BBM497: Introduction to Natural Language Processing Lab. **(Due: 04/05/2020)**

Submission Assignment #3

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1 Reading Data

I read the input file line by line with using rules() function and returned a dictionary for CFG rules. By reading the file, I created a list with its own rules for each rule and added these rules to the dictionary.

```
ROOT-->['S .', 'S !', 'is it true that S ?     ']
S-->['NP VP']
VP-->['Verb NP']
NP-->['Det Noun', 'Pronoun ', 'NP PP']
PP-->['Prep NP']
Noun-->['Adj Noun', 'president', 'sandwich', 'pickle', 'mouse', 'floor']
Verb-->['ate', 'wanted', 'kissed', 'washed', 'pickled', 'is', 'prefer', 'like', 'need', 'want']
Det-->['the', 'a', 'every', 'this', 'that']
Adj-->['fine', 'delicious', 'beautiful', 'old']
Prep-->['with', 'on', 'under', 'in', 'to', 'from']
Pronoun-->['me', 'i', 'you', 'it']
```

Figure 1: Rules Dictonary

2 Generating Sentences

I generated the sentences with the randsentences () function. I used the dictionary with CFG rules when generating sentences. I used the random.randint () function which rule to choose, and randomly selected from the value lists of the rules, repeating this process until the sentence was created or reaching the sentence length. I have written the generated sentences in the out.txt file.

3 Parsing

I used the CYKParser () function to check if the sentences are correct according to the given grammar rule. I created a matrix for each sentence using createTable() function. I filled the matrix using Grammer's rules. I added the rules in which the words in the sentence correspond to the first row of the matrix. Then I proceeded by comparing the rules and continued to add to the matrix if the compared rules were valid in the grammer's rule. To check the correctness of the sentence, I checked the last row of the matrix, if the last element was the 'S' character, I got the sentence correctly. Although the sentences were created according to the grammer's rule, some of them were not correct as grammers. While short sentences were generally correct, some of the long sentences were not correct grammatically.

```
it washed a delicious president ! ==>CORRECT
this beautiful pickle kissed that mouse ! ==>CORRECT
me pickled it ! ==>CORRECT
is it true that you like a floor from me on it under me on me ? ==>NOT CORRECT
a mouse need it . ==>CORRECT
it like you ! ==>CORRECT
i is the pickle on a old mouse ! ==>NOT CORRECT
is it true that a floor in you to it with the sandwich in you to the president pickled it ? ==>NOT CORRECT
the beautiful president with me under you in the sandwich under this pickle pickled me ! ==>NOT CORRECT
it prefer that president ! ==>CORRECT
```

Figure 2: Some examples of generated sentences