import nltk

from nltk import FeatureChartParser

fcfg = nltk.data.load('P2.fcfg')

parser = FeatureChartParser(fcfg)

def parse\_text(text):

examples = text.splitlines()

for sent in examples:

print(sent)

parses = parser.parse(sent.split())

for tree in parses:

print(tree)

def parse\_file(name):

f = open(name, 'r')

text = f.read()

f.close()

parse\_text(text)

print("================ Positive examples ================")

parse\_file('P2.pos')

print("================ Negative examples ================")

parse\_file('P2.neg')

S -> Sentence | WSentence | WQuestion

Sentence -> NP[ARG=?arg] VP[ARG=?arg,SUBCAT=nil]

WSentence -> WAdv Sentence Sentence

## the verb must be in the plural form

WQuestion -> WAdv AuxV[ARG=?arg] NP[ARG=?arg] VP[ARG=[NUM=pl,FORM=pres],SUBCAT=nil]

WQuestion -> WhPron AuxV[ARG=?arg] NP[ARG=?arg] VP[ARG=[NUM=pl,FORM=pres],SUBCAT=nil]

WQuestion -> PosWh AuxV[ARG=?arg] NP[ARG=?arg] VP[ARG=[NUM=pl,FORM=pres],SUBCAT=nil]

NP -> ADJ | NP Conj NP

NP[ARG=?arg] -> ProperNoun[ARG=?arg]

NP[ARG=?arg] -> Det[ARG=?arg] ADJ

NP[ARG=?arg] -> Det[ARG=?arg] Nominal[ARG=?arg]

Nominal[ARG=?arg] -> Nominal[ARG=?arg] Noun[ARG=?arg] | Noun[ARG=?arg]

NP[ARG=?arg] -> Nominal[ARG=?arg]

NP[ARG=?arg] -> NP[ARG=?arg] PP

ADJ -> Adj NP

PP -> Prep NP

ARGS[CAT=np] -> NP

ARGS[CAT=vp] -> VP

ARGS[CAT=pp] -> PP

ARGS[CAT=adj] -> Adj

ARGS[CAT=s] -> Sentence

VP[SUBCAT=?sub,ARG=?arg] -> V[SUBCAT=?sub,ARG=?arg]

VP[SUBCAT=?rest,ARG=?arg] -> VP[SUBCAT=nil,ARG=?arg] Conj VP[SUBCAT=nil,ARG=?arg]

VP[SUBCAT=nil,ARG=?arg] -> Adv VP[SUBCAT=?sub,ARG=?arg]

VP[SUBCAT=?rest,ARG=?arg] -> VP[SUBCAT=[HEAD=?cat,TAIL=?rest],ARG=?arg] ARGS[CAT=?cat]

VP[SUBCAT=?sub,ARG=?arg] -> GerundSent[SUBCAT=?sub,ARG=?arg]

VP[SUBCAT=?sub,ARG=?arg] -> ModalSent[SUBCAT=?sub,ARG=?arg]

GerundSent[SUBCAT=?sub,ARG=?arg] -> V[SUBCAT=?vbg,ARG=[FORM=gerundgsent,PER=?p,NUM=?n]] VBG[cat=?vbg]

ModalSent[SUBCAT=?sub,ARG=?arg] -> Modal V[SUBCAT=?sub,ARG=[FORM=?f,NUM=pl]] ARGS[CAT=np]

ModalSent[SUBCAT=?sub,ARG=?arg] -> Modal VH[ARG=[FROM=modal,NUM=pl]] VPASTPART ARGS[CAT=np]

ModalSent[SUBCAT=?sub,ARG=?arg] -> Modal NEG VH[ARG=[FROM=modal,NUM=pl]] VPASTPART ARGS[CAT=np]

V[SUBCAT=nil,ARG=[FORM=pres,PER=3,NUM=sg]] -> 'barks'|'giggles'

V[SUBCAT=nil,ARG=[FORM=pres,NUM=pl]] -> 'bark'|'serve'

V[SUBCAT=[HEAD=s,TAIL=nil],ARG=[FORM=pres,PER=3,NUM=sg]] -> 'thinks'

V[SUBCAT=[HEAD=np,TAIL=nil],ARG=[FORM=pres,PER=3,NUM=sg]] -> 'feeds' | 'eats' | 'drinks'|'wears'

#because we can have feed NP NP (feed gromit(np) cheese and bread(np -> np conj np)

V[SUBCAT=[HEAD=np, TAIL=[HEAD=np, TAIL=nil]],ARG=[FORM=pres,PER=3,NUM=sg]] -> 'feeds'|'serves'

#puts (np)the dish (pp) in the sink

V[SUBCAT=[HEAD=np,TAIL=[HEAD=pp,TAIL=nil]],ARG=[FORM=pres,PER=3,NUM=sg]] -> 'puts'

#NP HEAD BECAUSE -> THEY FEED/EAT \_\_

V[SUBCAT=[HEAD=np,TAIL=nil],ARG=[FORM=pres,NUM=pl]] -> 'feed' | 'eat' | 'have'|'drink'|'wear'|'serve'|'put'

V[SUBCAT=nil,FORM=pres,NUM=pl] ->'have'

V[SUBCAT=[HEAD=np, TAIL=[HEAD=np, TAIL=nil]],ARG=[FORM=pres,NUM=pl]] -> 'feed'

V[SUBCAT=[HEAD=s,TAIL=nil],ARG=[FORM=pres,NUM=pl]] -> 'think'

V[SUBCAT=[HEAD=np],ARG=[FORM=pres,PER=3,NUM=sg]] -> 'likes'

#TO HANDLE PHRASES SUCH AS -> WHAT DO YOU THINK

V[SUBCAT=nil,ARG=[FROM=pres,NUM=pl]] -> 'think' | 'eat'|'drink'

V[SUBCAT=[HEAD=np,TAIL=nil],ARG=[FORM=past]] -> 'fed' | 'ate'|'served'

V[SUBCAT=[HEAD=np,TAIL=[HEAD=np, TAIL=nil]],ARG=[FORM=past]] -> 'feed'

##ate can be both transitive and intransitive (they ate (a chocolate))

V[SUBCAT=nil,ARG=[FORM=past]] -> 'barked' | 'ate'|'giggled'

V[SUBCAT=[HEAD=vbg,TAIL=nil],ARG=[FROM=gerundgsent,PER=3,NUM=sg]] -> 'likes'

VH[ARG=[FORM=modal,NUM=pl]] -> 'have'

VBG[CAT=vbg] -> 'eating' | 'feeding'|'drinking'

VPASTPART -> 'eaten' | 'seen'|'served'

AuxV[ARG=[FORM=pres,NUM=sg,PER=3]] -> 'does'

AuxV[ARG=[FORM=past]] -> 'did'|'do'

V -> 'think'|'put'

ProperNoun[ARG=[NUM=sg,PER=3]] -> 'Wallace' | 'Gromit'|'Bart'|'Homer'|'Lisa'

Noun[ARG=[NUM=sg]] -> 'cheese' | 'water' | 'kitchen' | 'dinner' | 'bread' | 'dog'|'shoes'|'salad'|'milk'|'lunch'

Noun[ARG=[NUM=pl]] -> 'dogs' |'sandwiches'

Det[ARG=[NUM=sg]] -> 'that' | 'a'|'he'

Det[ARG=[NUM=pl]] -> 'these' | 'those'

Det -> 'the' |'my'|'every'

Prep -> 'in' | 'after' | 'when'

Adv -> 'seldom' | 'often'|'never'

Conj -> 'and' | 'when'

Adj -> 'tasty' | 'soft'|'blue'|'green'|'healthy'|'small'

WAdv -> 'when' | 'where'

WhPron -> 'what'

PosWh -> 'whom'

Modal -> 'may'

NEG -> 'not'

a small dog barks

every dog barks

Bart giggles

Homer giggled

Bart wears blue shoes

Homer serves Lisa and Bart a healthy green salad

Lisa thinks Homer thinks Bart drinks milk

Homer and Bart never drink milk in the kitchen after lunch

when does Lisa drink milk in the kitchen

when Homer drinks milk Bart giggles

when do Lisa and Bart wear shoes

Lisa puts the milk in the kitchen

feed Wallace Gromit

feed feed

Wallace feed Gromit

Wallace feeds Gromit Gromit Gromit

when Gromit barks

when does Wallace

Wallace puts

Gromit thinks the cheese

Wallace drinks

when eats Wallace eat cheese

Wallace feeds and ate Gromit

Wallace often eats tasty eats tasty

that dog bark

the dogs barks

these dog eat cheese and bread

those dog eat cheese and bread

Gromit eats a sandwiches

Wallace likes feed Gromit

when barks Wallace eat cheese

Gromit and Wallace eat the eat soft cheese and the tasty cheese

when did Wallace ate cheese