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Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Midterm Examination, Fall-2023
Course Code: CSE445, Course Title: Natural LanguageProcessing
Level: 4 Term: 1, 2 Batch: 56, 57

Time: 1 Hour and 30 Minutes **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	Define Natural Language Processing. Write down the major areas of research and development in NLP.	3	CO1
	b)	Write down the regular expression based on the following scenario: "First match the word Column, then followed by a number and optional spaces, the whole pattern repeated any number of times"	2	
2.	*a)*	Describe the difference between lemmatization and stemming with proper examples.	3	CO2
	b)	Analyze the best suitable algorithm for calculating minimum edit distance to convert "EDITING" to "DISTANCE" (using insertion cost = 1, deletion cost = 1 and substitution cost = 2) .	5	
3.	*a)*	Analyze Naive Bayes Theorem to predict the category of this testing data: Bangladesh cricket team get excellent victory	7	CO2
4.	*a)*	Explain shortly about "discounting". Mention the problems regarding HMM and give proper solutions.	2+3	CO2

words	class
Bangladesh cricket team victory	Pos
Cricket matches Bangladesh	Pos
Cricket players skillful	Pos
Proud of Bangladesh team	Pos
Bangladesh cricket match defeated	Neg
Bangladesh cricket team get struggled	Neg
Excellent batting Bangladesh team	Pos
Injuries in Bangladesh cricket team	Neg

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Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall-2023

Course Code: CSE445, Course Title: Natural Language Processing

Level: 4 Term: 1 & 2 Batch: 56 & 57

Time: 2 Hours **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	**Define** N-Gram language model. **Explain** the evaluations of language models.	[1+3]	CO2
	b)	**Determine** if a word is end-of-sentence using a Decision Tree.	[2]	
2.	*a)*	**Apply** the Hidden Markov model to find out the Emission and Transition Probabilities considering the corpus below: 1. Rocky Ruhi love campus. 2. Can Rocky search campus? 3. Will Ruhi search campus? 4. Rocky can see Will. 5. Ruhi will love DIU. 6. Love is noun.	[6]	CO2
	b)	**Determine** the appropriate sequence of tags for the sentence, "Can Will search campus?" from the above probabilities.	[4]	
3.	*a)*	**Conclude** the aim of computational semantics. **Evaluate** FOL on the following statement: 1. Every student passes the exam. 2. There is at least one man who wins the race. 3. If Mitu did not attend the meeting, then she missed it.	[2+3]	CO3
	b)	"Predicate logic is more expressive than propositional logic"- agree or not. **Justify** your answer with proper explanations.	[3]	
4.	*a)*	**Check** whether the following Context free grammar G is suitable for the CYK algorithm mentioning appropriate reason: S → AB A → CC | a | c B → BC | b C → CB | BA | c	[2]	CO3

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	b)	If possible, **implement** the CYK algorithm step by step using the formula to determine if "cbba" is in L(G).	**[6]**	
	c)	**Analyze** the pros and cons of the CYK algorithm based on the above implementation.	**[2]**	
5.	*a)*	**Differentiate** between Discourse and Dialog.	**[2]**	**CO4**
	b)	Suppose, Rafi is a DIU student. At the starting of Spring 24 semester, he will need some fundamental books based on his registered courses. So, he goes to DIU Central Library to discuss with the Library Official to rent those books. He also informs him about additional library facilities available like renew books, literacy classes, locker and research support. Now, observing the above scenario, **create** different types of Grounding based on Turn Taking between Rafi and Library Official based on a Discourse and Dialog system.	**[4]**	

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