

# **A few words on Graphs and Semantics**

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# Motivation

*“What is the relationship between Sean Lennon and Mick Jagger?”*

[http://www.pumpthemusic.com/oracle/index\\_post.php](http://www.pumpthemusic.com/oracle/index_post.php)

## Links from Sean Lennon to Mick Jagger

Sean Lennon is the child of

John Lennon

John Lennon composed

“Imagine”

Imagine was composed by

Paul McCartney

Paul McCartney collaborated minorly on

“Band Aid”

Band Aid was a minor collaboration between

David Bowie

David Bowie collaborated on

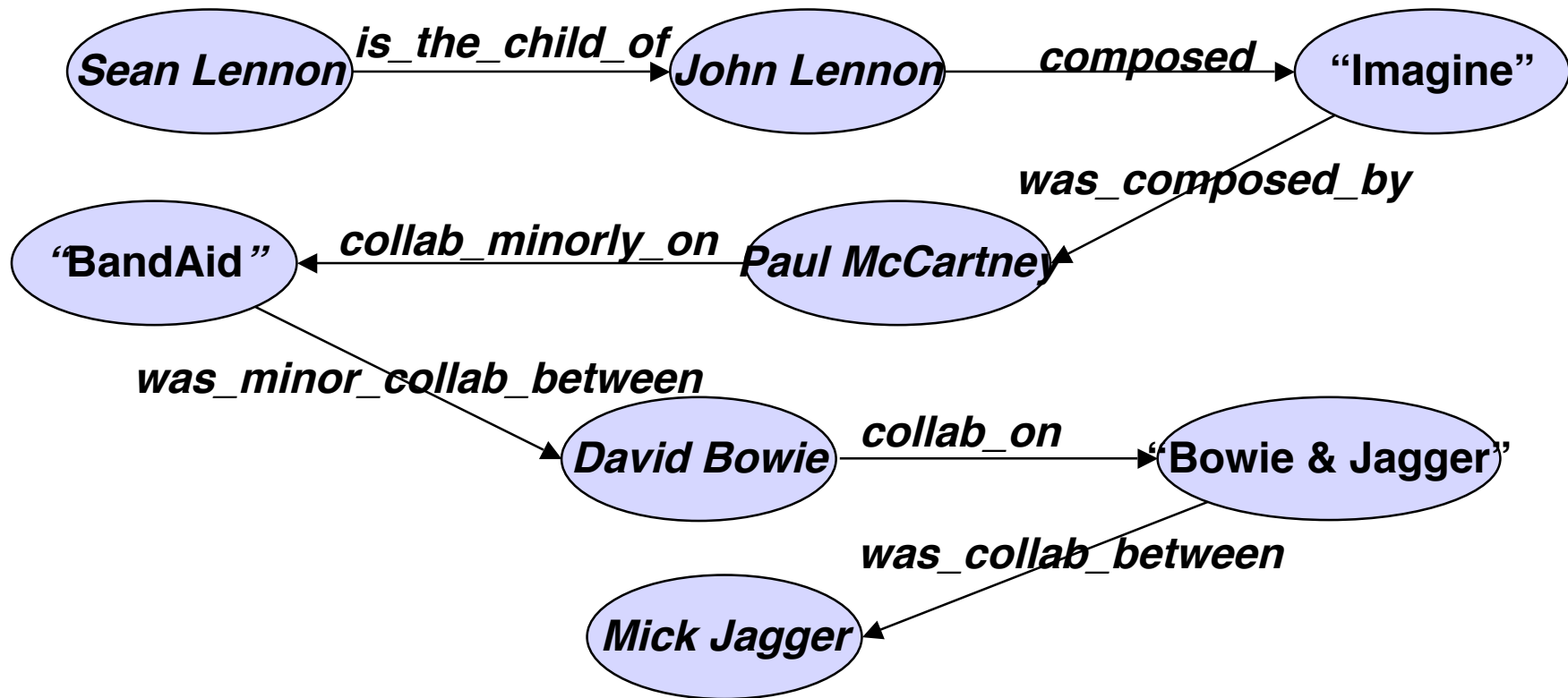
“David Bowie & Mick Jagger”

David Bowie & Mick Jagger was a collaboration between

Mick Jagger

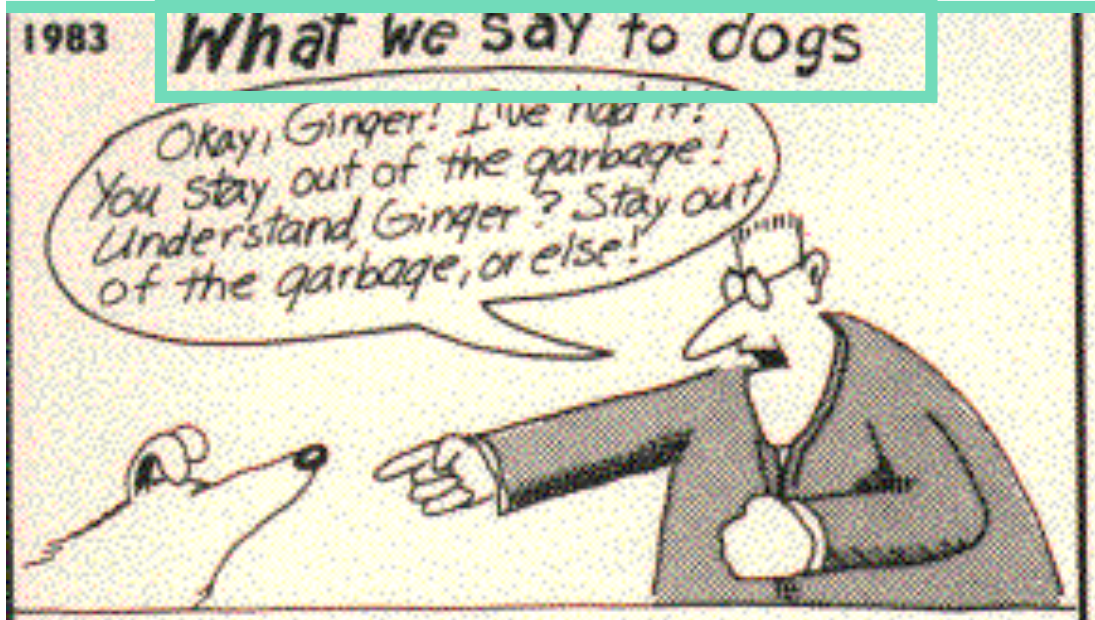
# Graphical representation

Sean Lennon	is the child of	John Lennon
John Lennon	composed	Imagine
Imagine	was composed by	Paul McCartney
Paul McCartney	collaborated minorly on	Band Aid
Band Aid	was a minor collaboration between	David Bowie
David Bowie	collaborated on	David Bowie & Mick Jagger
David Bowie & Mick Jagger	was a collaboration between	Mick Jagger

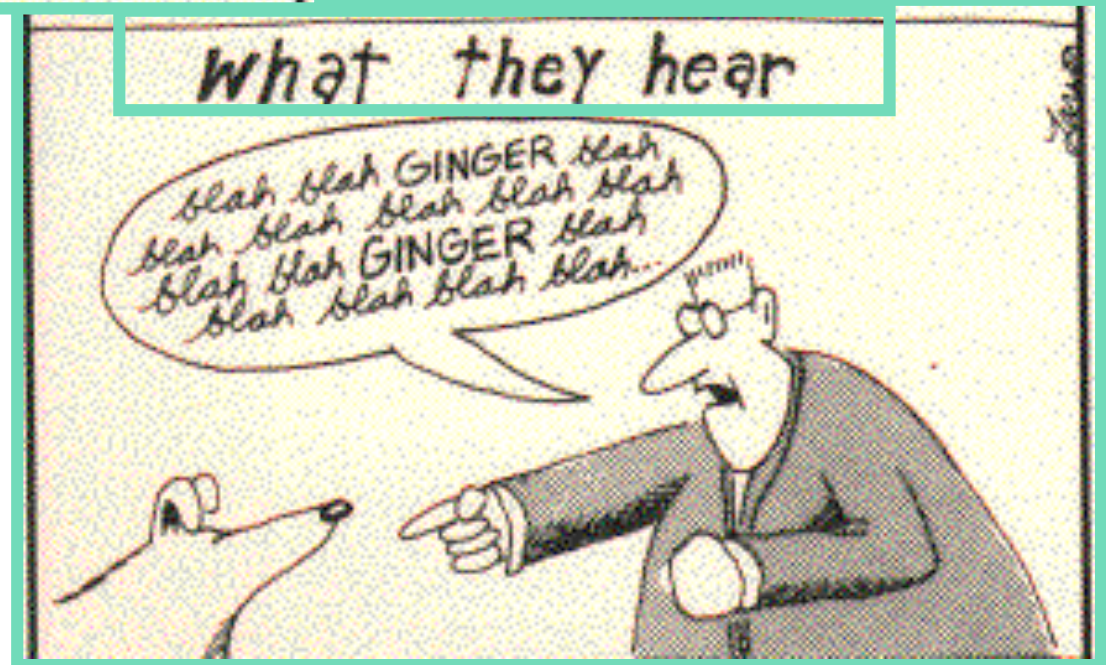




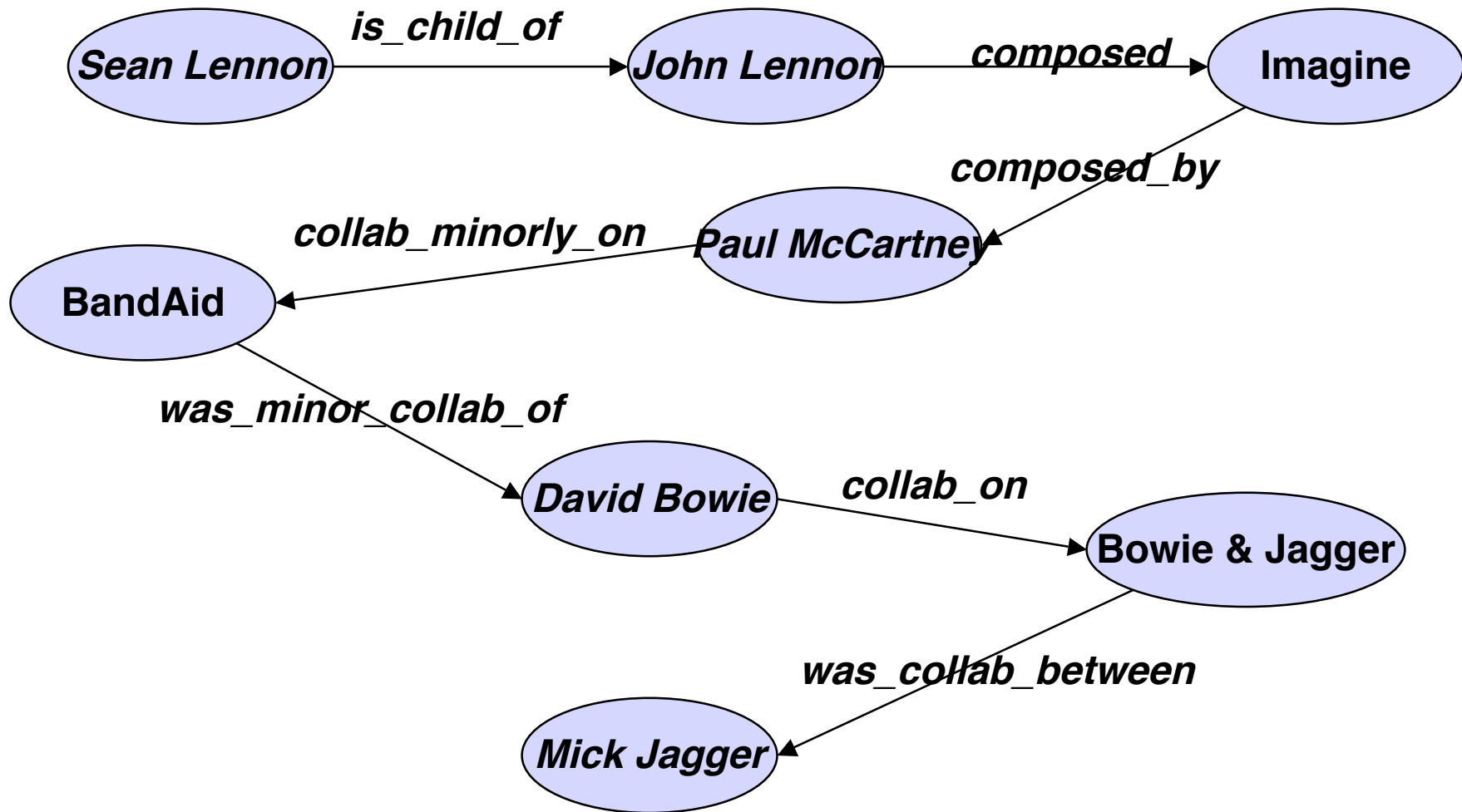
## So what is the problem?



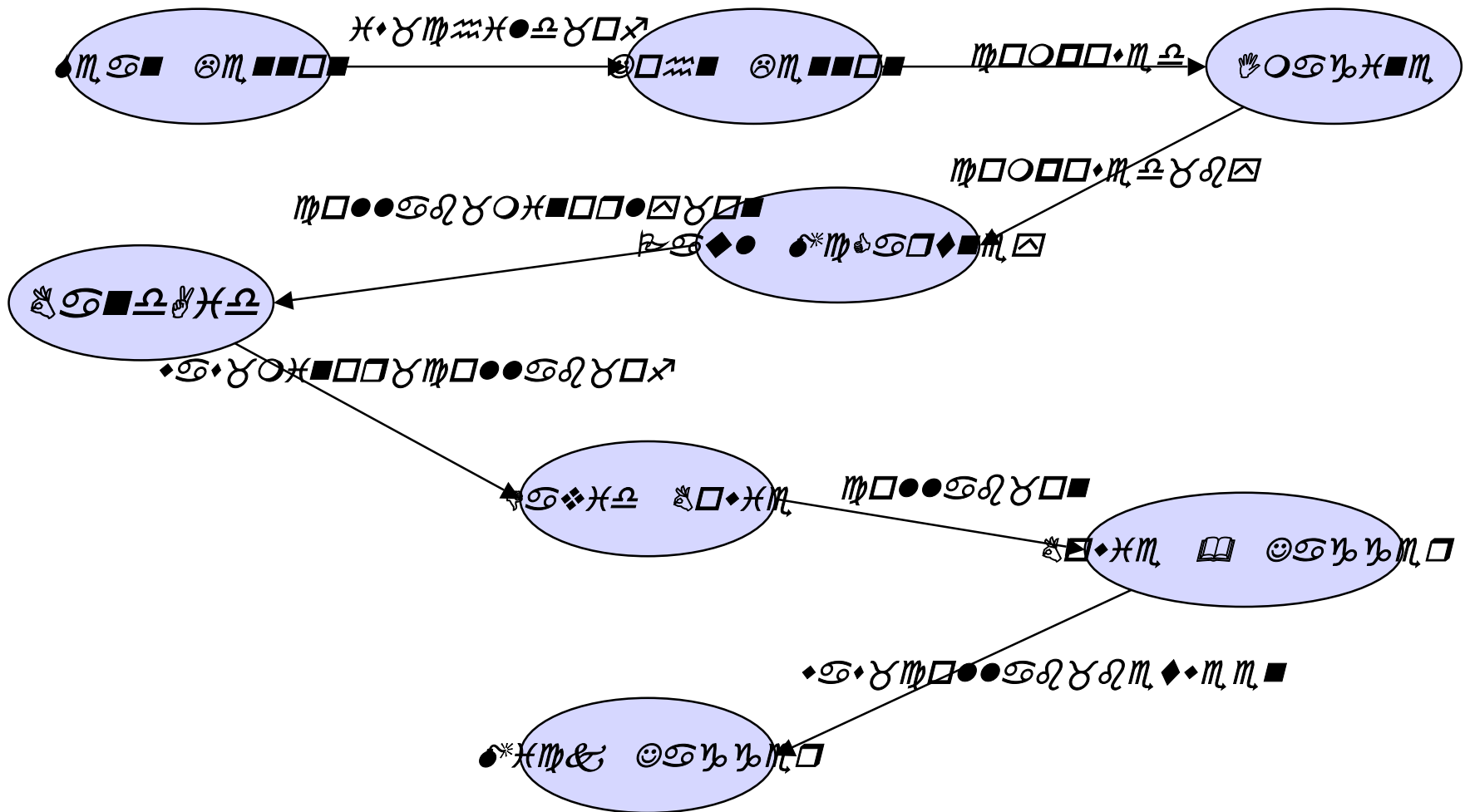
*“Far Side”  
by Gary Larson*



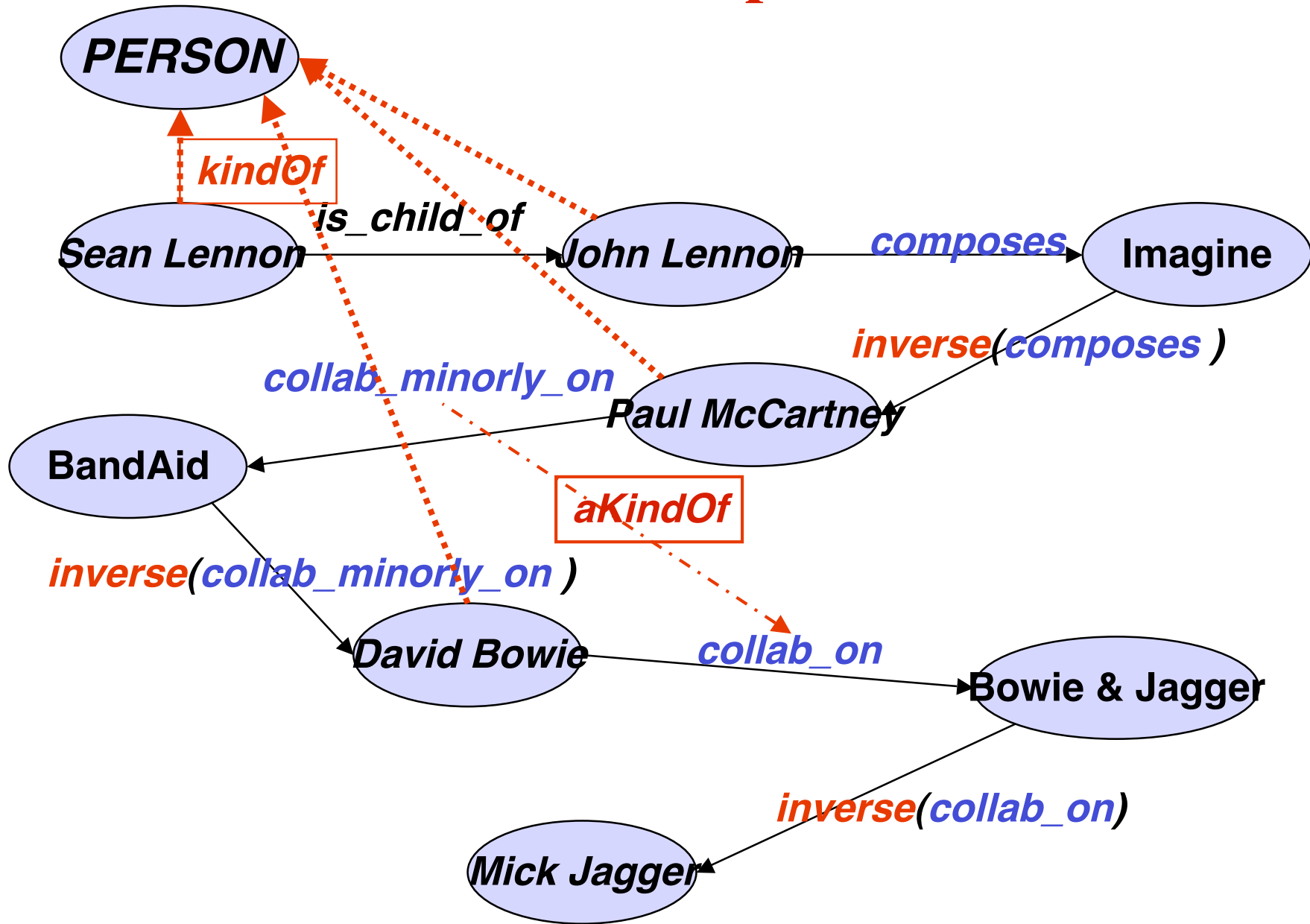
# What we say to computers



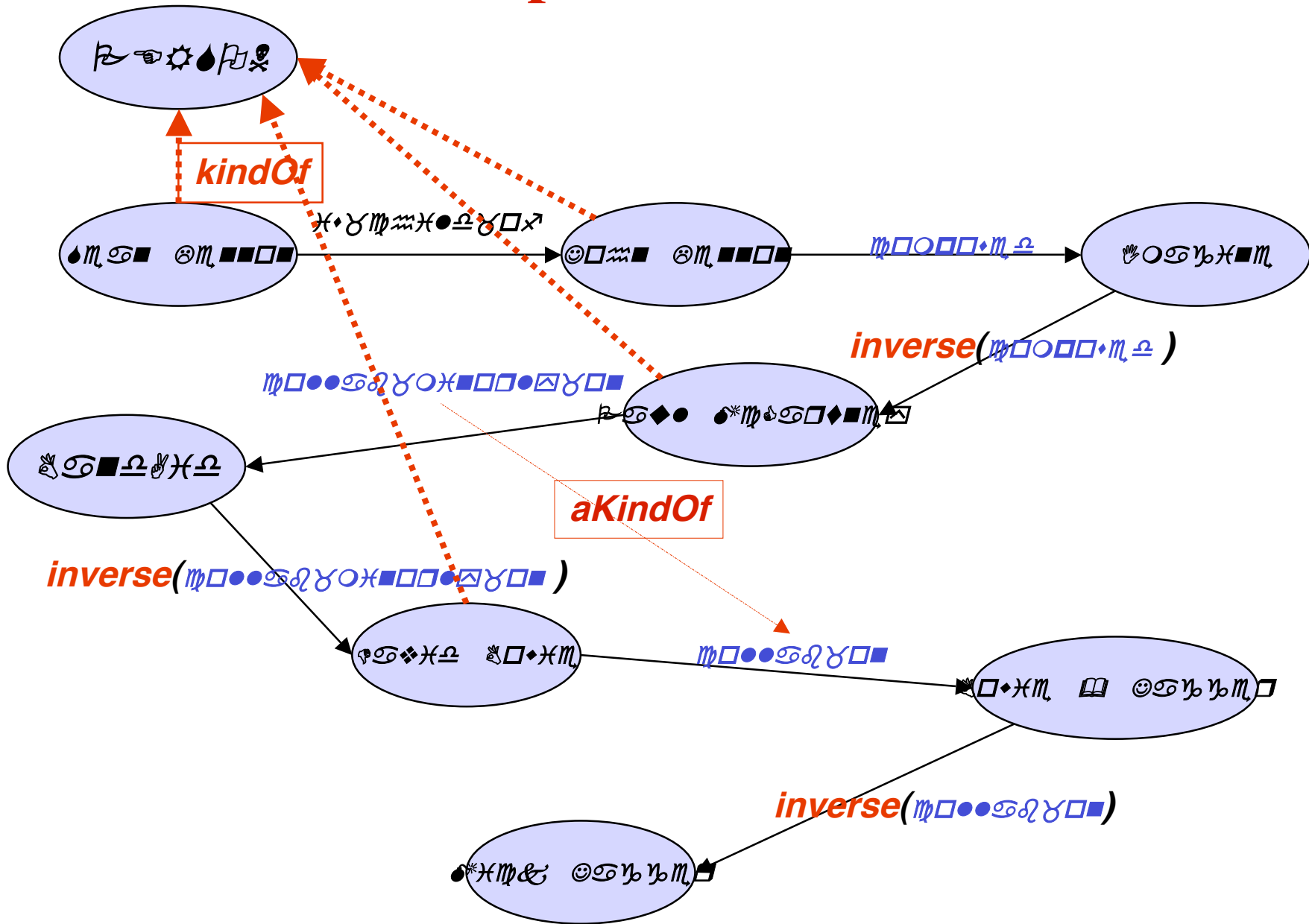
# What computers “hear”



# What we would like computers to understand



# What computers will understand



# BUT, computers will also know that

***inverse(inverse(P) ) means the same thing as P, for any P***

**e.g.**

***inverse(inverse(composes) )  $\equiv$  composes***

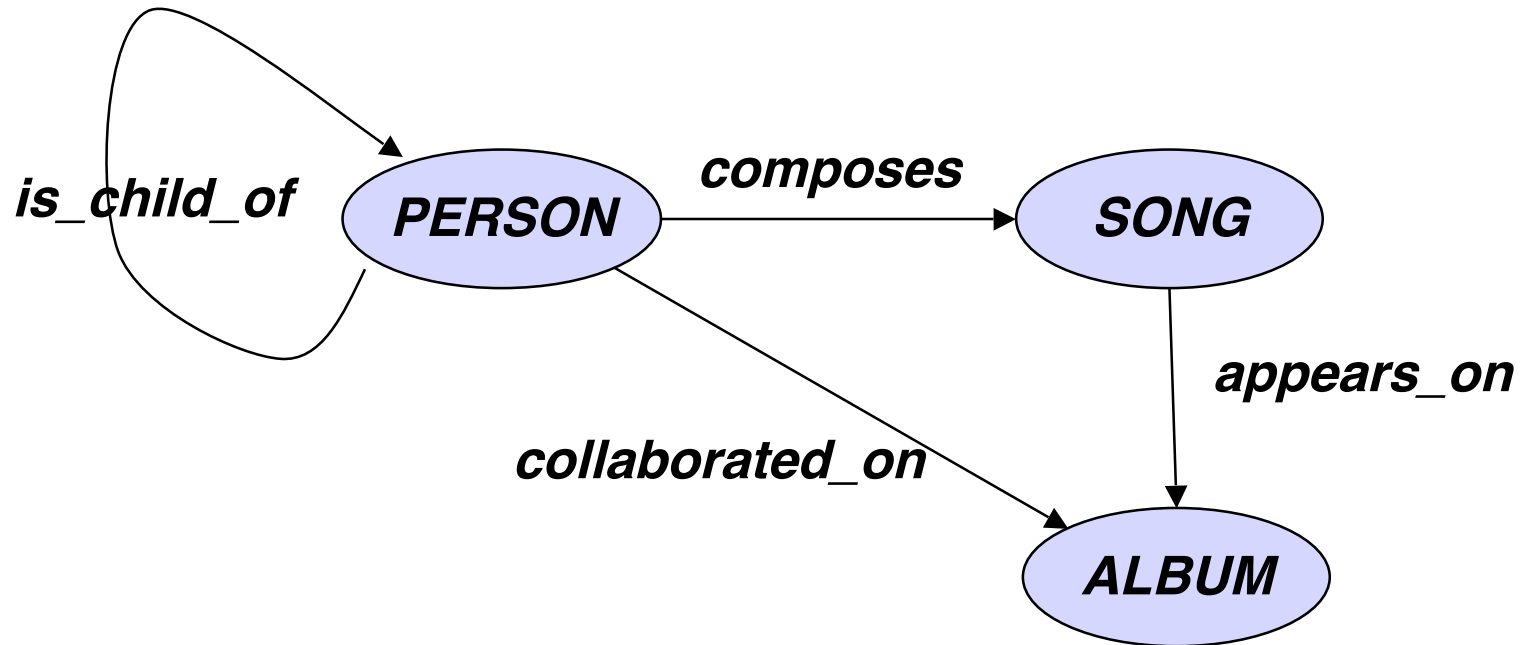
***inverse(inverse(collab\_on) )  $\equiv$  collab\_on***

*In other words, we have a logic for special connectives (“constructors”) like **inverse( )***

***DESCRIPTION LOGIC: a collection of such concept and relationship constructors that have proven to be useful empirically.***

# And, we plan to have “ontologies”

*Explaining things like*



*IF  $x \neq y$  and (x composes s1) and (y composes s2) and  
(s1 appears on w) and (s2 appears on w)  
THEN (x and y collaborated on w)*