IST664 Natural Language Processing: Homework 3

2019-05-25

1. Part 1:

Sentences from the sentences.txt file:

Arthur is the king.

['Arthur', 'is', 'the', 'king', '.']

(START

(S1

(NP (Proper Arthur))

(VP (VerbT is) (NP (Det the) (NP (Noun king))))

(Eos .)))

Arthur rides the horse near the castle.

['Arthur', 'rides', 'the', 'horse', 'near', 'the', 'castle', '.']

(START

(S1

(NP (Proper Arthur))

(VP

(VerbT rides)

(NP

(Det the)

(NP

(Noun horse)

(PP (Prep near) (NP (Det the) (NP (Noun castle)))))))

(Eos .)))

(START

(S1

(NP (Proper Arthur))

(VP

(VerbT rides)

(NP (Det the) (NP (Noun horse)))

(PP (Prep near) (NP (Det the) (NP (Noun castle)))))

(Eos .)))

Arthur rides the plodding horse near the castle.

['Arthur', 'rides', 'the', 'plodding', 'horse', 'near', 'the', 'castle', '.']

(START

(S1

(NP (Proper Arthur))

(VP

(VerbT rides)

(NP

(Det the)

(ADJ plodding)

(NP

(Noun horse)

(PP (Prep near) (NP (Det the) (NP (Noun castle)))))))

(Eos .)))

(START

(S1

(NP (Proper Arthur))

(VP

(VerbT rides)

(NP (Det the) (ADJ plodding) (NP (Noun horse)))

(PP (Prep near) (NP (Det the) (NP (Noun castle)))))

(Eos .)))

The Holy Grail is a chalice.

['the', 'Holy\_Grail', 'is', 'a', 'chalice', '.']

(START

(S1

(NP (Det the) (NP (PNP Holy\_Grail)))

(VP (VerbT is) (NP (Det a) (NP (Noun chalice))))

(Eos .)))

The sensational Holy Grail is a sacred chalice.

['the', 'sensational', 'Holy\_Grail', 'is', 'a', 'sacred', 'chalice', '.']

(START

(S1

(NP (Det the) (ADJ sensational) (NP (PNP Holy\_Grail)))

(VP (VerbT is) (NP (Det a) (ADJ sacred) (NP (Noun chalice))))

(Eos .)))

Every coconut was carried to the hottest mountains.

['every', 'coconut', 'was', 'carried', 'to', 'the', 'hottest', 'mountains', '.']

(START

(S1

(NP (Det every) (NP (Noun coconut)))

(VP

(VBD was)

(VBD carried)

(PP (TO to) (NP (Det the) (JJS hottest) (NP (NNS mountains)))))

(Eos .)))

Sixty strangers are at the Round Table.

['sixty', 'strangers', 'are', 'at', 'the', 'Round\_Table', '.']

(START

(S1

(NP (CD sixty) (NP (NNS strangers)))

(VP

(VBP are)

(PP (Prep at) (NP (Det the) (NP (PNP Round\_Table)))))

(Eos .)))

Sir Lancelot might have spoken.

['Sir\_Lancelot', 'might', 'have', 'spoken', '.']

(START

(S1

(NP (Proper Sir\_Lancelot))

(VP (MD might) (VB have) (VBN spoken))

(Eos .)))

Guinevere had been riding with Patsy for five weary nights.

['Guinevere', 'had', 'been', 'riding', 'with', 'Patsy', 'for', 'five', 'weary', 'nights', '.']

(START

(S1

(NP (Proper Guinevere))

(VP

(VBD had)

(VBN been)

(VBG riding)

(PP

(Prep with)

(NP

(Proper Patsy)

(PP (Prep for) (NP (CD five)))

(ADJ weary)

(NP (NNS nights)))))

(Eos .)))

Sir Bedevere might have been suggesting this quest.

['Sir\_Bedevere', 'might', 'have', 'been', 'suggesting', 'this', 'quest', '.']

(START

(S1

(NP (Proper Sir\_Bedevere))

(VP

(MD might)

(VB have)

(VBN been)

(VBG suggesting)

(NP (Det this) (NP (Noun quest))))

(Eos .)))

The Britons migrate south frequently.

['the', 'Britons', 'migrate', 'south', 'frequently', '.']

(START

(S1

(NP (Det the) (NP (NNPS Britons)))

(VP (VB migrate) (RB south) (RB frequently))

(Eos .)))

Arthur and Guinevere ride frequently near the castle.

['Arthur', 'and', 'Guinevere', 'ride', 'frequently', 'near', 'the', 'castle', '.']

(START

(S1

(NP (Proper Arthur) (CC and) (Proper Guinevere))

(VP

(VB ride)

(RB frequently)

(PP (Prep near) (NP (Det the) (NP (Noun castle)))))

(Eos .)))

He suggests to grow fruit at home.

['he', 'suggests', 'to', 'grow', 'fruit', 'at', 'home', '.']

(START

(S1

(NP (PRP he))

(VP

(VBZ suggests)

(TO to)

(VB grow)

(NP (Noun fruit) (PP (Prep at) (NP (Noun home)))))

(Eos .)))

Riding to Camelot is not hard.

['riding', 'to', 'Camelot', 'is', 'not', 'hard', '.']

(START

(S1

(VP (VBG riding) (PP (TO to) (NP (PNP Camelot))))

(VP (VerbT is) (NOT not) (ADJ hard))

(Eos .)))

Do coconuts speak?

['do', 'coconuts', 'speak', '?']

(START (S1 (NP (DO do) (NP (NNS coconuts))) (VP (VB speak)) (Eos ?)))

Why does England have a king?

['why', 'does', 'England', 'have', 'a', 'king', '?']

(START

(S1

(WAdv why)

(NP (DO does) (NP (PNP England)))

(VP (VB have) (NP (Det a) (NP (Noun king))))

(Eos ?)))

Sentences from the challenge sentences.txt:

It is Sir Lancelot who knows Zoot!

['it', 'is', 'Sir\_Lancelot', 'who', 'knows', 'Zoot', '!']

(START

(S1

(NP (PRP it))

(VP (VerbT is) (NP (Proper Sir\_Lancelot)))

(NP (WPro who) (VP (VBZ knows) (NP (Proper Zoot))))

(Eos !)))

Arthur rode to Camelot and drank from his chalice.

['Arthur', 'rode', 'to', 'Camelot', 'and', 'drank', 'from', 'his', 'chalice', '.']

(START

(S1

(NP (Proper Arthur))

(VP (VBD rode) (PP (TO to) (NP (PNP Camelot))))

(CC and)

(VP (VBD drank) (PP (Prep from) (NP (POS his) (Noun chalice))))

(Eos .)))

For this exercise, I added following rules to the camelot\_grammar.cfg file:

* S1: VP VP Eos – Sentence can have two verb phrases followed by an end of sentence.
* S1: WAdv NP VP Eos – Sentence can start with “how”, “when”, “where”, “why”, followed by a noun phrase and a verb phrase. Reserved for questions.
* S1: NP VP NP Eos – Sentence can have a NP, followed by a VP, and second NP.
* S1: NP VP CC VP Eos – Sentence starts with a NP, followed by two VP joined by a connector (CC).
* VP: VerbT PP – Verb in the present tense followed by PP
* VP: VerbT NOT ADJ – Verb in the present tense followed by negation and adjective.
* VP: VBG NOT ADJ – Present participle verb followed by negation and adjective.
* VP: VB – Verb in present tense.
* VP: VB RB RB – Verb in base form followed by two adverbs.
* VP: VB RB PP – Verb in base form followed by adverb and PP.
* VP: VBD PP – Verb in past tense followed by PP.
* VP: VBD VBD PP – Two verbs in past tense followed by PP.
* VP: VBD VBN VBG PP – Three verbs in past tense, past participle, and present participle, followed by PP.
* VP: VBP PP – Verbs in third person followed by PP.
* VP: VBG PP – Verbs in present participle followed by PP.
* VP: VBZ TO VB NP – Verb in singular third person followed by ‘to’, verb in base form and NP.
* VP: MD VB VBN – Modal followed by verb in base form and past participle.
* VP: MD VB VBN VBG NP – Modal followed by verb in base form, past participle, and present participle, then followed by a NP.
* VP: VBZ NP – Verb in third person singular form, followed by a NP.
* NP: Det ADJ NP – Determiner followed by an adjective and NP.
* NP: Det JJS NP – Determiner followed by a superlative adjective and NP.
* NP: Proper PP – Proper noun followed by a PP.
* NP: PNP – Proper noun, non-people.
* NP: NNPS – Plural proper nouns.
* NP: CD NP – Numbers followed by NP.
* NP: CD – Numbers.
* NP: NNS – Plural nouns
* NP: Proper PP ADJ NP – Proper noun followed by PP, adjective, and second PP.
* NP: Proper CC Proper - Two proper nouns connected by a CC.
* NP: PRP – Personal pronoun.
* NP: DO NP – “Do”/”Does” followed by NP.
* NP: WPro VP – “What”/”Who” followed by VP.
* NP: POS Noun – Possessive personal pronoun followed by noun.
* PP: TO NP – “To” word followed by NP.

1. Additional sentence not in the original sentences.

Coconut drinks at the castle!

['coconut', 'drinks', 'at', 'the', 'castle', '!']

(START

(S1

(NP (Noun coconut))

(VP

(VerbT drinks)

(PP (Prep at) (NP (Det the) (NP (Noun castle)))))

(Eos !)))

I added the phrase “Coconut drinks at the castle!” which can mean myriad things. It could mean there are coconut drinks at the castle, or coconut, as a personal pronoun, is drinking at the castle; the latter making no sense unless there is a person nicknamed Coconut.

In this case, the parser happens to take this second meaning as the word coconut is being considered its own noun phrase, followed by the verb ‘drinks’ and the prepositional phrase “at the castle”.

However, if the phrase “there are” had not been omitted, then the parser would have needed to be constructed differently, considering that ‘there are’ starts as a location preposition plus verb phrase before moving on to the noun phrase. Without this explicit section of the sentence, the parser is tricked into creating a new meaning for this phrase.