BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

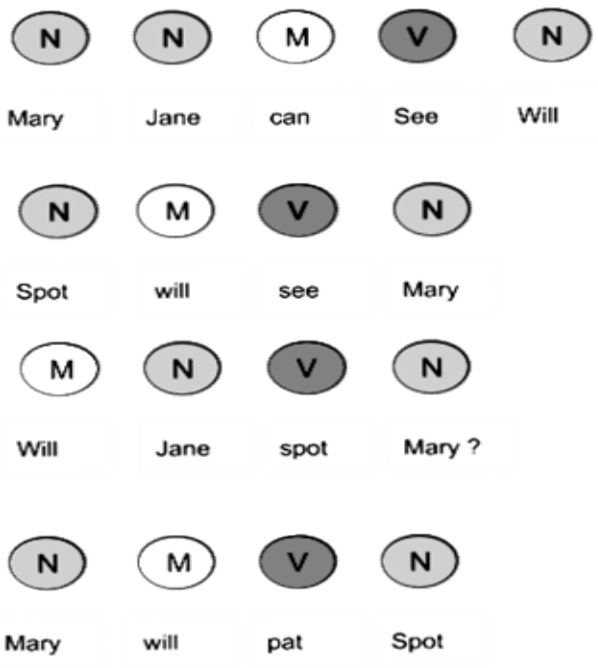
CLASS: MTECH/PRE-PHD **SEMESTER : II/NA**
BRANCH: CS **SESSION : SP2024**

SUBJECT: CS633 NATURAL LANGUAGE PROCESSING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Describe different phases of NLP with example.	[5]		2
Q.1(b)	Find edit distance between "INTENTION" and "EXECUTION" using dynamic programming approach.	[5]		3
Q.2(a)	Assume that the following is a small corpus; Training corpus: 1. Thank you so much for your help. 2. I really appreciate your help. 3. Excuse me, do you know what time it is? 4. I'm really sorry for not inviting you. 5. I really like your watch. Test data: "I really like your garden." Find the Bigram probabilities of the training data and find probability given test sentence using add-1 smoothing.	[5+2]		3
Q.2(b)	Suppose we have following type of possible item types X={Apple, banana, carrorts, dates, eggs, frogs, grapes}. And suppose we have N independent samples: W={apples apples apples banana banana dates dates eggs eggs eggs frogs grapes grapes} Calculate the empirical probabilities. Calculate good tuning probability estimates based on W. Verify summation of probability times frequency gives us 1.	[3]		5
Q.3(a)	For given sentences	[5]		4



PTO

Calculate transition and emission probability. And find probability of sentence 'Will can spot Mary'

Q.3(b)	Find suitable POS tags for sentence given in Q3(a) with probabilities using Viterbi algorithm.	[5]	5
Q.4(a)	Explain ways to convert word to vectors with example.	[5]	2
Q.4(b)	Explain working of CBOW and its importance in NLP.	[5]	3
		[5]	3
Q.5(a)	Explain role of Probabilistic CFG in NLP. Convert given grammar to CNF form.		

$S \rightarrow NP\ VP$
$S \rightarrow Aux\ NP\ VP$

$S \rightarrow VP$

$NP \rightarrow Pronoun$
$NP \rightarrow Proper\text{-}Noun$
$NP \rightarrow Det\ Nominal$
$Nominal \rightarrow Noun$
$Nominal \rightarrow Nominal\ Noun$
$Nominal \rightarrow Nominal\ PP$
$VP \rightarrow Verb$
$VP \rightarrow Verb\ NP$
$VP \rightarrow Verb\ NP\ PP$

$VP \rightarrow Verb\ PP$
$VP \rightarrow VP\ PP$
$PP \rightarrow Preposition\ NP$

Q.5(b)	Compare top down and bottom up approach with help of an example.	[5]	3

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