Common

Sense

Reasoning

Common Sense Reasoning

Frames

Understanding

Common Sense Reasoning

Scripts
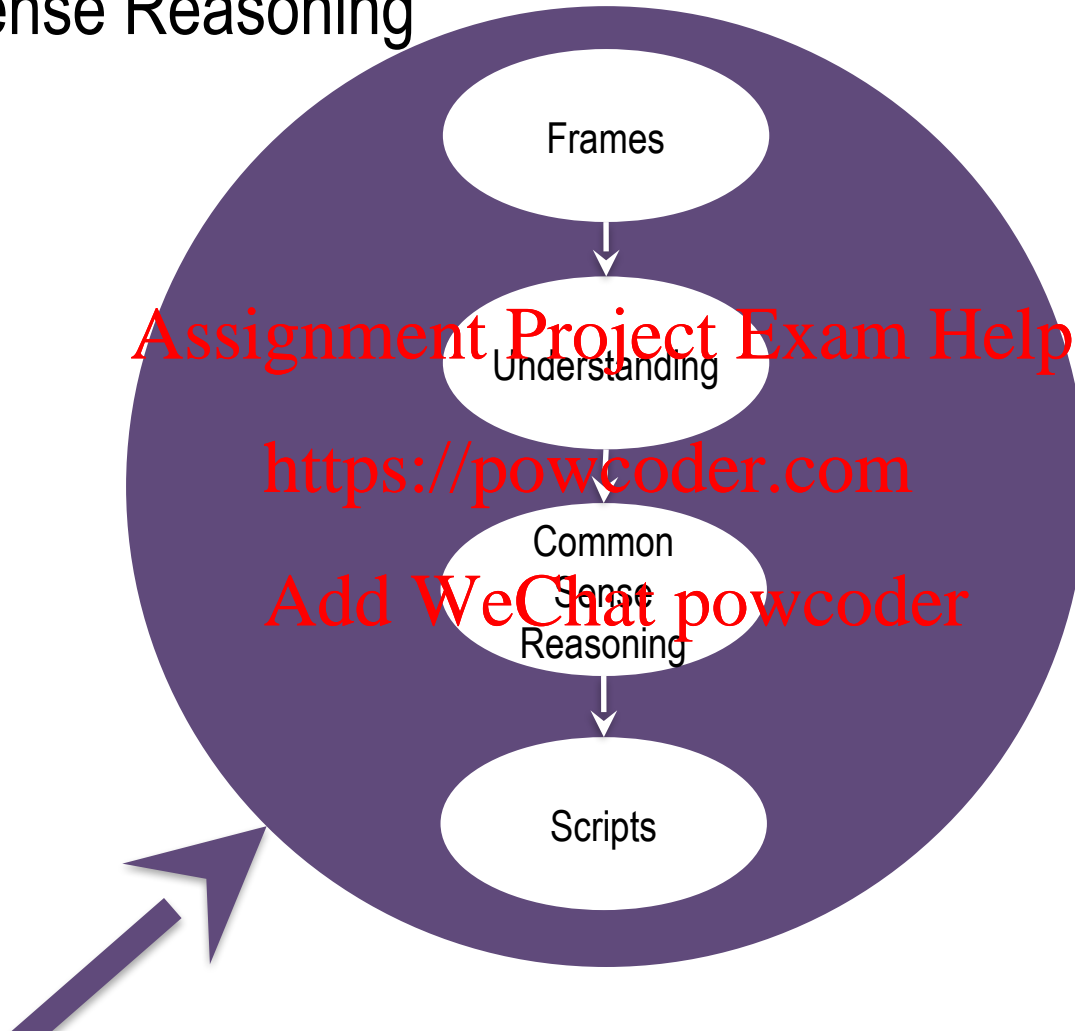
Lesson Preview

- Primitive actions

- Actions and subactions

- State changes

Ashok **ate** a frog.

Ashok **ate** out at a restaurant.

I could tell something was really **eating** him.

The manager would rather **eat** the losses
than devote more resources to the project.

The river gradually **ate** away at the
riverbank.

The drip **ate** a whole through the wallpaper.

The forest was completely **eaten** by the fire.

He **ate** crow when his prediction was false.

Ashok **ate** a frog.

Ashok **ate** out at a restaurant.

I could tell something was really **eating** him.

The manager would rather **eat** the losses
than devote more resources to the project.

The river gradually **ate** away at the
riverbank.

The drip **ate** a whole through the wallpaper.

The forest was completely **eaten** by the fire.

He **ate** crow when his prediction was false.

Ashok **ate** a frog.

Ashok **devoured** a frog.

Ashok **consumed** a frog.

Ashok **ingested** a frog.

Ashok **partook** of a frog.

Ashok **swallowed** a frog.

Ashok **dined** on a frog.

Ashok **inhaled** a frog.

Primitive Actions

Move-body-part

Expel

Propel

See

Smell

Move-possession

Think-about

Move-object

Ingest

Speak

Heart

Feel

Move-concept

Conclude

Primitive Actions

Move-body-part	Move-object
Expel	Ingest
Propel	Speak
See	Heart
Smell	Feel
Move-possession	Move-concept
Think-about	Conclude

Ashok ~~ate~~ **ingested** a frog.

Ashok ~~devoured~~ **ingested** a frog.

Ashok ~~consumed~~ **ingested** a frog.

Ashok **ingested** a frog.

Ashok ~~partook of~~ **ingested** a frog.

Ashok ~~swallowed~~ **ingested** a frog.

Ashok ~~dined on~~ **ingested** a frog.

Ashok ~~inhaled~~ **ingested** a frog.

Write the primitive action that subsumes the verbs in the following sentences.

Primitive Actions

Move-body-part	Move-object
Expel	Ingest
Propel	Speak
See	Heart
Smell	Feel
Move-possession	Move-concept
Think-about	Conclude

John [ran] .

John [pushed] the cart.

John [took] the book from Mary.

John [ate] ice cream with a spoon.

John pushed the cart.

Action Frame
  primitive : propel
  agent : John
  object : cart

John took the book from Mary.

```
Action Frame
        primitive : move-
possession
        agent : john
        coagent : cart
        object : book
```

Write the action frame corresponding to the above sentence, using a primitive action.

Primitive Actions

Move-body-part	Move-object	See	Heart
Expel	Ingest	Smell	Feel
Propel	Speak	Move-possession	Move-concept
	Conclude	Think-about	

John fertilized the field.

~~John fertilized the field.~~

John put fertilizer on the field.

~~John fertilized the field.~~

John put fertilizer on the field.

Action Frame

primitive : move-possession

agent : John

object : fertilizer

destination : field

Bill shot Bob.

Bill propelled a bullet into Bob.

```
Action Frame
      primitive : propel
      agent : Bill
      object : bullet
      destination : Bob
```

Rewrite the sentence in the form of a primitive action, then construct an action frame for the sentence.

Primitive Actions

Move-body-part	Move-object	See	Heart
Expel	Ingest	Smell	Feel
Propel	Speak	Move-possession	Move-concept
	Conclude	Think-about	

Ashok put the wedge on the block.

Action Frame
        primitive : move-object
        agent : Ashok
        object : wedge
        destination : block

Ashok put the wedge on the block.

Action Frame
    primitive : move-object
    agent : Ashok
    object : wedge
    destination : block
    sub-action :
    sub-action :
    sub-action :

Action Frame
    primitive : move-body-part
    object : fingers
    destination : open

Action Frame
    primitive : move-body-part
    object : hand

Action Frame
    primitive : move-body-part
    object : fingers
    destination : closed

Ashok enjoyed eating the frog.

```
Action Frame
       primitive :
       ingest
       agent : Ashok
       object : frog
       result :
```

Ashok enjoyed eating the frog.

Action Frame
        primitive :
        ingest
        agent : Ashok
        object : frog
        result :

State-Change Frame
        object : Ashok's
mood
        destination :
Happy

Susan comforted Jing.

Action Frame
        primitive : do
        agent : Susan
        result :

State-Change Frame
        object : Jing's mood
        destination : Happy

Maria told Ben to throw the ball.

```
Action Frame
        primitive :
speak
        agent : Maria
        result :
Action Frame
        primitive :
propel
        agent : Ben
        object : ball
```

Complete the frame representations for these sentences.

Anika decided to have a glass of water.

Marc loved watching TED talks.

○ Action ○ State Change

primitive : conclude

agent : Anika

result :

○ Action ○ State Change

primitive : ingest

agent : Anika

object : glass of water

○ Action ○ State Change

primitive : see

agent : Marc

object : TED talks

result :

○ Action ○ State Change

object : Mark's mood

destination : Happy

Primitive Actions

Move-body-part	Move-object	See	Heart
Expel	Ingest	Smell	Feel
Propel	Speak	Move-possession	Move-concept
	Conclude	Think-about	

Assignment

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

To recap...

- Primitive actions

- Actions and sub-actions

- State changes