Unit 7 - Week 5

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-04, 23:59 IST.

1) *1 point*

Which of the following are true?

1. Given a CFG and its corresponding CNF, they both produce the same language.
2. For a given grammar, there can be more than one CNF.
3. It requires '2n+1' productions or steps in CNF to generate a string w of length 'n'.
4. None of the above

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.
2.

2) *1 point*

Consider the CFG given below:

S -> ASA | aB
A -> B | S
B -> b | ε

How many non-terminals need to be added to convert the above grammar into CNF?

1. 1
2. 4
3. 2
4. 3

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
4.

3) *1 point*

Which of the following are true with respect to a Top-Down and Bottom-Up Parser?

1. A Top-Down Parser never explores options that will not lead to a full parse.
2. A Bottom-Up Parser never explores options that will not lead to a full parse.
3. A Top-Down Parser never explores options that do not connect to the actual sentence.
4. A Bottom-Up Parser never explores options that do not connect to the actual sentence.

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.
4.

4) *2 points*

Consider the PCFG given below:

S -> A B	**0.3**
S -> B C	**0.7**
A -> B A	**0.4**
A -> a	**0.6**
B -> CC	**0.7**
B -> b	**0.3**
C -> A B	**0.3**
C -> a	**0.7**

Using CKY algorithm for PCFG, find the no. of parse trees for the string "ababa" and the probability score for the most probable tree.

1. 2, $5.7 * 10^{-4}$
2. 3, $5.7 * 10^{-4}$
3. 2, $1.55 * 10^{-3}$
4. 3, $1.55 * 10^{-3}$

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
4.

5) *1 point*

Consider the PCFG given below:

S -> NP VP	**0.6**	**PropNoun -> DALLAS**	**0.2**
S -> VP	**0.4**	**PropNoun -> ALICE**	**0.2**
NP -> NP PP	**0.4**	**PropNoun -> BOB**	**0.3**
NP -> PropNoun	**0.6**	**PropNoun -> AUSTIN**	**0.3**
VP -> Verb	**0.3**	**Verb -> ADORE**	**0.5**
VP -> Verb NP	**0.3**	**Verb -> SEE**	**0.5**
VP -> VP PP	**0.4**	**Prep -> IN**	**0.4**
PP -> Prep NP	**1.0**	**Prep -> WITH**	**0.6**

What is the probability of the sentence $w_{1:4}$ = "SEE BOB IN AUSTIN" ?

1. 0.00031104
2. 0.000031104
3. 0.00062208
4. 0.000062208

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
3.

6) *0 points*

What is the equivalent CNF for the PCFG given in Question 5 above?

1.

S -> NP VP	0.6	NP -> AUSTIN	0.18
S -> ADORE	0.06	VP -> ADORE	0.15
S -> SEE	0.06	VP -> SEE	0.15
S -> Verb NP	0.12	VP -> Verb NP	0.3
S -> VP PP	0.16	VP -> VP PP	0.4
NP -> NP PP	0.4	Verb -> ADORE	0.5
NP -> DALLAS	0.12	Verb -> SEE	0.5
NP -> ALICE	0.12	Prep -> IN	0.4
NP -> BOB	0.18	Prep -> WITH	0.6
PP -> Prep NP	1.0		

2.

S -> NP VP	0.6	NP -> AUSTIN	0.12
S -> ADORE	0.06	VP -> ADORE	0.15
S -> SEE	0.06	VP -> SEE	0.15
S -> Verb NP	0.12	VP -> Verb NP	0.3
S -> VP PP	0.16	VP -> VP PP	0.4
NP -> NP PP	0.4	Verb -> ADORE	0.5
NP -> DALLAS	0.18	Verb -> SEE	0.5
NP -> ALICE	0.18	Prep -> IN	0.4
NP -> BOB	0.12	Prep -> WITH	0.6
PP -> Prep NP	1.0		

3.

S -> NP VP	0.6	VP -> ADORE	0.15
S -> Verb	0.12	VP -> SEE	0.15
S -> Verb NP	0.12	VP -> Verb NP	0.3
S -> VP PP	0.16	VP -> VP PP	0.4
NP -> NP PP	0.4	Verb -> ADORE	0.5
NP -> DALLAS	0.12	Verb -> SEE	0.5
NP -> ALICE	0.12	Prep -> IN	0.4
NP -> BOB	0.18	Prep -> WITH	0.6
NP -> AUSTIN	0.18		
PP -> Prep NP	1.0		

4.

S -> NP VP	0.6	NP -> AUSTIN	0.18
S -> ADORE	0.06	VP -> ADORE	0.15
S -> SEE	0.06	VP -> SEE	0.15
S -> Verb NP	0.12	VP -> Verb NP	0.3
S -> VP PP	0.16	VP -> VP PP	0.4
NP -> NP PP	0.4	Verb -> ADORE	0.5
NP -> DALLAS	0.12	Verb -> SEE	0.5
NP -> ALICE	0.12	Prep -> IN	0.4
NP -> BOB	0.18	Prep -> WITH	0.6
PropNoun -> DALLAS	0.2	PropNoun -> ALICE	0.2
PropNoun -> BOB	0.3	PropNoun -> AUSTIN	0.3
PP -> Prep NP	1.0		

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.

7) *2 points*

Using the Inside Algorithm, what is the probability for generating the sentence w = "SEE BOB IN AUSTIN" ?

1. $3.11 * 10^{-4}$
2. $6.22 * 10^{-4}$
3. $9.33 * 10^{-4}$
4. $6.22 * 10^{-3}$

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
2.

8) *1 point*

Consider the expression below:

P("Fire breaks out in the forest", $N^1_{2,3}$ | G) = ∑ P("Fire breaks out in the forest" | $N^j_{2,3}$, G)

What does the L.H.S. represent?

1. Probability of the sentence "Fire breaks out in the forest", given a grammar G.
2. Probability of the sentence "Fire breaks out in the forest", given a grammar G and some rule which derives the segment "breaks out".
3. Probability of the sentence "Fire breaks out in the forest", given a grammar G and that there is some consistent spanning of the segment "breaks out", i.e. from word 2 to 3.
4. None of the above

☐ 1.
☐ 2.
☐ 3.
☐ 4.

No, the answer is incorrect.
Score: 0
Accepted Answers:
3.