Demo of the Micro ELI Question Answering System

Parsing Stories

INPUT

```
((JACK WENT TO THE STORE)
 (JACK GOT A RED KITE)
 (JACK WENT HOME))
```

```
Input is (JACK WENT TO THE STORE)


Processing word *START*

Processing word JACK
  *CD-FORM* = (JACK)
  *PART-OF-SPEECH* = NOUN-PHRASE
  *SUBJECT* = (JACK)


Processing word WENT
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))
  GO-VAR1 = (JACK)
  *CONCEPT* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))


Processing word TO
  *PART-OF-SPEECH* = PREPOSITION
  *CD-FORM* = (TO)


Processing word THE

Processing word STORE
  *PART-OF-SPEECH* = NOUN
  *CD-FORM* = (STORE)
  *PART-OF-SPEECH* = NOUN-PHRASE
  GO-VAR2 = (STORE)


CD form is (ACTOR (JACK) <=> (*PTRANS*) OBJECT (JACK) TO (STORE))

Input is (JACK GOT A RED KITE)


Processing word *START*

Processing word JACK
  *CD-FORM* = (JACK)
  *PART-OF-SPEECH* = NOUN-PHRASE
  *SUBJECT* = (JACK)


Processing word GOT
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*ATRANS* (ACTOR ?GET-VAR1) (OBJECT ?GET-VAR2) (TO ?GET-VAR1) (FRO
M ?GET-VAR3))
  GET-VAR1 = (JACK)
  *CONCEPT* = (*ATRANS* (ACTOR ?GET-VAR1) (OBJECT ?GET-VAR2) (TO ?GET-VAR1) (FRO
M ?GET-VAR3))
```

```
Processing word A

Processing word RED

Processing word KITE
  *PART-OF-SPEECH* = NOUN
  *CD-FORM* = (KITE)
  *PART-OF-SPEECH* = ADJECTIVE
  *PREDICATES* = ((COLOR (RED)))
  *PART-OF-SPEECH* = NOUN-PHRASE
  *CD-FORM* = (KITE (COLOR (RED)))
  GET-VAR2 = (KITE (COLOR (RED)))


CD form is (ACTOR (JACK) <=> (*ATRANS*) OBJECT (KITE (COLOR (RED))) TO (JACK))

Input is (JACK WENT HOME)


Processing word *START*

Processing word JACK
  *CD-FORM* = (JACK)
  *PART-OF-SPEECH* = NOUN-PHRASE
  *SUBJECT* = (JACK)


Processing word WENT
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))
  GO-VAR1 = (JACK)
  *CONCEPT* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))


Processing word HOME - not in dictionary
  GO-VAR2 = (HOUSE)


CD form is (ACTOR (JACK) <=> (*PTRANS*) OBJECT (JACK) TO (HOUSE))
```

OUTPUT

```
(ACTOR (JACK) <=> (*PTRANS*) OBJECT (JACK) TO (STORE))
(ACTOR (JACK) <=> (*ATRANS*) OBJECT (KITE) TO (JACK))
(ACTOR (JACK) <=> (*PTRANS*) OBJECT (JACK) TO (HOUSE))
```

Parsing Questions

INPUT

```
(WHO WENT TO THE STORE)
```

```
Processing word *START-QUESTION*

Processing word WHO
  *PART-OF-SPEECH* = NOUN-PHRASE
  *CD-FORM* = (*?*)
  *SUBJECT* = (*?*)


Processing word WENT
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?GO-VAR3))
  GO-VAR1 = (*?*)
  *CONCEPT* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?GO-VAR3))


Processing word TO
  *PART-OF-SPEECH* = PREPOSITION
  *CD-FORM* = (TO)


Processing word THE

Processing word STORE
  *PART-OF-SPEECH* = NOUN
  *CD-FORM* = (STORE)
  *PART-OF-SPEECH* = NOUN-PHRASE
  GO-VAR2 = (STORE)
(*PTRANS* (ACTOR (*?*)) (OBJECT (*?*)) (TO (STORE)))
```

OUTPUT

```
(*PTRANS* (ACTOR (*?*)) (OBJECT (*?*)) (TO (STORE)))
```

INPUT

```
(WHERE DID JACK GO)
```

```
Processing word *START-QUESTION*

Processing word WHERE
  *PART-OF-SPEECH = ADVERB


Processing word DID
  *PART-OF-SPEECH* = HELPING-VERB


Processing word JACK
  *CD-FORM* = (JACK)
  *PART-OF-SPEECH* = NOUN-PHRASE
  *SUBJECT* = (JACK)


Processing word GO
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?GO-VAR3))
  GO-VAR1 = (JACK)
  GO-VAR2 = (*?*)
  *CONCEPT* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?GO-VAR3))
(*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (*?*)))
```

OUTPUT

```
(*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (*?*)))
```

Finding Answers to Questions

INPUT QUESTION

```
(WHO GOT A KITE)
```

INPUT STORY

```
((JACK WENT TO THE STORE)
 (JACK GOT A KITE)
 (JACK WENT HOME))
```

OUTPUT

```
(JACK GOT A KITE)
```

INPUT QUESTION

```
(WHERE DID JACK GO)
```

INPUT STORY

```
((JACK WENT TO THE STORE)
 (JACK GOT A RED KITE)
 (JACK WENT HOME))
```

OUTPUT

```
(JACK WENT TO THE STORE)
```

INPUT QUESTION

```
(WHO WENT TO THE BEACH)
```

INPUT STORY

```
((JACK WENT TO THE STORE)
 (BOB WENT TO THE BEACH)
 (JACK GOT A KITE)
 (BOB GOT A SEASHELL))
```

OUTPUT

```
(BOB WENT TO THE BEACH)
```

Answering ProPara Questions

INPUT QUESTION

```
(WHERE DOES ACID RAIN GO)
```

INPUT STORY

```
((ACID RAIN ENTERS THE ATMOSPHERE AND LANDS)
 (KITE ENTERS THE ATMOSPHERE AND LANDS))
```

OUTPUT

```
(ACID RAIN ENTERS THE ATMOSPHERE AND LANDS)
```

Paraphrasing a Given Sentence

INPUT

```
(BOB WENT TO THE BEACH)
```

OUTPUT

```
(BOB IS GOING TO BEACH)
(BOB IS COMING TO BEACH)
```

Question Answering Using Micro SAM

INPUT

```
((*ptrans* (actor (jack))
           (object (jack))
           (to (store)))
 (*atrans* (object (kite))
           (to (jack)))
 (*ptrans* (actor (jack))
           (object (jack))
           (to (house))))
```

```
Input is
    (*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (STORE)))

New script $SHOPPING
Matches
    (*PTRANS* (ACTOR ?SHOPPER) (OBJECT ?SHOPPER) (TO ?STORE))

Adding script CD
    (*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (STORE)))

Input is
    (*ATRANS* (OBJECT (KITE)) (TO (JACK)))

Matches
    (*ATRANS* (ACTOR ?STORE) (OBJECT ?BOUGHT) (FROM ?STORE) (TO ?SHOPPER))

Adding script CD
    (*PTRANS* (ACTOR (JACK)) (OBJECT (KITE)) (TO (JACK)))

Adding script CD
    (*ATRANS* (ACTOR (STORE)) (OBJECT (KITE)) (FROM (STORE)) (TO (JACK)))

Input is
    (*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (HOUSE)))

Matches
    (*PTRANS* (ACTOR ?SHOPPER) (OBJECT ?SHOPPER) (FROM ?STORE) (TO ?ELSEWHERE))

Adding script CD
    (*ATRANS* (ACTOR (JACK)) (OBJECT (MONEY)) (FROM (JACK)) (TO (STORE)))

Adding script CD
    (*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (FROM (STORE)) (TO (HOUSE)))


Story done - final script header
    ($SHOPPING (SHOPPER (JACK)) (STORE (STORE)) (BOUGHT (KITE)) (ELSEWHERE (HOUS
E)))

Database contains:

((*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (TO (STORE))) (*PTRANS* (ACTOR (JACK))
 (OBJECT (KITE)) (TO (JACK)))
 (*ATRANS* (ACTOR (STORE)) (OBJECT (KITE)) (FROM (STORE)) (TO (JACK)))
 (*ATRANS* (ACTOR (JACK)) (OBJECT (MONEY)) (FROM (JACK)) (TO (STORE)))
 (*PTRANS* (ACTOR (JACK)) (OBJECT (JACK)) (FROM (STORE)) (TO (HOUSE)))
 ($SHOPPING (SHOPPER (JACK)) (STORE (STORE)) (BOUGHT (KITE)) (ELSEWHERE (HOUSE))
))
```

```
Processing word *START-QUESTION*

Processing word WHERE
  *PART-OF-SPEECH = ADVERB


Processing word DID
  *PART-OF-SPEECH* = HELPING-VERB


Processing word JACK
  *CD-FORM* = (JACK)
  *PART-OF-SPEECH* = NOUN-PHRASE
  *SUBJECT* = (JACK)


Processing word GO
  *PART-OF-SPEECH* = VERB
  *CD-FORM* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))
  GO-VAR1 = (JACK)
  GO-VAR2 = (*?*)
  *CONCEPT* = (*PTRANS* (ACTOR ?GO-VAR1) (OBJECT ?GO-VAR1) (TO ?GO-VAR2) (FROM ?
GO-VAR3))

The CD answer to the given question is:

(JACK IS GOING TO STORE)
(JACK IS COMING TO STORE)
```

OUTPUT

(JACK IS GOING TO STORE)
(JACK IS COMING TO STORE)