

Problem 1:

a.i)

[[Paris]]_{LOCATION: CITY} LOCATION offers incredible views from the [[Seine]]_{LOCATION: RIVER} LOCATION, with [[France]]_{LOCATION: COUNTRY} LOCATION's most famous monuments facing it. The [[French Office of Tourism]]_{ORGANIZATION} is promoting cruises on the river and offers free guides. [[Anne Hidalgo]]_{PERSON}, the Mayor of [[Paris]]_{LOCATION: CITY} LOCATION, recently solved the problem of crowded museums by opening new attractions and providing cheap trips to the [[Alps]]_{LOCATION: MOUNTAIN} LOCATION or to [[Dauville]]_{LOCATION: CITY} LOCATION, by the [[Atlantic]]_{LOCATION: OCEAN} LOCATION.

a.ii)

I could use two labels for one input like below:

Word	Level 1	Level 2
Johnny	B-PER	O
Arrow	I-PER	O
graduated	O	O
from	O	O
University	B-ORG	O
of	I-ORG	O
Texas	I-ORG	B-STATE
at	I-ORG	O
Dallas	I-ORG	B-CITY
before	O	O
moving	O	O
to	O	O
San	B-LOC	B-CITY
Francisco	I-LOC	I-CITY
CA	I-LOC	B-STATE
.	O	O
Johnny	B-PER	O
now	O	O
enjoys	O	O
the	O	O
Pacific	B-LOC	B-OCEAN
Ocean	I-LOC	I-OCEAN
's	O	O
views	O	O
.	O	O

a.iii)

We can use gazetteer's listed items to extract word shape features. Then, we can use these to train our model.

For example, for :

San Francisco CA

is in shape like:

[San Francisco] CITY [CA] STATE

which is common for names of cities in gazetteers.

a.iv)

?₁: $x + IN$

?₂: $X_x + NW$

?₃: $x + IN$

?₄: $X_x + NNP$

?₅: $x + IN$

?₆: $X_x + NNP$

?₇: 0

?₈: 0

?₉: 0

?₁₀: B-STATE

?₁₁: 0

?₁₂: B-CITY

?₁₃: 0

b)

Step 1: Google "Barack Obama" and enter its wikipedia link. We can find its page name: Barack-Obama

Step 2: Go to: dbpedia.org/page/Barack-Obama .
We can find: dbp:name: Barack Obama (en)

dbp:birthPlace: Honolulu, Hawaii, U.S. (en)

Step 3: Go to: dbpedia.org/sparql/

Use the following Query Text: (First 500 results)

PREFIX dbpedia: <http://dbpedia.org/>
select DISTINCT ?per ?n ?bp where {

?per a dbo:Person;

dbp:name ?n;

dbp:birthPlace ?bp.

}

order by ?per

limit 500

If example results: (manually select the most suitable pairs)

Name	Birth Place
Bob Brockmann	New Orleans, Louisiana
Mike Whiddett	Auckland, New Zealand
Angela Johnson	Forest City, Iowa
Dustin Honken	Forest City, Iowa

C.1)

The [examinations] OCCURRENCE [started] ASPECTUAL at the beginning of May 2020. Faculty were all [on board] I-STATE to [request] I-ACTION distance learning [exams] OCCURRENCE. It was [said] REPORTING that students [living] I-STATE on campus since January 1, 2020 [tried] I-ACTION to [cancel] ASPECTUAL their [studies] OCCURRENCE before 5pm today. They [watched] PERCEPTION their friends [packing] OCCURRENCE their stuff since March 12 2020.

C.2)

The examinations started <TSIGNAL> at </TSIGNAL> the <TIMEX3 ID="t1" TYPE="DURATION" VALUE="2020-05"> beginning of May 2020 </TIMEX3>. Faculty were all on board to request distance learning exams. It was said that students living on campus <TSIGNAL> since </TSIGNAL> <TIMEX3 ID="t2" TYPE="DATE" VALUE="2020-01-01"> January 1, 2020 </TIMEX3> tried to cancel their studies <TSIGNAL> before </TSIGNAL> <TIMEX3 ID="t3" TYPE="DATE" VALUE="THIS 17:00"> 5pm today </TIMEX3>. They watched their friends packing their stuff <TSIGNAL> since </TSIGNAL> <TIMEX3 ID="t4" TYPE="DATE" VALUE="2020-03-12"> March 12 2020 </TIMEX3>.

c.3)

- [started] → TLINK [Begins] → [beginning of May 2020]
- [living] → TLINK [After] → [January 1, 2020]
- [cancel] → TLINK [Before] → [5pm today]
- [packing] → TLINK [Begins] → [March 12 2020]
- [living] → TLINK [Includes] → [packing]
- [living] → TLINK [Includes] → [started]
- [packing] → TLINK [Includes] → [started]
- [tried] → SLINK [Modal] → [cancel]
- [watched] → SLINK [Evidential] → [packing]
- [started] → ALINK [Initiation] → [examinations]
- [cancel] → ALINK [Termination] → [studies]

Problem 2:

a)

S1: A new book explores the amazing national parks that are protected against development and ruin for decades now.

Predicate 1 [S1]: explore

Arg0-PAG: explorer

Arg1-LOC: place explored

Arg2-PPT: in search of what

Predicate 2 [S1]: protect

Arg0-PAG: protector

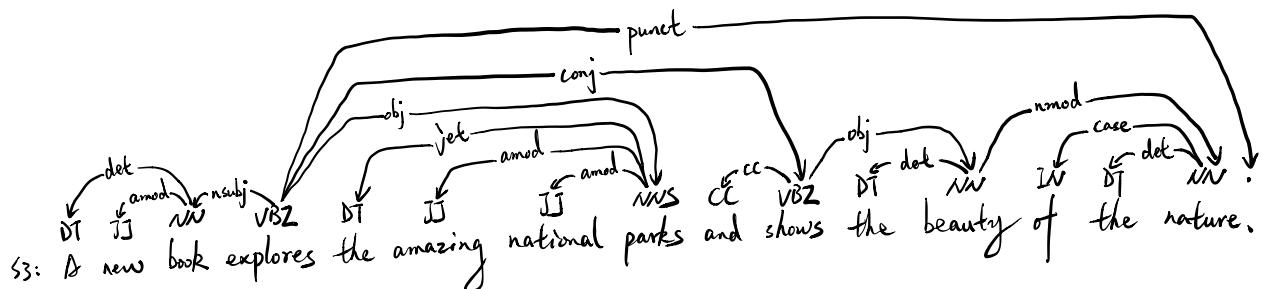
Arg1-PPT: protected

Arg2-PPT: danger

Arg3-MVR: instrument

[Arg0 A new book] explores [Arg1-LOC the amazing national parks]
[Arg1 that] are protected against [Arg3 development and ruin]
[ArgM-TMP for decades now].

b)



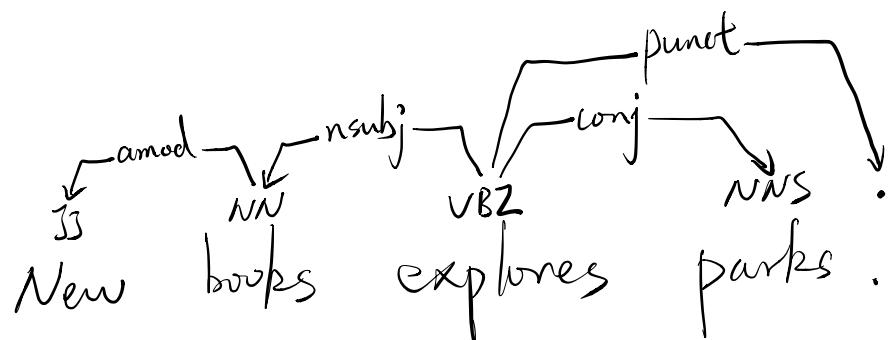
pseudo code:

```
function DEPENDENCY_PARSE(words) returns dependency tree{  
    state ← { [root], [words], [] } // initial configuration  
    while state not final {  
        t ← ORACLE(state); // choose a transition operation  
        state ← APPLY(t, state); // apply and get new state  
    }  
    return state  
}
```

s_3 is too long. I will use a shorter one to explain:

New book explores parks.

STEP	STACK	WORD LIST	ACTION
0	[root]	[new, book, explores, parks, .]	SHIFT
	[root, new]	[book, explores, parks, .]	SHIFT
	[root, new, book]	[explores, parks, .]	LEFTARC
	[root, book]	[explores, parks, .]	SHIFT
	[root, book, explores]	[parks, .]	SHIFT
	[root, explores]	[parks, .]	SHIFT
	[root, explores, parks]	[.]	RIGHTARC
	[root, explores, parks, .]	[.]	RIGHTARC
	[root, explores, parks]	[.]	RIGHTARC
	[root, explores]	[.]	RIGHTARC
	[root]	[.]	RIGHTARC



Problem 3:

a)

Cloud¹ = Sense 3

Cloud³ = Sense 1

Cloud² = Sense 2

Cloud⁴ = Sense 1

b)

is under the cloud of economic crisis

[is, VBL, under, IN, the, DT,

of, IN, economic, JJ, crisis, NN,

under is, the under, of economic, economic crisis]

c)

No window is assigned.

{blue, river, ice, mountain, sky, sun, water, weather, wind, zen}

[0, 0, 1, 0, 1, 0, 1, 1, 0, 0]