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Subject: NLP
Program : BS(SE) 05

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

Answer:

(a)

NLP (Natural Language Processing):

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.

Applications of NLP with example

1) Search results:
   t's easy to make mistakes when typing and not realize it. If the search engine on a website doesn't catch that mistake and instead shows no results, then potential buyers might assume you don't have the information or answers they're looking for and may instead go to a competitor.

2) Predictive text:
   Spell check is a form of NLP that everyone is used to by now. It's unobtrusive, easy to use, and can reduce a lot of headaches for both users and agents alike.

Name of 2 Challenges of NLP with example

1) Quora Question Pairs
2) Two Sigma Connect

(b)

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”

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.

Question#2

a) What do you mean by regular expressions?
b) Specify the text strings using the below regular expressions:

Answer:
(a)

Regular expression:

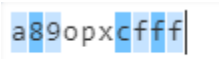
A regular expression is a set of characters, or a pattern, which is used to find sub strings in a given string. Regular expressions were originally used applications and word processors on multiple platforms.

(b) Specify the text strings using the below regular expressions:

1 /[a-fA-F0-9]

a. Given string: a89opxcfff

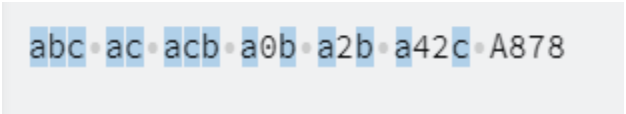
Solution:



2 /[abc]

a. Given string abc ac acb a0b a2b a42c A878

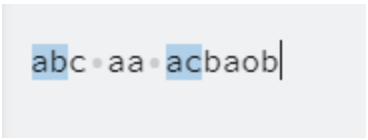
Solution:



3 a(b|c)

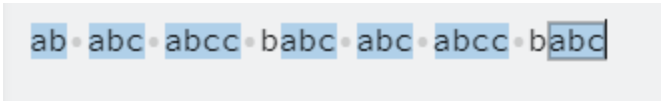
a. Given string abc aa acbaob

Solution:



4 /abc*

a. Given string ab abc abcc babc abc abcc babc

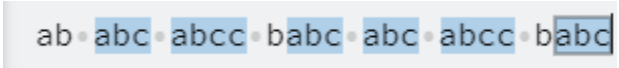


Solution:

5 /abc+

Given string ab abc abcc babc abc abcc babc

Solution:



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
```

Question No. 03

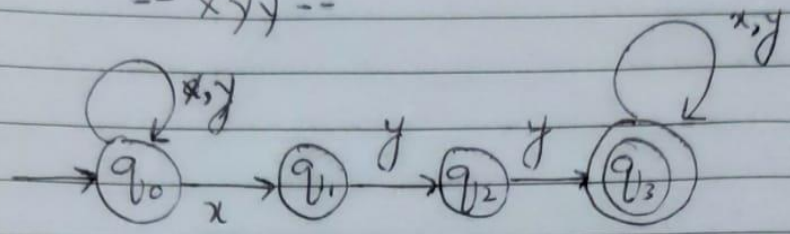
a) Design an NFA over an alphabet ∑={x,y} such that every string accepted must have a substring --xyy-- ? identify its tuples and also convert it into DFA.

Answer:

Question # 03

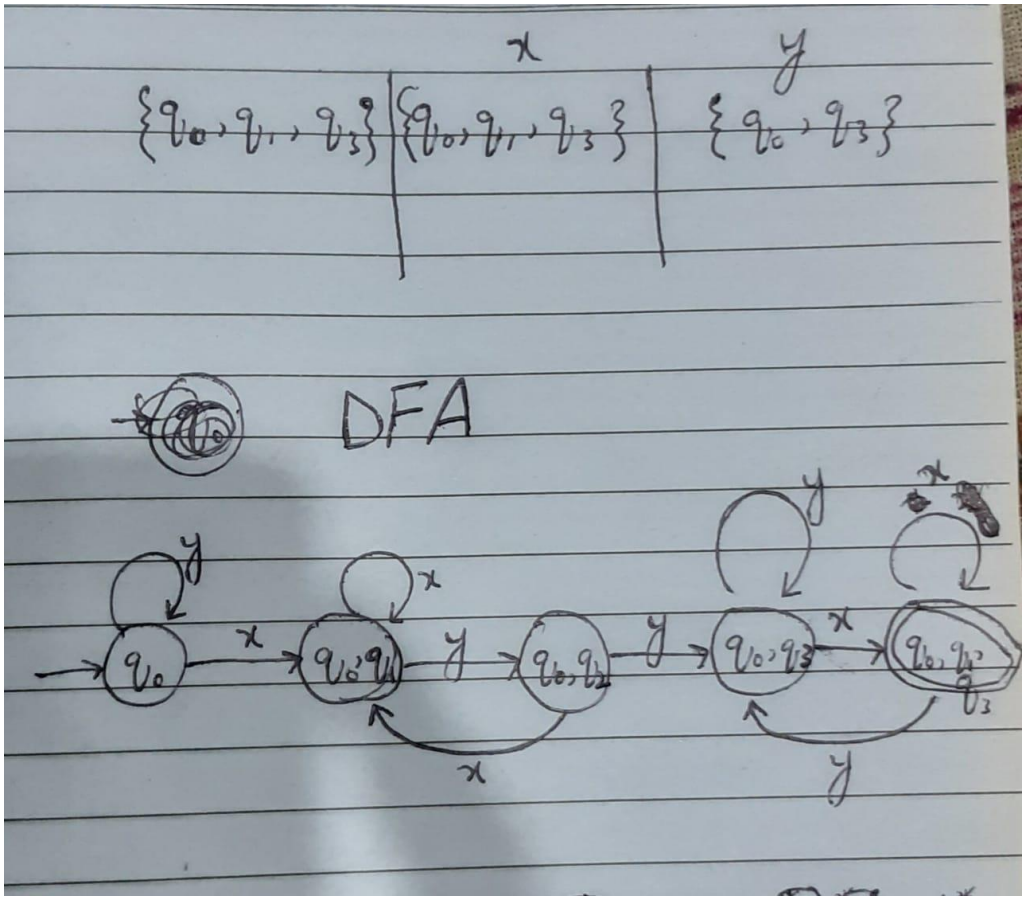
NFA

-- xyy --



	x	y
→ q_0	q_0, q_1	q_0
q_1	-	q_2
q_2	-	q_3
q_3	q_3	q_3

→ S	x	y
→ q_0	$\{q_0, q_1\}$	q_0
$\{q_0, q_1\}$	$\{q_0, q_1\}$	$\{q_0, q_2\}$
$\{q_0, q_2\}$	$\{q_0, q_3\}$	$\{q_0, q_3\}$
$\{q_0, q_3\}$	$\{q_0, q_1, q_3\}$	$\{q_0, q_3\}$



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)

Answer:

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

II. P(eyes|The green) = P (The green eyes) = 2/6 = 0.5

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

IV. P(sea|The green) = P (The green sea) = 0/6 = 0

P(S) = 0.333 * 0.5 * 0.17 * 0 = 0

THE END!