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Paper NlP

Question No. 1:

a) Briefly explain NLP? Write the name of 2 Applications of NLP with example? Write the name of 2 Challenges of NLP with example?

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.

- Spell check
- Autocomplete
- Voice text messaging

- Speech Recognition. ...
- Sentiment Analysis. ...

Question Answering.

b) Define Phonology and Morphology with the help of example?

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

a. *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."*

b.

Morphology is the study of morphemes; a morpheme is **defined** as "the smallest unit of **meaning** in a language." All words, since they have **meaning**, have at least 1 morpheme, but a word can have several morphemes.
For **example**, the word "cat" has just one morpheme but the word "cats" has 2, as the -s denotes plurality.

Question No. 2:

a) What do you mean by regular expressions?

A regular expression (or "regex") is a search pattern used for matching one or more characters within a string. It can match specific characters, wildcards, and ranges of characters. Regular expressions were originally used by Unix utilities, such as vi and grep. However, they are now supported by many code editing applications and word processors on multiple platforms. Regular expressions can also be used in most major programming languages

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

Regular expression

1) /abc? ← Select ab, abc

string :- abc ab abcc babc

2) /abc{2} → select abcc only

ab abc abcc babc bc

3) /a(bc)* → only a, and abc

:- ab abc abcc babc

4) [abc] → Select a, b, c indivi

→ ab abc ac acb aOb

5) /abc+ → a[redacted].

→ ab abc abcc babc

6) abc* → select abc, abcc, abc

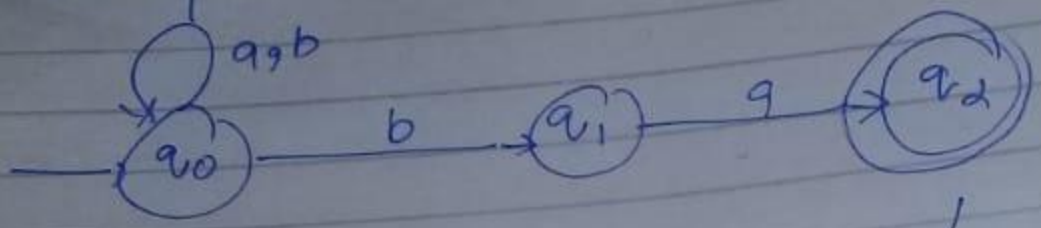
Question No. 3:

(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.

Q3 DFA / NFA

$\Sigma = (a, b)$

String - ba



NFA

∈	a	b
q_0	q_0	q_0, q_1
q_1	q_2	∅
q_2	∅	∅

Convert it to DFA

	a	b
$\{q_0\}$	$\{q_0\}$	$\{q_0, q_1\}$
$\{q_0, q_1\}$	$\{q_0, q_2\}$	$\{q_0, q_1\}$
$\{q_0, q_2\}$	$\{q_0\}$	$\{q_0, q_1\}$

Question No. 4:

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

Question No. 5:

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)
ii. P(eyes|The green)
iii. P(park|The green)
iv. P(sea|The green)

<s the eyes green </s>
<s park green the </s>
<s the jungle green </s>

i. P(1) <s) =count <s 1) = 2
Count <s 1) = 3