first
- If you can, use that answer
- Otherwise, check the parent

Big Picture

- Conan Doyle's universe is a more general version of the *Sherlock* universe
 - General facts about Holmes, Watson, etc.
 - Also true in the Conan Doyle's stories, *Elementary*, Sherlock Holmes movies, etc.
- How would you answer: "Is Holmes's ball spherical?"



Upper Ontology

- Abstract concepts
 - Thing
 - Relation
- Concepts/facts relevant across domains
 - Balls are spherical

Domain Specific Ontology

- Concrete concepts
 - Holmes
 - 221B Baker Street
- Domain-specific concepts/facts
 - Watson is Holmes's biographer

Questions to Consider

- What's my application/domain?
- What concepts and facts do I need in order to explore this domain?
- What concepts and facts are available in my chosen ontology?
- How are they organized?
- What's missing?

Ideas

- Drug discovery
- Meta-analysis of a research topic
- Building a family tree
- Analysis of website use
- Uncovering a discography for a musician
- Other ideas?

Handy list of ontologies from Indiana University:

<http://info.slis.indiana.edu/~dingying/Teaching/S604/OntologyList.html>

Please turn in your
document (or a picture of
your document) on Canvas

Thinking ahead to projects

- Your work today can be the starting point for your class project
- For example...

HW2

- CycL representations
 - Lots of practice next class
- Ontologizing the Mudd 3rd floor (CS) space
- Due 1/24/2019 before class
- Part 2: read a Sherlock Holmes short story 😊