

1. Given the text example below, show the following NLP operations'

Simple text: "Barack Hussein Obama is an American politician who served as the 44th President of the United States from 2009 to 2017"

Barack-1

Text Annotation

Barack-1:Barack

Lemma Annotation

Barack-1:Barack

Parts of speech tags

Barack-1:NNP

Named entity relation

Barack-1:PERSON

Hussein-2

Text Annotation

Hussein-2:Hussein

Lemma Annotation

Hussein-2:Hussein

Parts of speech tags

Hussein-2:NNP

Named entity relation

Hussein-2:PERSON

Obama-3

Text Annotation

Obama-3:Obama

Lemma Annotation

Obama-3:Obama

Parts of speech tags

Obama-3:NNP

Named entity relation

Obama-3:PERSON

is-4

Text Annotation

is-4:is

Lemma Annotation

is-4:be

Parts of speech tags

is-4:VBZ

Named entity relation

is-4:O

an-5

Text Annotation

an-5:an

Lemma Annotation

an-5:a

Parts of speech tags

an-5:DT

Named entity relation

an-5:O

American-6

Text Annotation

American-6:American

Lemma Annotation

American-6:american

Parts of speech tags

American-6:JJ

Named entity relation

American-6:MISC

politician-7

Text Annotation

politician-7:politician

Lemma Annotation

politician-7:politician

Parts of speech tags

politician-7:NN

Named entity relation

politician-7:O

who-8

Text Annotation

who-8:who

Lemma Annotation

who-8:who

Parts of speech tags

who-8:WP

Named entity relation

who-8:O

served-9

Text Annotation

served-9:served

Lemma Annotation

served-9:serve

Parts of speech tags

served-9:VBD

Named entity relation

served-9:O

as-10

Text Annotation

as-10:as

Lemma Annotation

as-10:as

Parts of speech tags

as-10:IN

Named entity relation

as-10:O

the-11

Text Annotation

the-11:the

Lemma Annotation

the-11:the

Parts of speech tags

the-11:DT

Named entity relation

the-11:O

44th-12

Text Annotation

44th-12:44th

Lemma Annotation

44th-12:44th

Parts of speech tags

44th-12:JJ

Named entity relation

44th-12:ORDINAL

President-13

Text Annotation

President-13:President

Lemma Annotation

President-13:president

Parts of speech tags

President-13:NN

Named entity relation

President-13:O

of-14

Text Annotation

of-14:of

Lemma Annotation

of-14:of

Parts of speech tags

of-14:IN

Named entity relation

of-14:O

the-15

Text Annotation

the-15:the

Lemma Annotation

the-15:the

Parts of speech tags

the-15:DT

Named entity relation

the-15:O

United-16

Text Annotation

United-16:United

Lemma Annotation

United-16:United

Parts of speech tags

United-16:NNP

Named entity relation

United-16:LOCATION

States-17

Text Annotation

States-17:States

Lemma Annotation

States-17:States

Parts of speech tags

States-17:NNPS

Named entity relation

States-17:LOCATION

from-18

Text Annotation

from-18:from

Lemma Annotation

from-18:from

Parts of speech tags

from-18:IN

Named entity relation

from-18:O

2009-19

Text Annotation

2009-19:2009

Lemma Annotation

2009-19:2009

Parts of speech tags

2009-19:CD

Named entity relation

2009-19:DATE

to-20

Text Annotation

to-20:to

Lemma Annotation

to-20:to

Parts of speech tags

to-20:TO

Named entity relation

to-20:DATE

2017-21

Text Annotation

2017-21:2017

Lemma Annotation

2017-21:2017

Parts of speech tags

2017-21:CD

Named entity relation

2017-21:DATE

.-22

Text Annotation

.-22:.

Lemma Annotation

.-22:.

Parts of speech tags

.-22:.

Named entity relation

.-22:O

parsing

(ROOT (S (NP (NNP Barack) (NNP Hussein) (NNP Obama)) (VP (VBZ is) (NP (NP (DT an) (JJ American) (NN politician)) (SBAR (WHNP (WP who)) (S (VP (VBD served) (PP (IN as) (NP (NP (DT the) (JJ 44th) (NN President)) (PP (IN of) (NP (DT the) (NNP United) (NNPS States)))))) (PP (IN from) (NP (CD 2009) (TO to) (CD 2017)))))))) (. .)))

-> politician/NN (root)

-> Obama/NNP (nsubj)

-> Barack/NNP (compound)

-> Hussein/NNP (compound)

-> is/VBZ (cop)

-> an/DT (det)

-> American/JJ (amod)

-> served/VBD (acl:relcl)

-> who/WP (nsubj)

-> President/NN (nmod:as)

-> as/IN (case)

-> the/DT (det)

- > **44th/JJ (amod)**
- > **States/NNPS (nmod:of)**
- > **of/IN (case)**
- > **the/DT (det)**
- > **United/NNP (compound)**
- > **2017/CD (nmod:from)**
- > **from/IN (case)**
- > **2009/CD (nummod)**
- > **to/TO (dep)**
- > **./ (punct)**

Core reference resolution

[CHAIN1-["Barack Hussein Obama" in sentence 1, "an American politician who served as the 44th President of the United States from 2009 to 2017" in sentence 1, "He" in sentence 2], CHAIN2-["44th" in sentence 1], CHAIN4-["the 44th President of the United States" in sentence 1], CHAIN5-["the United States" in sentence 1], CHAIN6-["2009 to 2017" in sentence 1], CHAIN7-["African American" in sentence 2], CHAIN9-["the first African American to have served as president" in sentence 2]]

2. Draw a knowledge graph for the given data.