Practice Final Answers

Question 1 -- Either a labeled bracketing OR a tree can be used to represent the phrase structure of a sentence. Here are 2 equivalent representations of this sentence.

(S (NP (NNP Eleanor) (NNP Rigby))

(VP (VBZ picks)

(RP up)

(NP (DT the) (NN rice))

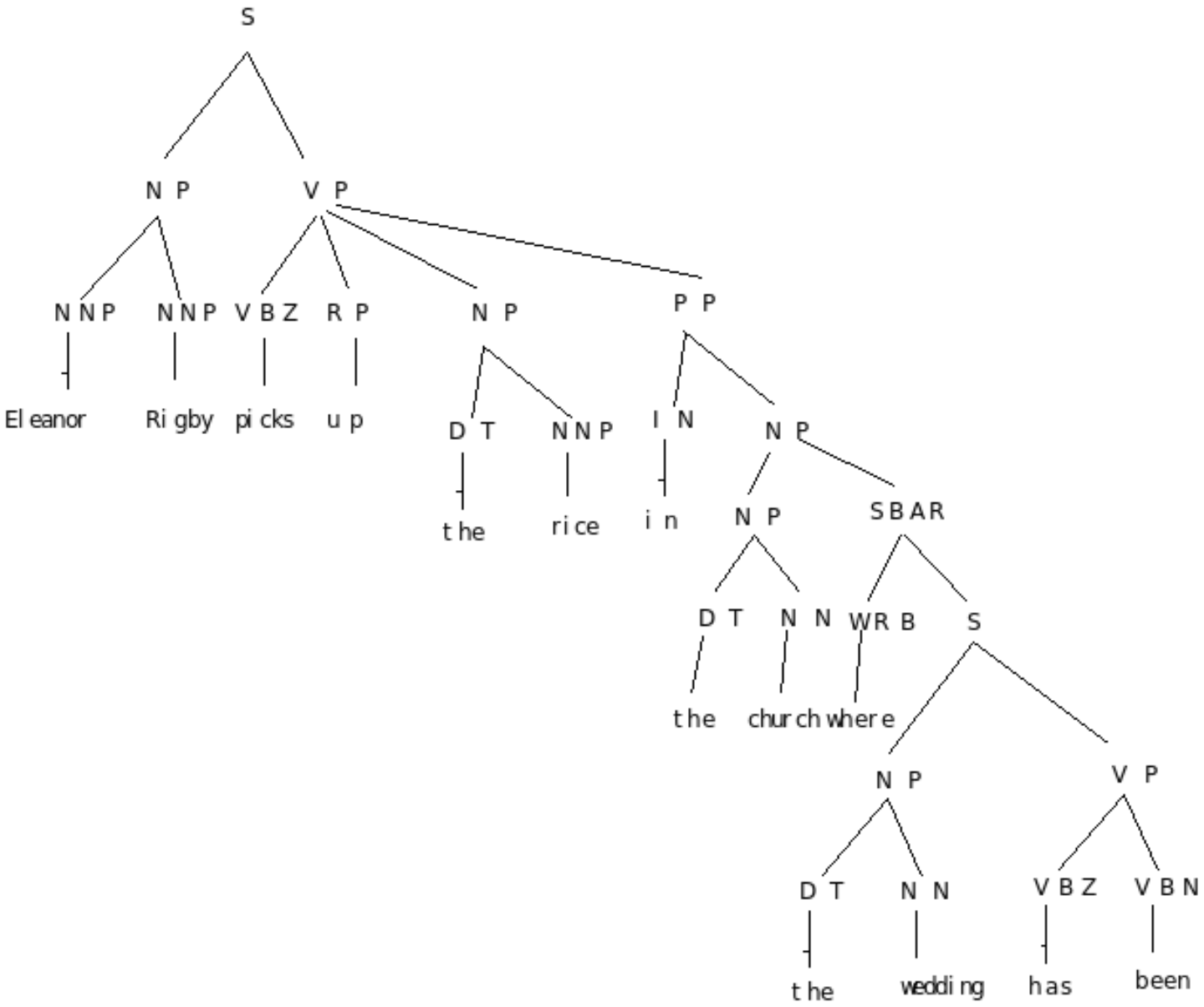
(PP (IN in)

(NP (NP (DT the) (NN church))

(SBAR (WRB where)

(S (NP (DT the) (NN wedding))

(VP (VBZ has) (VBN been))))))))



Question 2 -- (some variation is possible)

1. S → NP VP

2. NP → DT NBAR

3. NBAR --> ADJP NOM

4. NOM --> NN NOM

5. NOM --> NN

6. NOM --> NNS

7. ADJP → RB JJ.

8. VP --> RB VBAR

9. VBAR --> VBZ NP

10. VP --> VBZ

Question 3:

query = [10,7,0,20,0,5,0]

others = [[7,30,1,25,0,5,0],[7,25,3,0,0,6,0],[7,5,30,0,20,10,0]]

Similarity([10,7,0,20,0,5,0],[7,30,1,25,0,5,0]) = $\frac{805}{\sqrt{574 \times 1600}} \approx .84$

Similarity([10,7,0,20,0,5,0],[7,25,3,0,0,6,0]) = $\frac{275}{\sqrt{574 \times 719}} \approx .43$

Similarity([10,7,0,20,0,5,0],[7,5,30,0,20,10,0]]) = $\frac{155}{\sqrt{574 \times 1474}} \approx .17$

Question 4: (some of the ARG2s may be a little controversial and I would account for that on the test)

1. Mergers often trigger longer lunch hours and increased/ARG2 ABSENTEEISM

2. Unice/ARG2 is an ACRONYM for the [Union of Industrial and Employers' Confederations of Europe]/ARG1

3. He/ARG1 assumed that post at the AGE of 35/ARG2

4. the song's/ARG1 original BEAUTY comes through

5. Excluding the higher/ARG2 tax/ARG1 RATE, the company would have met analysts' expectation

Question 5 (sample answer): '[a-z]*(([bcdfghjklmnpqrstvwxyz]ed)|([ao]ught)|([slp]aid)|([wlprs]ent)|([lrhtw]ung)|stood|([bwt]ore)|([rdw]ove)|([pwr]oke)|rode|([st]old)|held)($|)'

Question 6 -- The answer is:

B-cubed precision is: ((3/4 * 3) + 1/4 + 1)/5 = .7

B-cubed recall is: ((3/4 *3) + 0 + (.5 * 2))/6 = 13/24 = .54

F measure = (2 * .7 * .54)/(.7 + .54) = .61

For B-cubed precision we are averaging the precision for each item the system outputs:

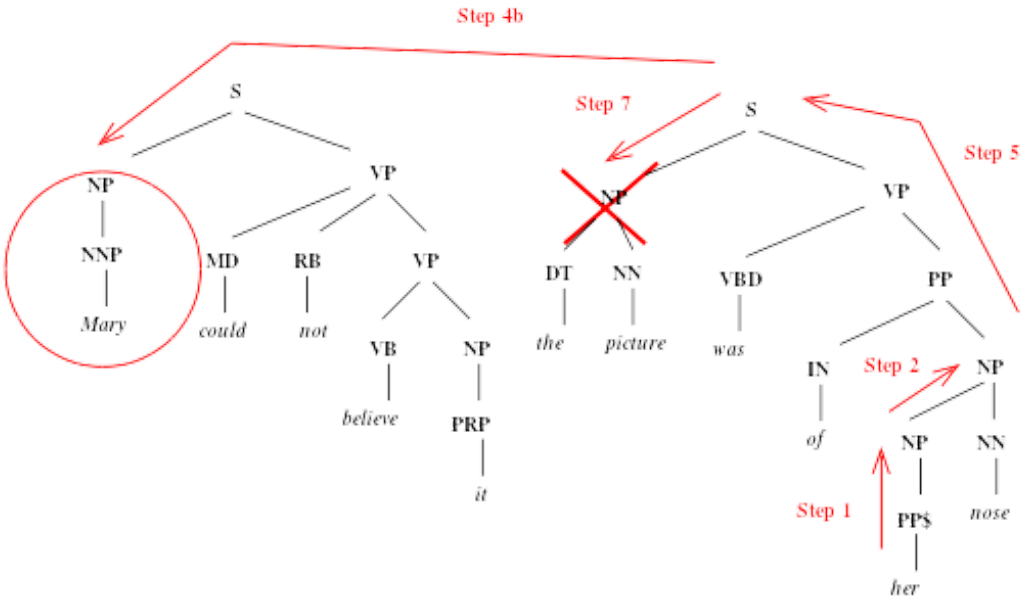
> A_1, A_2 and A_3, each are correctly aligned 3/4 of the time (correctly to themselves and each other for a total of 3 and incorrectly aligned to B_2) -- this accounts for the **(3/4 *3)**
>
> B_2 is only aligned correctly to itself and incorrectly to A_1, A_2 and A_3, so it is correctly aligned **1/4** of the time.
>
> B_1 is only aligned to itself and that is correct, so it is correctly aligned **100%** of the time.

For B-cubed recall we are averaging recall for each item in the answer key:

> A_1, A_2 and A_3, each are aligned 3/4 of the time (to themselves and each other for a total of 3 -- only A_4 is missing) -- this accounts for the **(3/4 *3)**
>
> A4 is missing from the system output (and thus is not matched to anything) -- this accounts for the **0**
>
> B_1 is aligned to itself -- its alignment ot B_2 is missing -- this accounts for **.5**
>
> B_2 is only aligned to itself -- alignment to B_1 is missing -- this accounts for .5

F-measure is the harmonic mean of .7 and .54 -- (2 times the product) divided by the sum, as above.

Question 7:



Question 8. There are 2 possible alignments. The probability is the sum of these 2 possibilities, although the unlikely one is so low that it does not effect the score really.

bad/malo dog/perro = ((1.7 * 10**-5) * (1.6 * 10**-4) * .6 * .87) = 1.42e-09

bad/perro dog/malo = ((1.7 * 10**-5) * (1.6 * 10**-4) * .12 * .01) = 3.26e-12

So the sum is 1.42e-09