

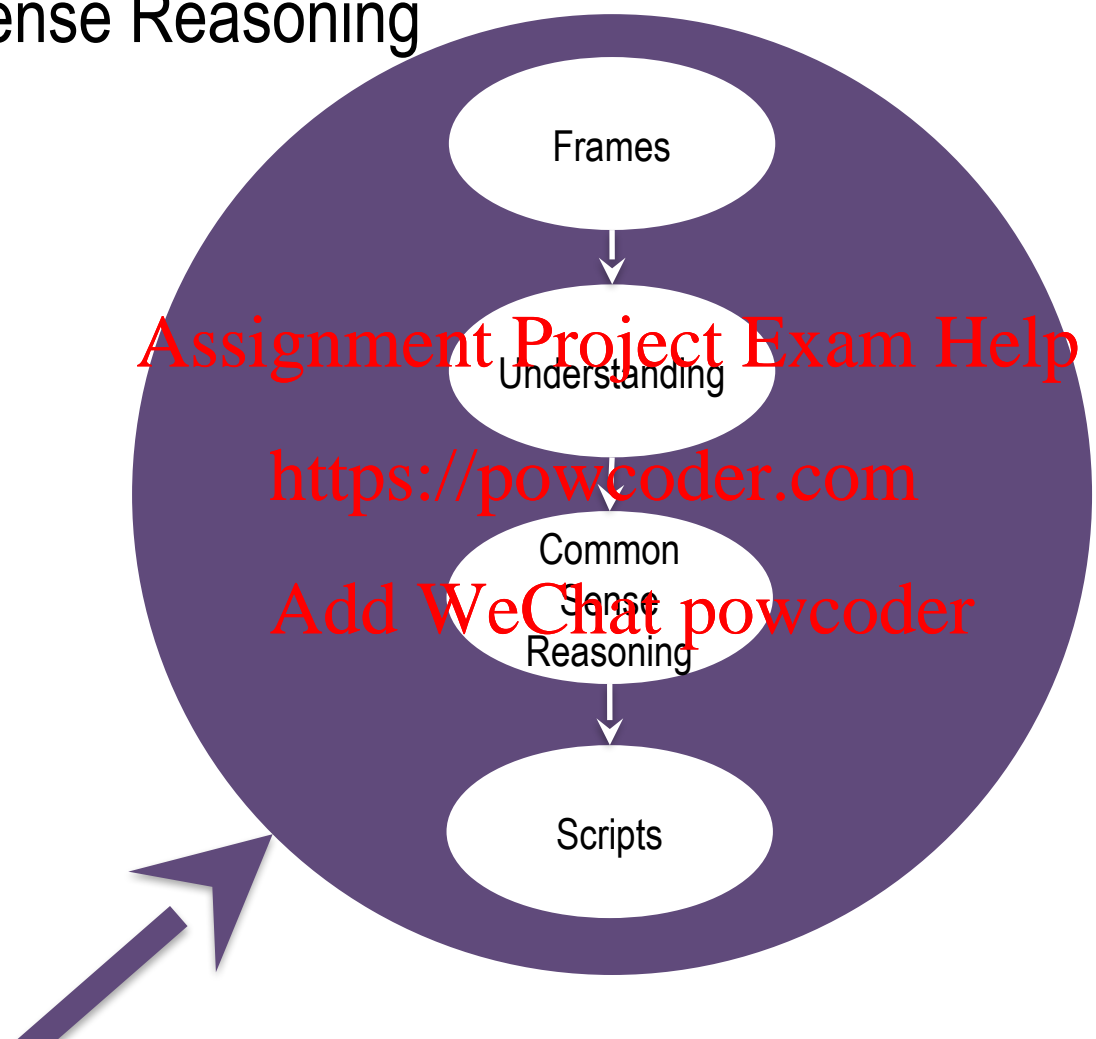
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Understanding

# Common Sense Reasoning



# Lesson Preview

- Thematic role systems
- Ambiguity
- Constraints

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## Story 1:

Today, an extremely serious earthquake of magnitude 8.5 hit Lower Slabovia, killing 25 people and causing \$500 million in damage. The President of Lower Slabovia said that the hard-hit area near the Sadie Hawkins fault has been a danger zone for years.

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## Story 2:

Today, the President of Lower Slabovia killed 25 proposals totaling \$500 million for research in earthquake prediction. Our Lower Slabovian correspondent calculates that 8.5 research proposals are rejected for every one approved. There are rumors that the President's science advisor, Sadie Hawkins, is at fault.

**Sentence 1:**

A serious earthquake killed 25 people in Lower Slabovia.

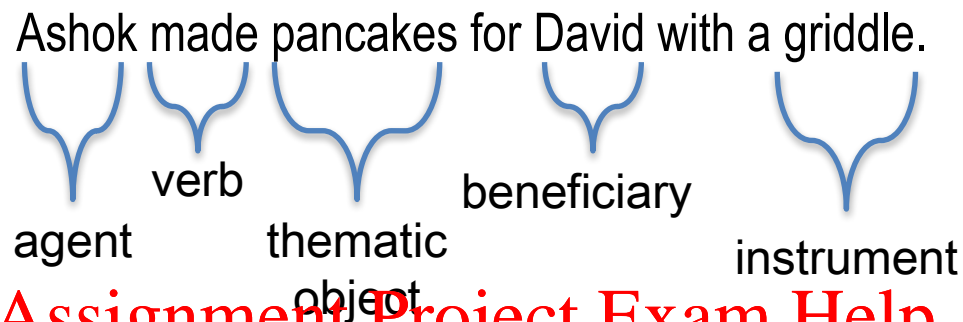
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**Sentence 2:**

The President of Lower Slabovia killed 25 proposals for earthquake prediction.

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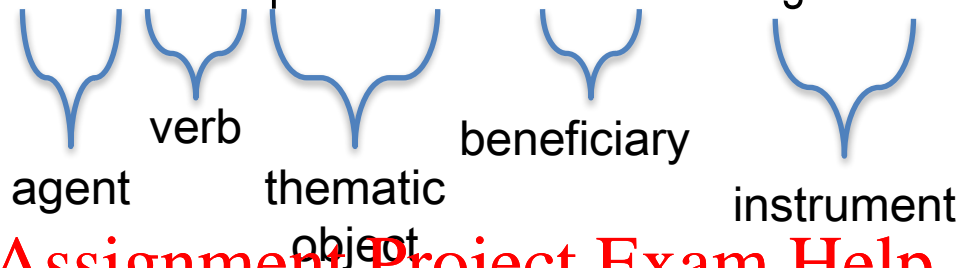


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Ashok made pancakes for David with a griddle.



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Thematic Role

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**verb** : make

**agent** : Ashok

**beneficiary** : David

**thematic object** :

pancakes

**instrument** : griddle

David went to the meeting with Ashok by car.

Thematic Role

**verb** : go

**agent** : David

**coagent** : Ashok

**destination** :

meeting

**conveyance** : car

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Write the thematic role frame given  
by the sentence above.



David went to the meeting with Ashok by car.

Thematic Role

**verb** : go

**agent** : David

**coagent** : Ashok

**destination** :

meeting

**conveyance** : car

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David went to the meeting with Ashok by car.

Thematic Role	
<b>verb</b>	: go
<b>agent</b>	: David
<b>coagent</b>	: Ashok
<b>destination</b>	: meeting
<b>conveyance</b>	: car

Prepositional Constraints	
Preposition	Thematic Roles
by	agent, conveyance, location
for	beneficiary, duration
from	source
to	destination
with	coagent, instrument

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## Prepositional Constraints

Preposition	Thematic Roles
by	agent, conveyance, location
for	beneficiary, duration
from	source
to	destination
with	coagent, instrument

That was written by Ashok.

David went to New York by train.

David stood by the statue.

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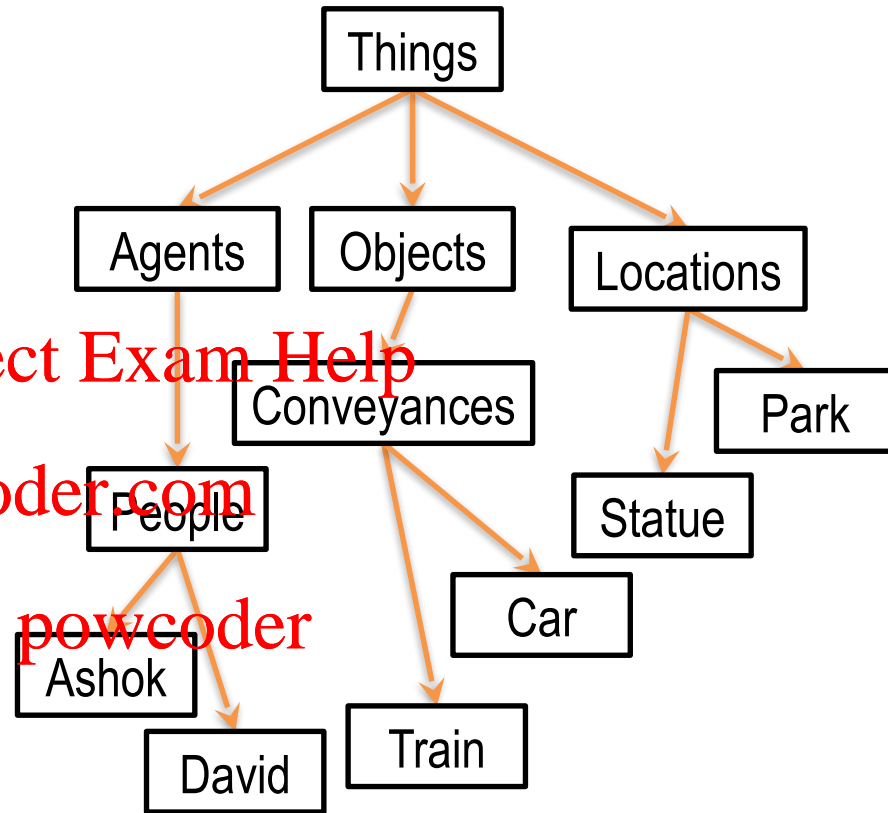
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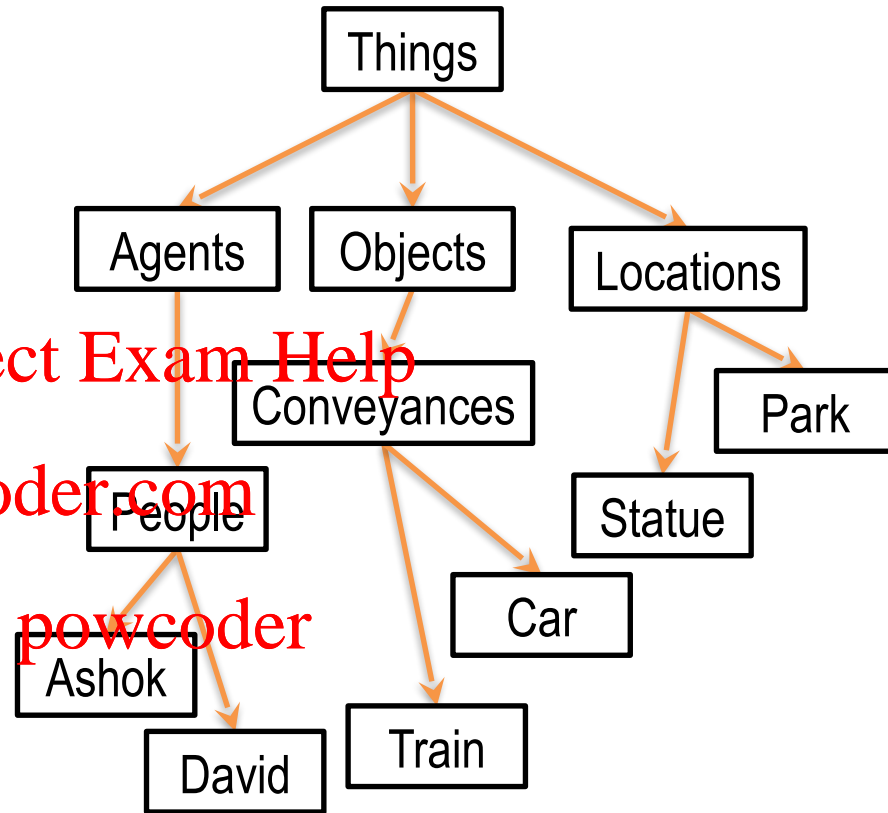
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### Prepositional Constraints

Preposition	Thematic Roles
by	agent, conveyance, location
for	beneficiary, duration
from	source
to	destination
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take. *verb.* /tāk/

- to reach for and hold
- to bring or transport
- to remove
- to medicate
- to capture
- to steal
- to cheat or swindle
- to subtract
- to measure
- to accompany
- to assume control
- to remove from the body

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take. verb. /tāk/

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- to remove
- to medicate
- to capture
- to steal
- to cheat or swindle
- to subtract
- to measure
- to accompany
- to assume control
- to remove from the body

take1  
agent :  
object :

take2  
agent :  
object :  
destination :

take3  
agent :  
object :  
location :

take4  
agent :  
object :  
medicine :

take5  
agent :  
target :

take7  
agent :  
target :  
prize :

take8  
minuend :  
subtrahend :

take6  
agent :  
object :  
source :

take9  
agent :  
quantity :

take10  
agent :  
coagent :  
destination :

take11  
agent :  
target :  
particle : over

take12  
agent :  
article :  
particle : off

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I took the candy from the baby.

take. *verb.* /tāk/

- to reach for and hold
- to bring or transport
- to remove
- to medicate
- to capture
- to steal
- to cheat or swindle
- to subtract
- to measure

take1  
agent :  
object :

take2  
agent :  
object :  
destination :

take3  
agent :  
object :  
location :

take4  
agent :  
medicine :

take5  
agent :  
target :

take7  
agent :  
target :  
prize :

take8  
minuend :  
subtrahend :

take6  
agent :  
object :  
source :

take9  
agent :  
quantity :

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agent :  
target :  
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take8  
minuend :  
subtrahend :

take6  
agent :  
object :  
source :

take9  
agent :  
quantity :

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agent :  
object :

take2  
agent :  
object :  
destination :

take3  
agent :  
object :  
location :

take4  
agent :  
medicine :

take5  
agent :  
target :

take7  
agent :  
target :  
prize :

take8  
minuend :  
subtrahend :

take6  
agent :  
object :  
source :

take9  
agent :  
quantity :

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Use the thematic role frames below to identify which sentence instantiates which meaning of 'take'.

1. I took an aspirin for my headache.
2. I took my briefcase to work today.
3. I took the casino for \$5 million.

take. verb. /tāk/

- to reach for and hold
- to bring or transport
- to remove
- to medicate
- to capture
- to steal
- to cheat or swindle
- to subtract
- to measure

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take1  
agent :   
object :

take2  
agent :  2  
object :   
destination :

take3  
agent :   
object :   
location :

take4  
agent :  1  
medicine :

take5  
agent :   
target :

take7  
agent :  3  
target :   
prize :

take6  
agent :   
object :   
source :

take8  
minuend :   
subtrahend :

take9  
agent :   
quantity :

**Sentence 1:** A serious earthquake killed 25 people in Lower Slabovia.

**Sentence 2:** The President of Lower Slabovia killed 25 proposals for earthquake prediction.

kill. *verb.* /kil/

- to cause the death of
- to put an end to

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kill1

agent :

victim :

kill2

agent :

object :

# **Assignment**

How would you use configuration to design an agent that could answer Raven's progressive matrices?

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## To recap...

- Thematic role systems
- Resolving ambiguity
- Leveraging constraints

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