NAME :HIDAYATULLAH KHAN
ID: 14311
SUB: NLP
DEP:BS(SE)5TH

Question No. 1: (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?

ANSWER:

Natural language processing involves the reading and **understanding** of spoken or written **language** through the medium of a computer.Through **natural language processing**, computers learn to accurately manage and apply overall linguistic meaning to text excerpts like phrases or sentences.

Applications:

Summarization

- Generating a short summary from one or more documents, sometimes based on a given query

This is a 7 sentence summary of http://hpi.de/en/news/jahrgaenge/2015/des...

Summary processing at low priority. Upgrade to BOOST

Design Thinking Week: Students Improve the Daily Life Experience for People with Illiteracies

On the occasion of the World Literacy Day on September 8 more than 40 young innovators applied their Design Thinking skills in order to make life easier for these people.

Here, the focus was especially on the possibilities of using digital technologies and computers to better the daily obstacles in life of the people concerned.

Under the guidance of the D-School's coaches the teams researched, developed and prototyped - and could present many versatile solutions in the end: e.g. one of the groups came up with an idea for a software program that lets internet browsers read texts, functions and links out loud so that people with reading problems can still use news sites or social networks like Facebook.

http://smmry.com/

13

Text Categorization

- Assigning one (or more) pre-defined category to a text

PubMed.gov US National Library of Medicine National Institutes of Health — PubMed — Advanced

Display Settings: Abstract — Send to:

Nature. 2014 Mar 20;507(7492):323-8. doi: 10.1038/nature13145. Epub 2014 Mar 12.

Coupling of angiogenesis and osteogenesis by a specific vessel subtype in bone.

Kusumbe AP[1], Ramasamy SK[1], Adams RH[2].

Author information

Abstract

The mammalian skeletal system harbours a hierarchical system of mesenchymal stem cells, osteoprogenitors and osteoblasts sustaining lifelong bone formation. Osteogenesis is indispensable for the homeostatic renewal of bone as well as regenerative fracture healing, but these processes frequently decline in ageing organisms, leading to loss of bone mass and increased fracture incidence. Evidence indicates that the growth of blood vessels in bone and osteogenesis are coupled, but relatively little is known about the underlying cellular and molecular mechanisms. Here we identify a new capillary subtype in the murine skeletal system with distinct morphological, molecular and functional properties. These vessels are found in specific locations, mediate growth of the bone vasculature, generate distinct metabolic and molecular microenvironments, maintain perivascular osteoprogenitors and couple angiogenesis to osteogenesis. The abundance of these vessels and associated osteoprogenitors was strongly reduced in bone from aged animals, and pharmacological reversal of this decline allowed the restoration of bone mass.

Comment In

Bone biology: Vessels of rejuvenation. [Nature. 2014]

PMID: 24646994 [PubMed - indexed for MEDLINE]

MeSH Terms

Aging/metabolism
Aging/pathology
Animals
Blood Vessels/anatomy & histology
Blood Vessels/cytology
Blood Vessels/growth & development
Blood Vessels/physiology*
Bone and Bones/blood supply*
Bone and Bones/cytology
Endothelial Cells/metabolism
Hypoxia-Inducible Factor 1, alpha Subunit/metabolism
Male
Mice
Mice, Inbred C57BL
Neovascularization, Physiologic/physiology*
Osteoblasts/cytology
Osteoblasts/metabolism
Osteogenesis/physiology*
Oxygen/metabolism
Stem Cells/cytology
Stem Cells/metabolism

11

CHALLENGES:

Syntax and ambiguity

- I saw the man with a telescope.
  - Who had the telescope?

(http://www.realtytrac.com/landing/2009-year-end-foreclosure-report.html)

Semantics

- The astronomer loves the star.
  - Star in the sky
  - Celebrity

(http://en.wikipedia.org/wiki/Star#/media/File:Starsinthesky.jpg)

(http://www.businessnewsdaily.com/2023-celebrity-hiring.html)

54

.

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

Phonetics and phonology

- The study of linguistic sounds and their relations to words

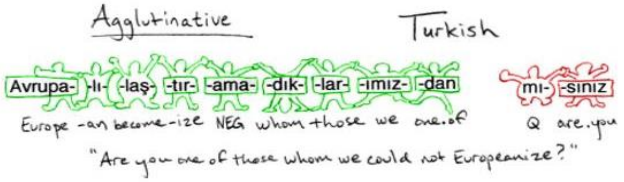
Das Funkalphabet - German Phonetic Spelling Code compared to the international ICAO/NATO code Listen to AUDIO for this chart! (below)		
Germany*	**Phonetic Guide**	**ICAO/NATO****
A wie **Anton**	AHN-tohn	**Alfa/Alpha**
Ä wie **Ärger**	AIR-gehr	(1)
B wie **Berta**	BAIR-tuh	**Bravo**
C wie **Cäsar**	SAY-zar	**Charlie**
Ch wie **Charlotte**	shar-LOT-tuh	(1)
D wie **Dora**	DOHR-uh	**Delta**
E wie **Emil**	ay-MEAL	**Echo**
F wie **Friedrich**	FREED-reech	**Foxtrot**
G wie **Gustav**	GOOS-tahf	**Golf**
H wie **Heinrich**	HINE-reech	**Hotel**
I wie **Ida**	EED-uh	**India/Indigo**
J wie **Julius**	YUL-ee-oos	**Juliet**
K wie **Kaufmann**	KOWF-mann	**Kilo**
L wie **Ludwig**	LOOD-vig	**Lima**
AUDIO 1 > Listen to mp3 for A-L		
M wie **Martha**	MAR-tuh	**Mike**
N wie **Nordpol**	NORT-pole	**November**
O wie **Otto**	AHT-toe	**Oscar**
Ö wie **Ökonom** (2)	UEH-ko-nohme	(1)
P wie **Paula**	POW-luh	**Papa**
Q wie **Quelle**	KVEL-luh	**Quebec**
R wie **Richard**	REE-shart	**Romeo**
S wie **Siegfried** (3)	SEEG-freed	**Sierra**
Sch wie **Schule**	SHOO-luh	(1)
ß (**Eszett**)	ES-TSET	(1)
T wie **Theodor**	TAY-oh-dohr	**Tango**
U wie **Ulrich**	OOL-reech	**Uniform**
Ü wie **Übermut**	UEH-ber-moot	(1)
V wie **Viktor**	VICK-tor	**Victor**
W wie **Wilhelm**	VIL-helm	**Whiskey**
X wie **Xanthippe**	KSAN-tipp-uh	**X-Ray**
Y wie **Ypsilon**	IPP-see-lohn	**Yankee**
Z wie **Zeppelin**	TSEH-puh-leen	**Zulu**

http://german.about.com/library/blfunkabc.htm

43

Morphology

- The study of internal structures of words and how they can be modified
- Parsing complex words into their components



(http://allthingslinguistic.com/post/50939757945/morphological-typology-illustrations-from)

44

Question No. 2:

(10)

a) What do you mean by regular expressions?

ANSW: A formal language for specifying or searching text strings .

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

1. /[a-fA-F0-9]
   a. Given string: a89opxcfff

   Ans: a89 cfff

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

   Ans: abc ac acb ab ab ac

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

   Ans: ab ac

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

   Ans: abc abc abcc abc abc abcc abc.

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

   Ans: abc abcc abc abc abcc abc

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

   Ans: $1

7. /[^a-z A-Z 0-9]
   a. Given string: a89 opx cfff $1!

   Ans: $!

8. /a(bc)
   a. Given string: ab abc ac acb a0b a2b a42c A87d

   Ans: abc

9. /a[bc]
   a. Given string abc ac acb a0ba2b

   Ans: ab ac ac

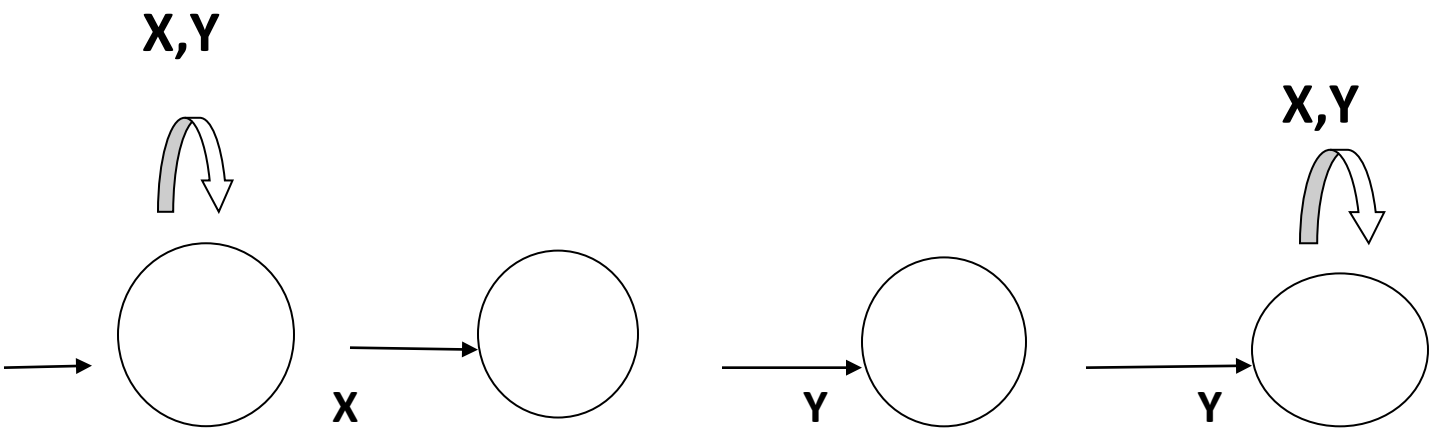
10. a|b|c
    a. Given string: ab abc ac acb a0b a2b a42c A87d

    Ans: ab abc ac acb ab ab ac.

Question No. 3:
(05)

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:

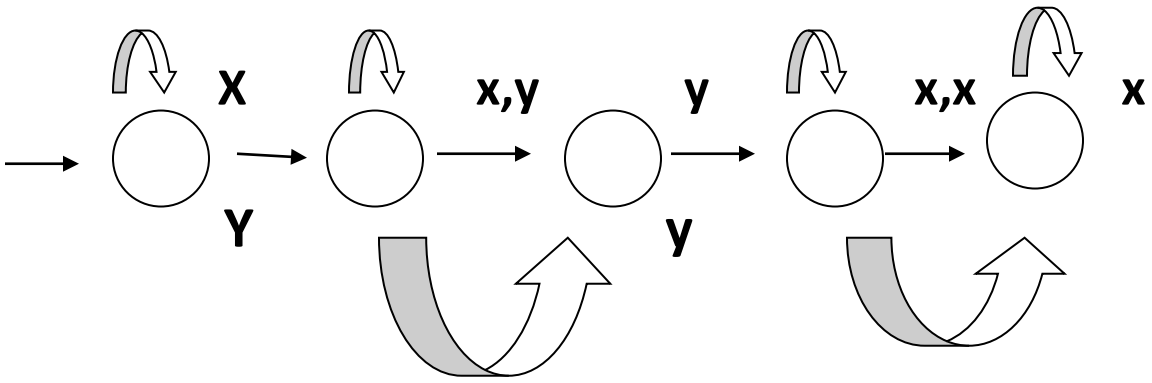


Q	X	Y
Q0	Q0,q1	Q0
Q1	NULL	Q2

Q2	NULL	Q3
Q3	Q1	Q4

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

DFA:

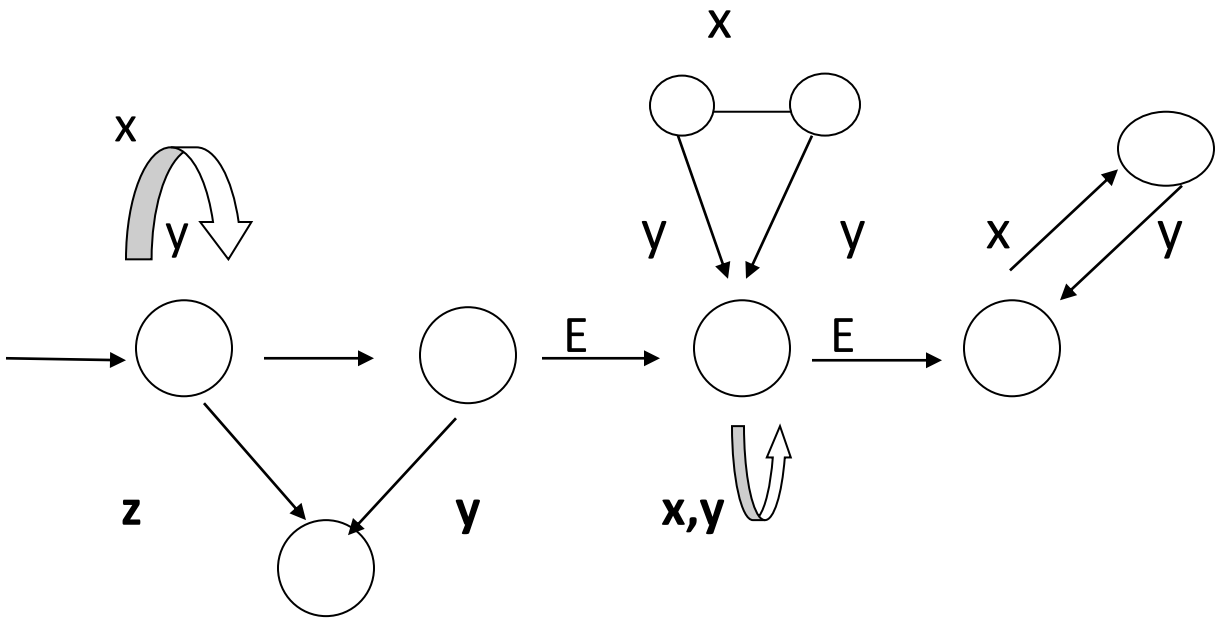


x **y**

Question No. 4: (05)

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

ANS: Design NFA for the regular expression.



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)

Ans: $\frac{P(\text{The green jungle})}{P(\text{The green})} = \frac{2}{6} = 0.333$

ii. P(eyes|The green)

Ans: $\frac{p(\text{The green eyes})}{P(\text{The green})} = \frac{3}{6} = 0.5$

iii. P(park|The green)

$\frac{P(\text{The green park})}{P(\text{The green})} = \frac{1}{6} = 0.17$

iv. P(sea|The green)

$$\frac{P(\text{The green park})}{P(\text{The green})} = \frac{0}{6} = 0$$

$$P(S) = \frac{2}{6} \cdot \frac{3}{6} \cdot \frac{1}{6} \cdot \frac{0}{6} = 0$$