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Paper : **(NLP)**

Semester : **5ᵗʰ.**

Department : **Bs (SE)**

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Qno1. (08)

a) Briefly explain NLP? Write the name of 2 Applications of NLP with example? Write the name of 2 Challenges of NLP with example? (05)
Define Phonology and Morphology with the help of example? (03)

Ans.

Briefly explain NLP?

NLP (Natural Language Processing) is the ability of computer program to understand human language as it is spoken .NLP is the component of artificial intelligent.

Natural language processing (NLP) is a subfield of linguistics, computer science, information engineering, and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to process and analyze large amounts of natural language data.

Write the name of 2 Applications of NLP with example?

1 Email filters

⇨ Email filters are one of the most basic and initial applications of NLP online. It started out with spam filters, uncovering certain words or phrases that signal a spam message. But filtering has upgraded, just like early adaptations of NLP.

2 machine translation

➡ One of the tell-tale signs of cheating on your Spanish homework is that grammatically, it's a mess. Many languages don't allow for straight translation and have different orders for sentence structure, which translation services used to overlook. But, they've come a long way.

With NLP, online translators can translate languages more accurately and present grammatically-correct results. This is infinitely helpful when trying to communicate with someone in another language. Not only that, but when translating from another language to your own, tools now recognize the language based on inputted text and translate it.

Write the name of 2 Challenges of NLP with example?

    1 Quora Question Pairs

    2 Two Sigma Connect

Define Phonology and Morphology with the help of example?

Phonology: Phonology is defined as the study of sound patterns and their meanings, both within and across languages

Example: An example of phonology is the study of different sounds and the way they come together to form speech and words – such as the comparison of the sounds of the two "p" sounds in "pop-up"

British English speakers, who will tend to say 'wanta'. However neither group will phonologically reduce want to when who is direct object of want e.g. who do you want to resign? Phonology goes beyond phonemes and includes syllable structure (the sequence /str/ is a legal syllable onset in English), intonation (rises at the end of questions), accent (some speakers of English pronounce grass with a short/long vowel) and so forth.

Morphology: Morphology is the branch of linguistics (and one of the major components of grammar) that studies word structures, especially regarding morphemes, which are the smallest units of language. They can be base words or components that form words, such as affixes. The adjective form is *morphological*.

Example: the word "cat" has just one morpheme but the word "cats" has 2, as the -s denotes plurality.

QNo2.

a) What do you mean by regular expressions?

• Regular expression: Regular expressions also called regex. It is a very powerful programming tool that is used for a variety of purposes such as feature extraction from text, string replacement and other string manipulations. A regular expression is a set of characters, or a pattern, which is used to find sub strings in a given string. for ex. extracting all hashtags from a tweet, getting email id or phone numbers etc..from a large unstructured text content.
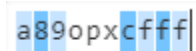
b) Specify the text strings using the below regular expressions:
   1. /[a-fA-F0-9]
         a. Given string: a89opxcfff

   2. /[abc]
         a. Given string abc ac acb a0b a2b a42c A878

   3. a(b|c)
         a. Given string abc aa acbaob

   4. /abc*
         a. Given string ab abc abcc babc abc abcc babc

   5. /abc+
         a. Given string ab abc abcc babc abc abcc babc

   6. /[^a-z A-Z]
         a. Given string   Price of cat $1

   7. /[^a-z A-Z 0-9]
         a.   Given string: a89 opx   cfff $1!
   8. /a(bc)
         a.   Given string: ab abc ac acb a0b a2b a42c A87d
   9. /a[bc]
         a.   Given string abc ac acb a0ba2b
   10. a|b|c
         a.   Given string: ab abc ac acb a0b a2b a42c A87d

Ans: **What do you mean by regular expressions?**

Regular expression: Regular expressions also called regex. It is a very powerful programming tool that is used for a variety of purposes such as feature extraction from text, string replacement and other string manipulations. A regular expression is a set of characters, or a pattern, which is used to find sub strings in a given string. for ex. extracting all hashtags from a tweet, getting email id or phone numbers etc..from a large unstructured text content

Note: I executed all regular expression in regex online website I have cropped all pictures and pasted here

    b) Specify the text strings using the below regular expressions:
      1 /[a-fA-F0-9]
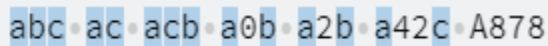   a. Given string: a89opxcfff

Solution:

a89opx**c f f f**

      2 /[abc]
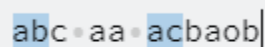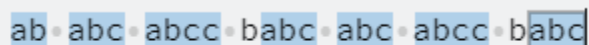   a. Given string abc ac acb a0b a2b a42c A878

Solution:

abc ac acb a0b a2b a42c A878

      3 a(b|c)
          a. Given string abc aa acbaob

Solution:

abc aa acbaob

      4 /abc*
          a. Given string ab abc abcc babc abc abcc babc

ab abc abcc babc abc abcc babc

Solution:

    5   /abc+

           Given string ab abc abcc babc abc abcc babc

Solution:
    ab abc abcc babc abc abcc babc

    6   /[^a-z A-Z]

        a. Given string Price of cat $1

Solution:
    Price of cat $1

    7   /[^a-z A-Z 0-9]

        a.   Given string: a89 opx cfff $1!

Solution:
    a89 opx   cfff $1!

    8   /a(bc)

        a.   Given string: ab abc ac acb a0b a2b a42c A87d

Solution:
    ab abc ac acb a0b a2b a42c A87d

    9   /a[bc]

        a.   Given string abc ac acb a0ba2b

Solution: abc ac acb a0ba2b

10 a|b|c

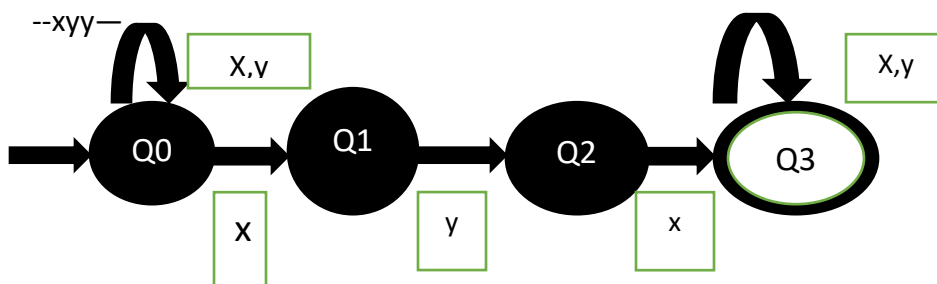   a.   Given string: ab abc ac acb a0b a2b a42c A87d

Solution: ab abc ac acb a0b a2b a42c A87d

Qno3:

a) Design an NFA over an alphabet ∑={x,y} such that every string accepted must have a substring --xyy-- ? identify its tuples and also convert it into DFA.
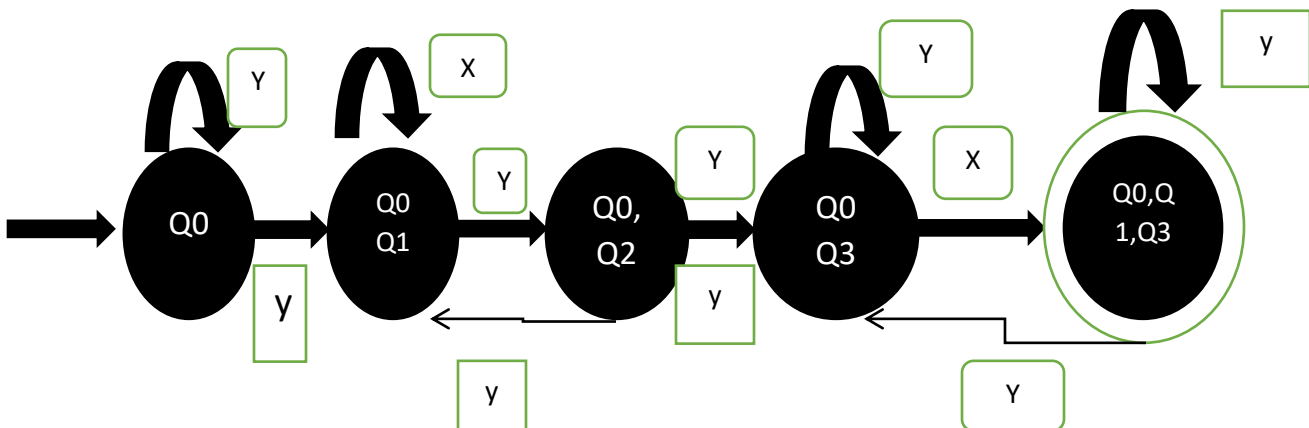
Ans: NFA

--xyy—

Q	X	Y
Q0	Q0 , Q1	Q0
Q1	Null	Q2
Q2	Null	Q3
Q3	Q1	Q3

Q	X	Y
→ Q0	{Q0 , Q1}	Q0
{Q0,Q1}	{Q0,Q1}	{Q0,Q2}
{Q0,Q2}	null	{Q0,Q3}
{Q0,Q3}	{Q0,Q1,Q3}	{Q0,Q3}
{Q0,Q1,Q3}	{Q0,Q1,Q3}	{Q0,Q3}

DFA

Question No. 4: (05)

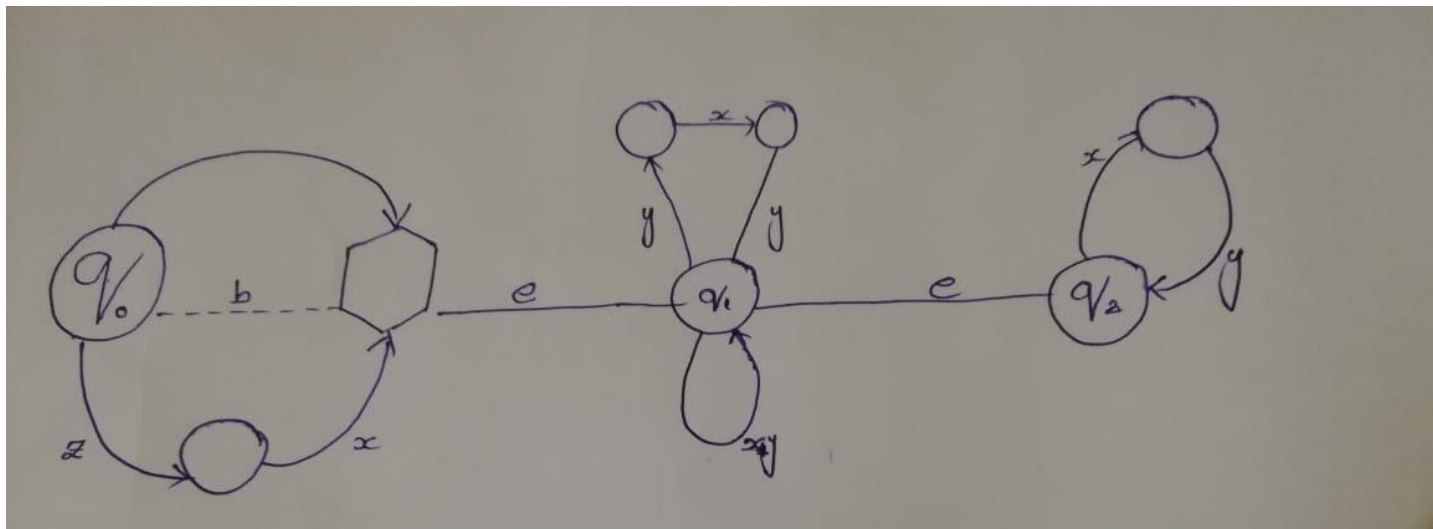a)Design an NFA for the regular expression : (x+y+zx) ((yxy)*+(x+y)*)*(xy)*

Question No. 5:   (02)

Find the Maximum Likelihood Estimation of the below according to the given corpus using
conditional probability: <s> The green eyes   </s>   <s> The green jungle   </s>
<s> The green jungle </s>   <s> The green eyes   </s>   <s> The green park   </s>
<s> The green eyes   </s>

i. P(jungle|The green))= P(The green jungle) = 2 = 0.333
P(The green)   6

ii. P(eyes|The green) =   P(The green eyes) = 3 = 0.5
P(The green)   6

iii. P(park|The green) =   P(The green park) = 1 = 0.17
P(The green)   6

iv. P(sea|The green)ddgz   =   P(The green park) = 0 = 0
P(The green)   6   P(S)
=2 .3 .1 .0 = 0   6 6 6 6