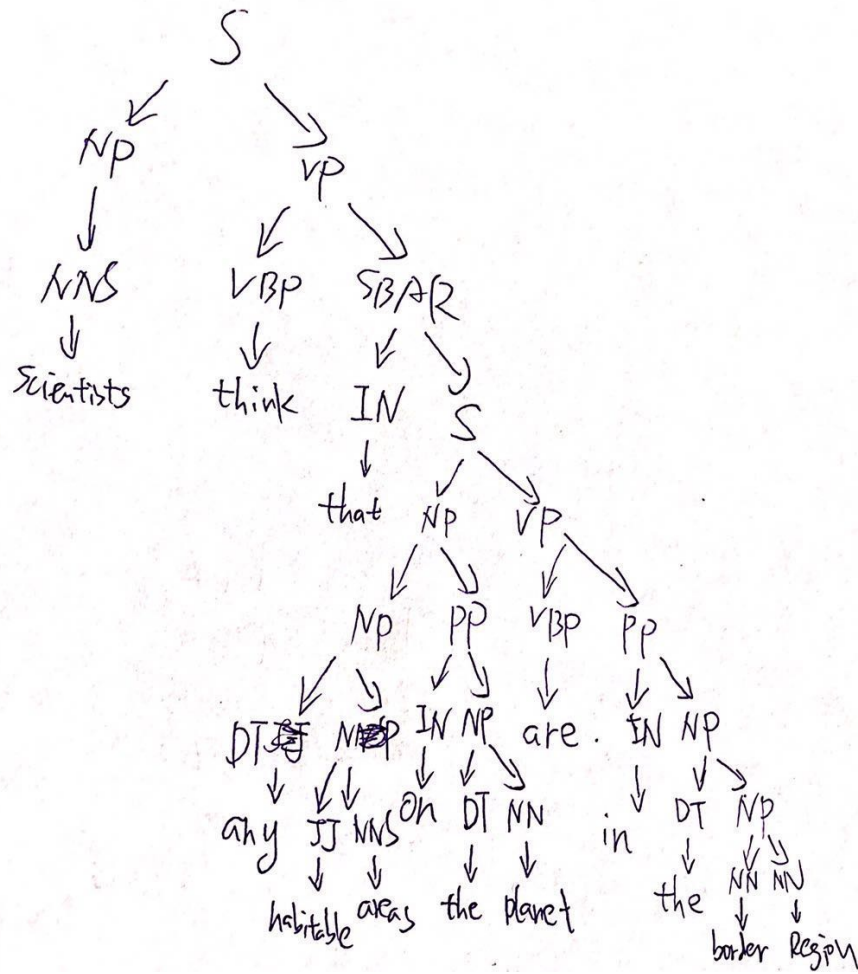


HW3 for Kexin Huang

NetId: kh2383

Grammar	Lexicon
S -> NP VP	<ul style="list-style-type: none">• <i>Scientists</i> = NNS
NP -> NNS	<ul style="list-style-type: none">• <i>think</i> = VBP
NP -> NP PP	<ul style="list-style-type: none">• <i>that</i> = IN
NP -> DT NP	<ul style="list-style-type: none">• <i>any</i> = DT
NP -> JJ NNS	<ul style="list-style-type: none">• <i>habitable</i> = JJ
NP -> NN NN	<ul style="list-style-type: none">• <i>areas</i> = NNS
PP -> IN NP	<ul style="list-style-type: none">• <i>on</i> = IN
NP -> DT NN	<ul style="list-style-type: none">• <i>the</i> = DT
VP -> VBP SBAR	<ul style="list-style-type: none">• <i>planet</i> = NN
VP -> VBP PP	<ul style="list-style-type: none">• <i>are</i> = VBP
SBAR -> IN S	<ul style="list-style-type: none">• <i>in</i> = IN• <i>the</i> = DT• <i>border</i> = NN• <i>region</i> = NN

Penn Tree:



difficulty: there may be some redundancy in the grammar structure.

2. See the ipython code in the file written in python 2

and the result is here:

```

(S
  (NP (NNS Scientists))
  (VP
    (VBP think)
    (SBAR
      (IN that)
      (S
        (NP
          (NP (DT any) (NP (JJ habitable) (NNS areas)))
          (PP (IN on) (NP (DT the) (NN planet))))
        (VP
          (VBP are)
          (PP (IN in) (NP (DT the) (NP (NN border) (NN region)))))))))
(S
  (NP (NNS Scientists))
  (VP
    (VBP think)
    (SBAR
      (IN that)
      (S
        (NP
          (DT any)
          (NP
            (NP (JJ habitable) (NNS areas))
            (PP (IN on) (NP (DT the) (NN planet))))
        (VP
          (VBP are)
          (PP (IN in) (NP (DT the) (NP (NN border) (NN region)))))))))

```

Problem 3: next page

3.

	Any	Habitable	Areas	Are	In	The	Border	region
	1	2	3	4	5	6	7	8
0	DT	/	NP	/	/	/	S	S
1		JJ	NG,NNS,NP	/	/	/	S	S
2			NNS,NP	/	/	/	S	S
3				VBP	/	/	VP	VP
4					IN	/	PP	PP
5						DT	NP	NP
6							NN,NG	NG
7								NN,NG