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Problem Solving Session - Jan 2024

Week 5 : Assignment 5

The due date for submitting this assignment has passed.

Due on 2024-02-28, 23:59 IST.

As per our records you have not submitted this assignment.

1)

Which of the following are true?

- A) Given a CFG and its corresponding CNF, they produce different languages.
- B) It requires '2n-1' productions or steps in CNF to generate a string w of length 'n'.
- C) For a given grammar, there can be more than one CNF.
- D) None of the above

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

B)

C)

1 point

2)

Consider the CFG given below:

$S \rightarrow xSy|V$

$V \rightarrow Vz|e$

How many non-terminals should be added to convert the CFG into CNF?

- A) 2
- B) 4
- C) 5
- D) 3

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

C)

2 points

3)

In the above Q. 2) How many different numbers of Null productions in the CFG to CNF converted form?

- A) 0
- B) 1
- C) 2
- D) 3

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

A)

1 point

4)

In the above Q. 2) How many different numbers of production rules/steps in the CFG to CNF converted form??

- A) 2
- B) 4
- C) 7
- D) 10

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

C)

1 point

For Question 5 to 7 consider the following PCFG fragment:

$S \rightarrow NN VP$	0.50	$S \rightarrow VP NN$	0.50
$NP \rightarrow NN PB$	0.40	$PB \rightarrow PP NN$	0.30
$VP \rightarrow VB NN$	0.30	$VP \rightarrow VB NP$	0.20
$VP \rightarrow NN VB$	0.25	$VP \rightarrow NN PB$	0.15
$PP \rightarrow \text{with}$	0.10	$PP \rightarrow \text{without}$	0.10
$VB \rightarrow \text{play}$	0.30	$VB \rightarrow \text{enjoy/like}$	0.20
$VB \rightarrow \text{watch/enjoy}$	0.25	$NN \rightarrow \text{children/students}$	0.15
$NN \rightarrow \text{cricket/football}$	0.15	$NN \rightarrow \text{friends}$	0.20
$NN \rightarrow \text{football/cricket}$	0.10	$NN \rightarrow \text{music/painting}$	0.12

For a sentence $S = w_1w_2w_3w_4$, assume that the cells in the table are indexed as follows:

	1	2	3	4	
w_1	11	12	13	14	1
	w_2	22	23	24	2
		w_3	33	34	3
			w_4	44	4

5)

Using CKY algorithm, find the probability score for the most probable tree for the sentence $S_1 = \text{"students play football with friends"}$.

- A) 6.06×10^{-4}
- B) 1.62×10^{-6}
- C) 2.73×10^{-3}
- D) 4.33×10^{-6}

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

B)

1 point

6)

Using CKY algorithm, find the number of parse trees for the sentence $S_2 = \text{students like painting}$ and the probability score for at least one of the probable trees.

- A) $1, 4.95 \times 10^{-3}$
- B) $3, 0.36 \times 10^{-3}$
- C) $2, 0.99 \times 10^{-3}$
- D) $2, 0.54 \times 10^{-3}$

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

C)

2 points

7)

Consider the expression below:

$P(\text{"students enjoy cricket like painting"}, N_{34}|G) = P_j P(\text{"students enjoy cricket like painting"} | N_{34}, G)$

What does the L.H.S. represent?

- A) Probability of the sentence "students enjoy cricket like painting", given a grammar G.
- B) Probability of the sentence "students enjoy cricket like painting", given a grammar G and that there is some consistent spanning of the segment "cricket like", i.e. from word 3 to 4.
- C) Probability of the sentence "students enjoy cricket like painting", given a grammar G and some rule which derives the segment "cricket like".
- D) None of the above

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

B)

1 point

8)

Which of the following grammars are valid CNF?

- a) $A \rightarrow B$ 2. $A \rightarrow BCD$ 3. $A \rightarrow BC$
- b) $B \rightarrow CD$ $B \rightarrow b$ $B \rightarrow \epsilon$
- c) $C \rightarrow c$ $C \rightarrow cC$ $C \rightarrow c$
- d) $A \rightarrow BC$ $A \rightarrow a$

- A) a
- B) b
- C) c
- D) d

- ☐ A)
- ☐ B)
- ☐ C)
- ☐ D)

No, the answer is incorrect.

Score: 0

Accepted Answers:

D)

1 point

