Introduction to Latent Semantic Analysis

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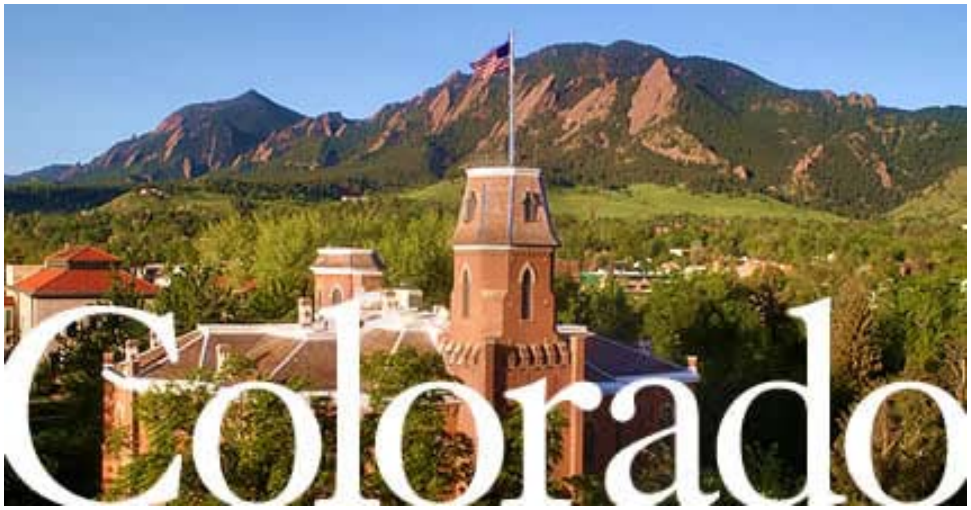


Overview

- Session 1: Introduction and Mathematical Foundations
- Session 2: Using the LSA website to conduct research
- Session 3: Issues and Applications

Session 1: Introduction and Mathematical Foundations

- Introduction to LSA (Tom Landauer)
- Mathematical Foundations (Simon Dennis)

Introduction to LSA

Basic idea:a passage is a linear equation, its meaning well approximated as the sum of the meanings of its words

$$\mathbf{m(passage) = m(word}_{\mathbf{1}}\mathbf{) + m(word}_{\mathbf{2}}\mathbf{) + m(word}\boldsymbol{n}\mathbf{)}$$

$$\mathbf{m(psg_i) = m(wd_{i1}) + (mwd_{i2}) + ... + m(wd_{in})}$$

Solve by Singular Value Decomposition (SVD)

result -- high-d vector for each word and passage
elements ordered by eigenvalue

reduce dimensionality to 50-500 [not 2or 3]
{dimensions are not interpretable}

represent similarity by **cosine** (or other relation)
in high dimensional [50-500 d] space

NOT KEYWORD Matching

Two people agree on best keyword 15%

100 people give 30 names

Words:

	Keyword	LSA
Doctor—Doctor	1.0	1.0
Doctor—Physician	0.0	0.8
Doctor—Surgeon	0.0	0.7

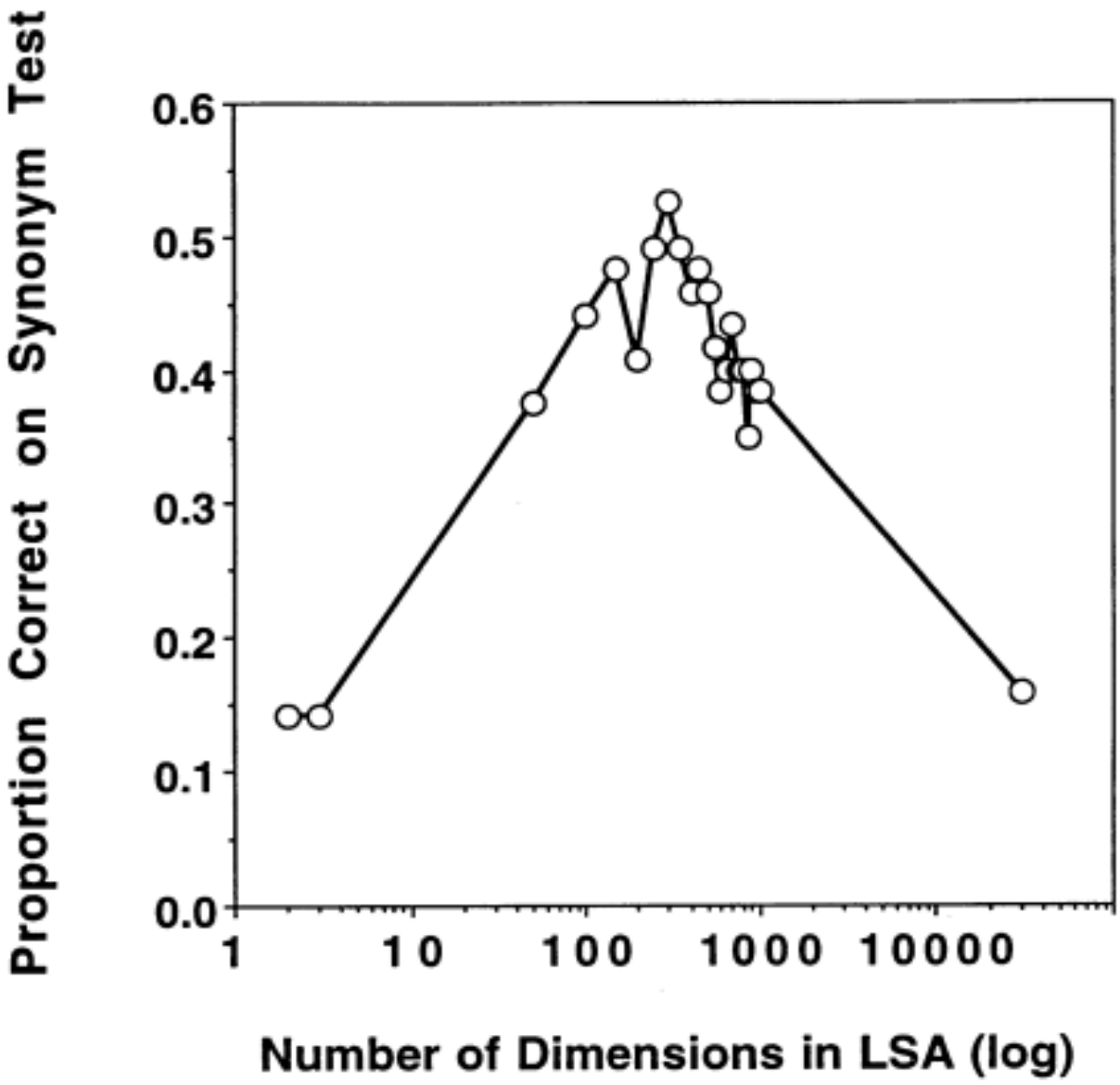
Passages:

Doctors operate on patients

Physicians do surgery.

Keywords 0, LSA .8

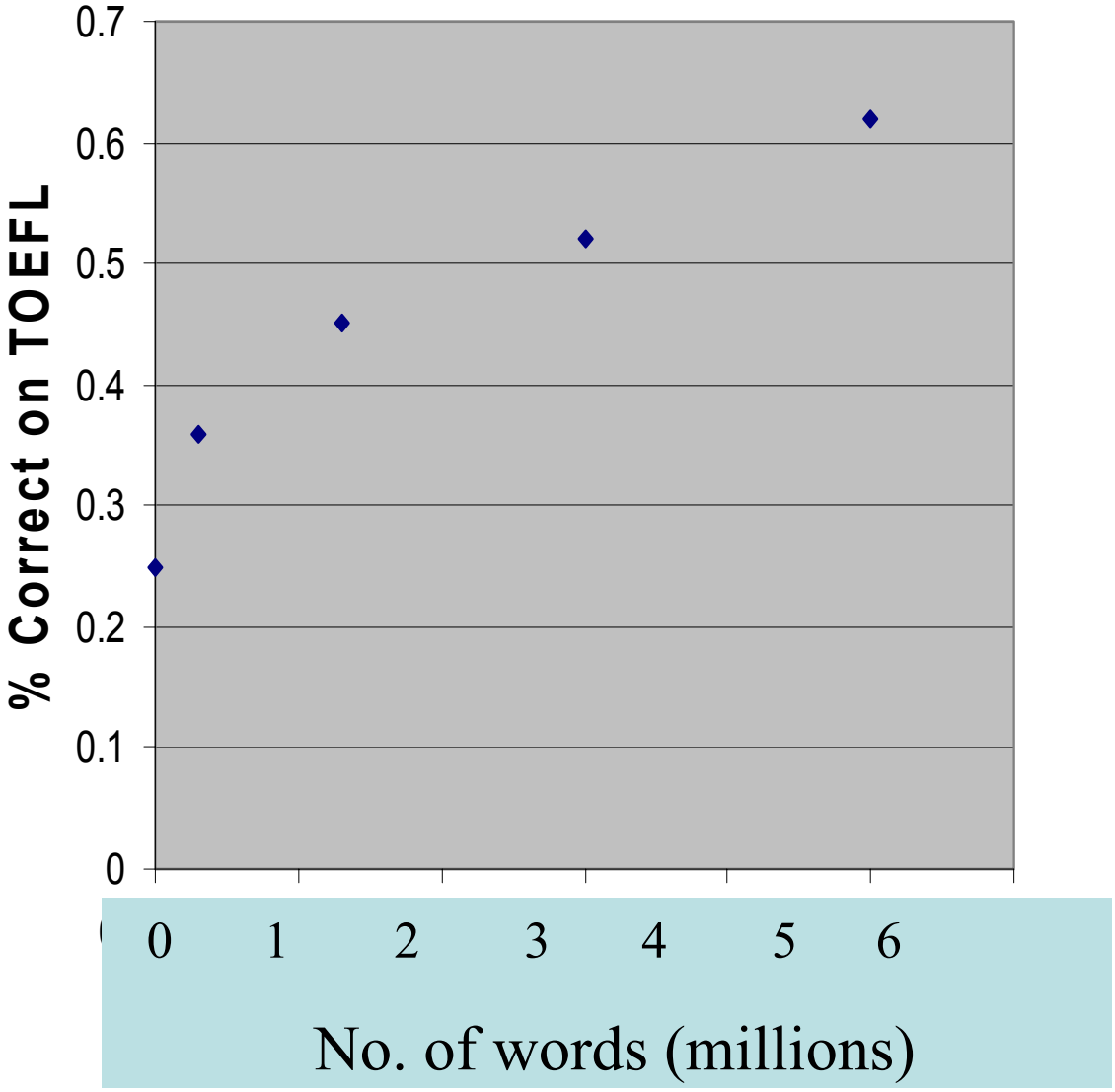
doctor – physician .61
doctor –doctors .79
mouse – mice .79
sugar - sucrose .69
salt - NaCl .61
sun - star .35
come – came .71
go – went .71
walk – walked .68
walk – walks .59
walk - walking - .79
depend – independent .24
…
random pairs -- .02 ± .03


Proportion Correct on Synonym Test
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
10
100
1000
10000
Number of Dimensions in LSA (log)

"the radius of spheres" - "a circle's diameter" = **.55**

"the radius of spheres" - "the music of spheres" = **.01**

Vocabulary knowledge v. training corpus size



- Syntax (word order)
- Polysemes
- Averaging sometimes good
- Words, sentences, paragraphs, articles

ABOUT SENTENTIAL SYNTAX—

- 100,000 word vocabulary

- Paragraph = five 20-word sentences

- Potential information from
  word combinations = 1,660 bits
- Potential information from
  word order = 305 bits

84% of potential information in word choice

predicting expository essay scores

with LSA <u>alone</u>

- create domain semantic space
- compute vectors for essays by adding their word vectors
- to predict grade on a new essay, compare it to ones previously scored by humans

Mutual information between two sets of grades:

human—human	.90
LSA – human	.81

90% as much information as is shared by two human experts is shared by a human and order-free LSA

LSA is not co-occurrence

Typically well over 99% of word-pairs whose similarity is induced never appear together in a paragraph.

Correlations (r) with LSA cosines over 10,000 random wd-wd pairs:

Times two words co-occur in same paragraph (log both)	0.35
Times two words occur in separate paragraphs (log A only + log B only)	0.30
Contingency measures:	
Mutual information	0.05
Chi-square	0.10
Joint/expected p(A&B)/(p(A)*p(B))	0.07

Misses:

attachment, modification, predication,

quantification, anaphora, negation…

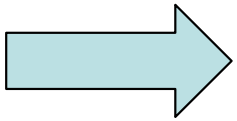
perceptual and volitional experience…

ABOUT CONTEX, METAPHOR, ANOLOGY

See Kintsch (2000, 2001)

ABOUT PERCEPTION,

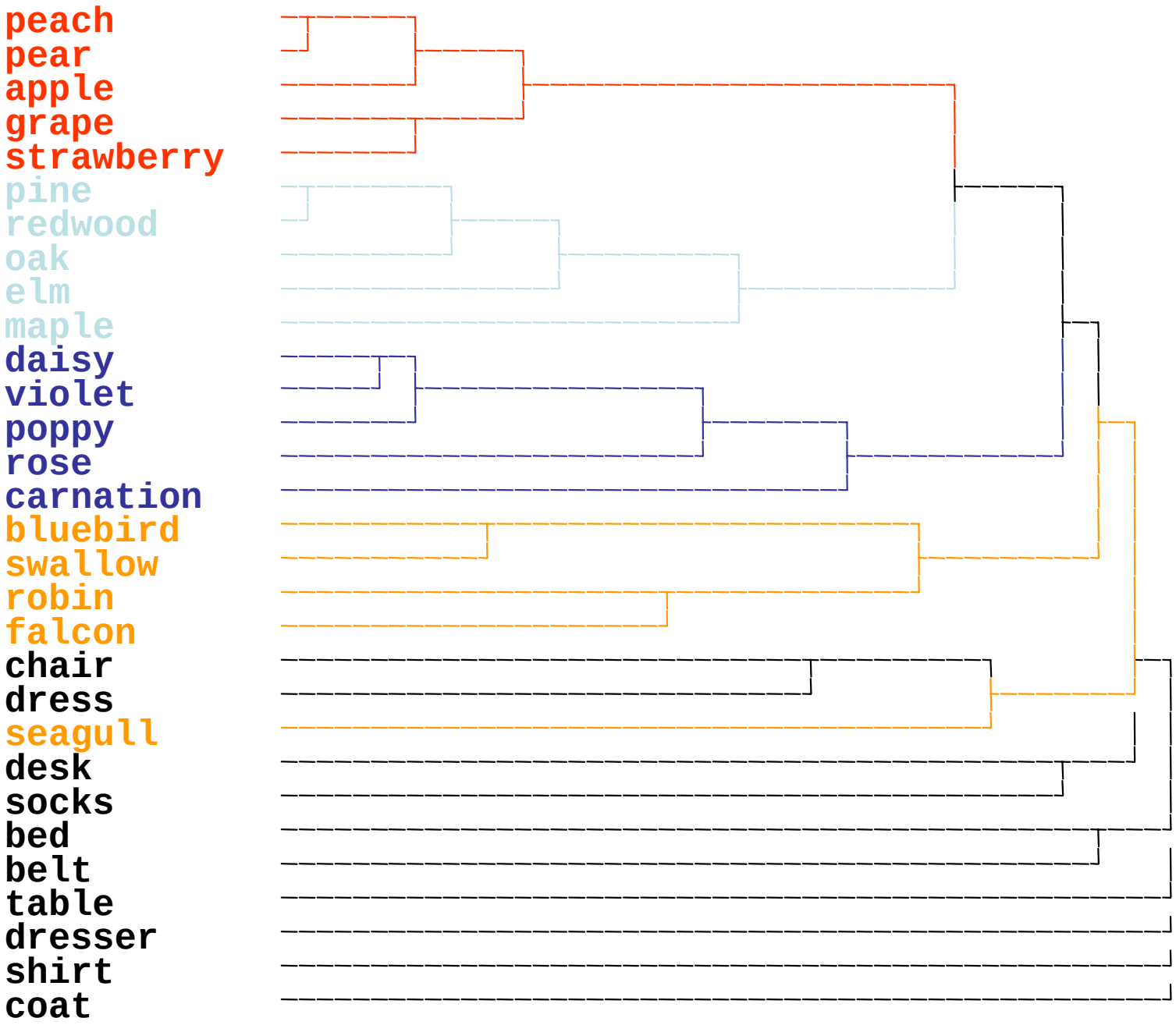
GROUNDING, EMBODIMENT--

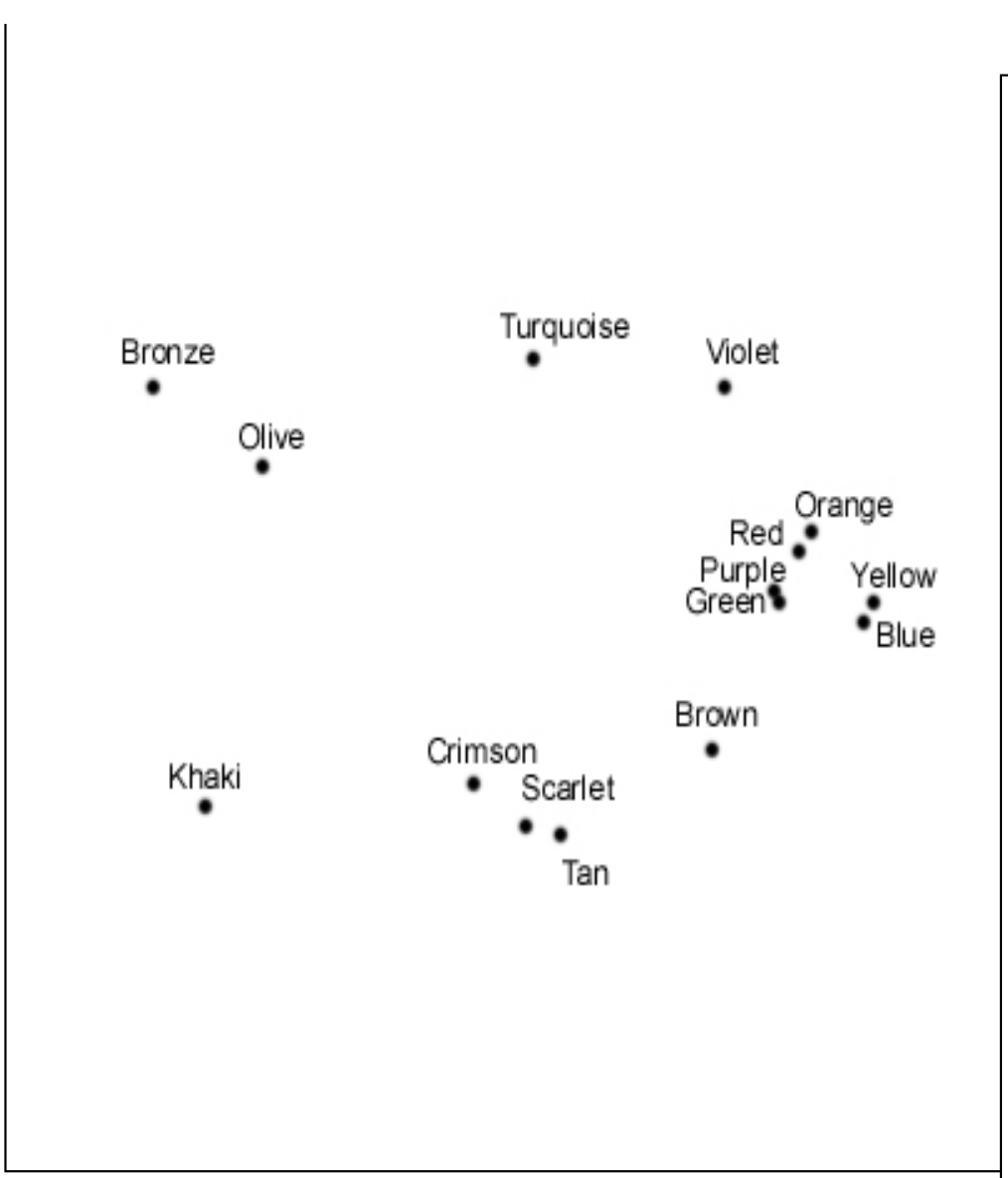


Correlations between cosines and typicality judgments from 3 sources

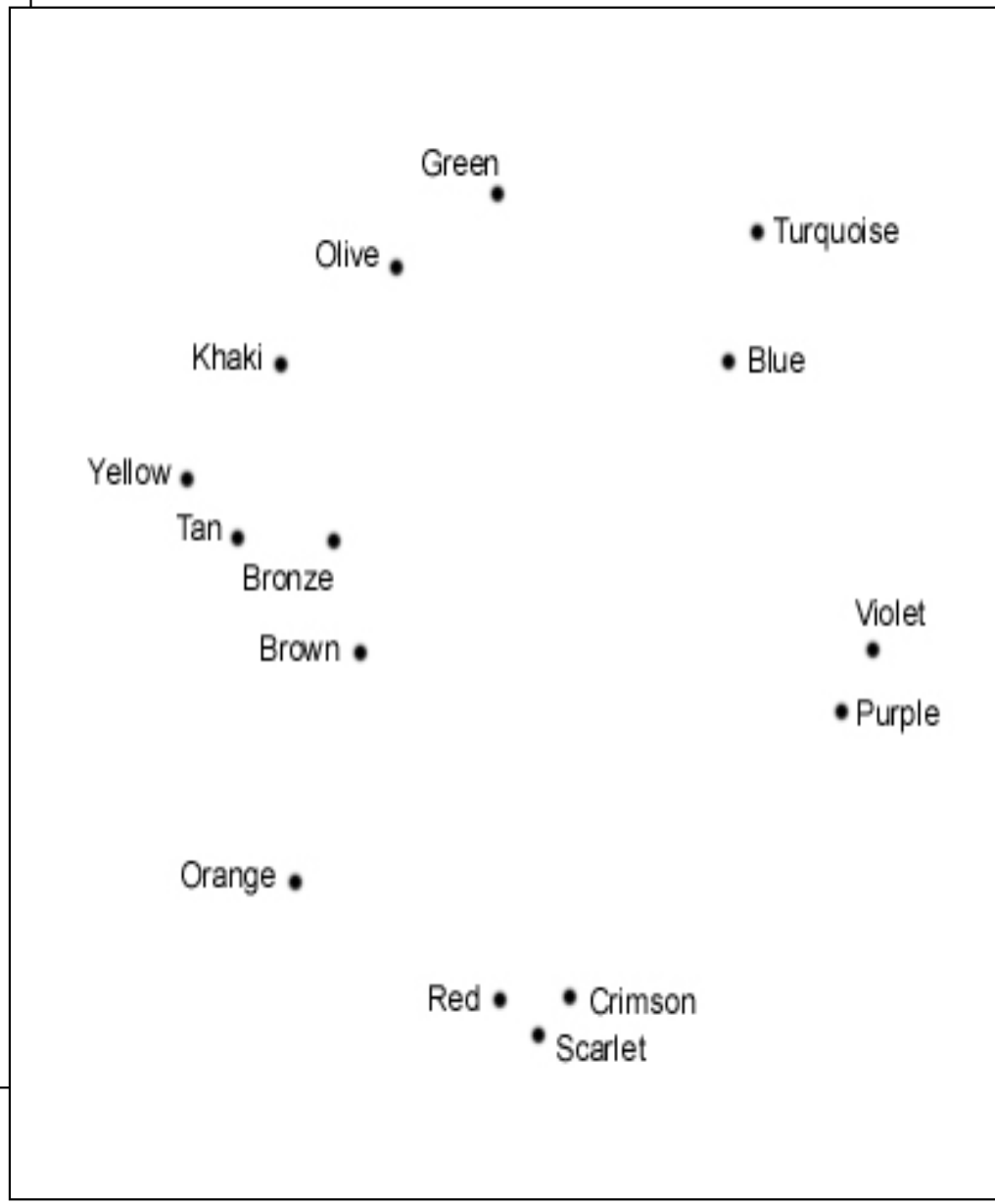
Cosines between category member representations and:	Malt & Smith	Rosch	Battig & Montague
semantic term "fruit"	.64	.61	.66
centroid of 15 fruits	.80	.73	.78

Hierarchical clustering of categories





MDS from one person's similarity judgments simulated by LSA cosines



MDS from mean of 26 subject's judgments (Rapoport & Fillenbaum, 1972)

mimics well:

single words

paragraphs

not so well:

sentences

What can you do with this?

Capture the similarity of what two words or passages are about

Examples:

- Pass multiple choice vocabulary and knowledge tests
- Measure coherence and comprehensibility
- Pick best text to learn from for individual
- Tell what's missing from a summary

More examples:

- connect all similar paragraphs in a tech manual
- or 1,000 book e-library
- suggest best sequence of paragraphs to learn **X** fastest
- match people, jobs, tasks, courses
- measure reading difficulty better than wd frequency
- score inverse cloze tests
- _____ tests _____
- He had some tests.[bad]
- He always gets As on tests. [OK]
- diagnose schizophrenia (Elvaväg & Foltz).
- "tell the story of Cinderella"
- "how do you wash clothes?"
- "name as many animals as you can"

Something it doesn't do so well:
Score short answer questions

(r = ~ .5 vs. human .8)

It needs help to do those.
Needs grammar relations, syntax, logic

Some General LSA Based Applications

- **Information Retrieval**
  - Find documents based on a free text or whole document as query— based on meaning independent of literal words
- **Text Assessment**
  - Compare document to documents of known quality/content
- **Automatic summarization of text**
  - Determine best subset of text to portray same meaning
  - Key words or best sentences
- **Categorization / Classification**
  - Place text into appropriate categories or taxonomies
- **Knowledge Mapping**
  - Discover relationships between texts

Last word: if you are going to apply LSA, try to use it for what it is good for.

Mathematical Foundations

- Constructing the raw matrix
- The Singular Value Decomposition and Dimension Reduction
- Term weighting
- Using the model
  - Term-term comparisons
  - Doc-doc comparisons
  - Psuedo Doc comparisons

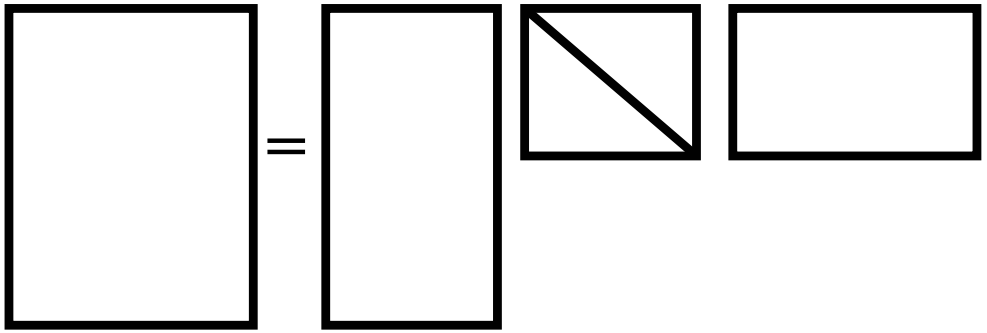
Example of text data: Titles of Some Technical Memos

- c1: ***Human*** machine ***interface*** for ABC ***computer*** applications
- c2: A ***survey*** of ***user*** opinion of ***computer system response time***
- c3: The ***EPS user interface*** management ***system***
- c4: ***System*** and ***human system*** engineering testing of ***EPS***
- c5: Relation of ***user*** perceived ***response time*** to error measurement

- m1: The generation of random, binary, ordered ***trees***
- m2: The intersection ***graph*** of paths in ***trees***
- m3: ***Graph minors*** IV: Widths of ***trees*** and well-quasi-ordering
- m4: ***Graph minors***: A ***survey***

Matrix of words by contexts

	c1	c2	c3	c4	c5	m1	m2	m3	m4
human	1	0	0	1	0	0	0	0	0
interface	1	0	1	0	0	0	0	0	0
computer	1	1	0	0	0	0	0	0	0
user	0	1	1	0	1	0	0	0	0
system	0	1	1	2	0	0	0	0	0
response	0	1	0	0	1	0	0	0	0
time	0	1	0	0	1	0	0	0	0
EPS	0	0	1	1	0	0	0	0	0
survey	0	1	0	0	0	0	0	0	1
trees	0	0	0	0	0	1	1	1	0
graph	0	0	0	0	0	0	1	1	1
minors	0	0	0	0	0	0	0	1	1

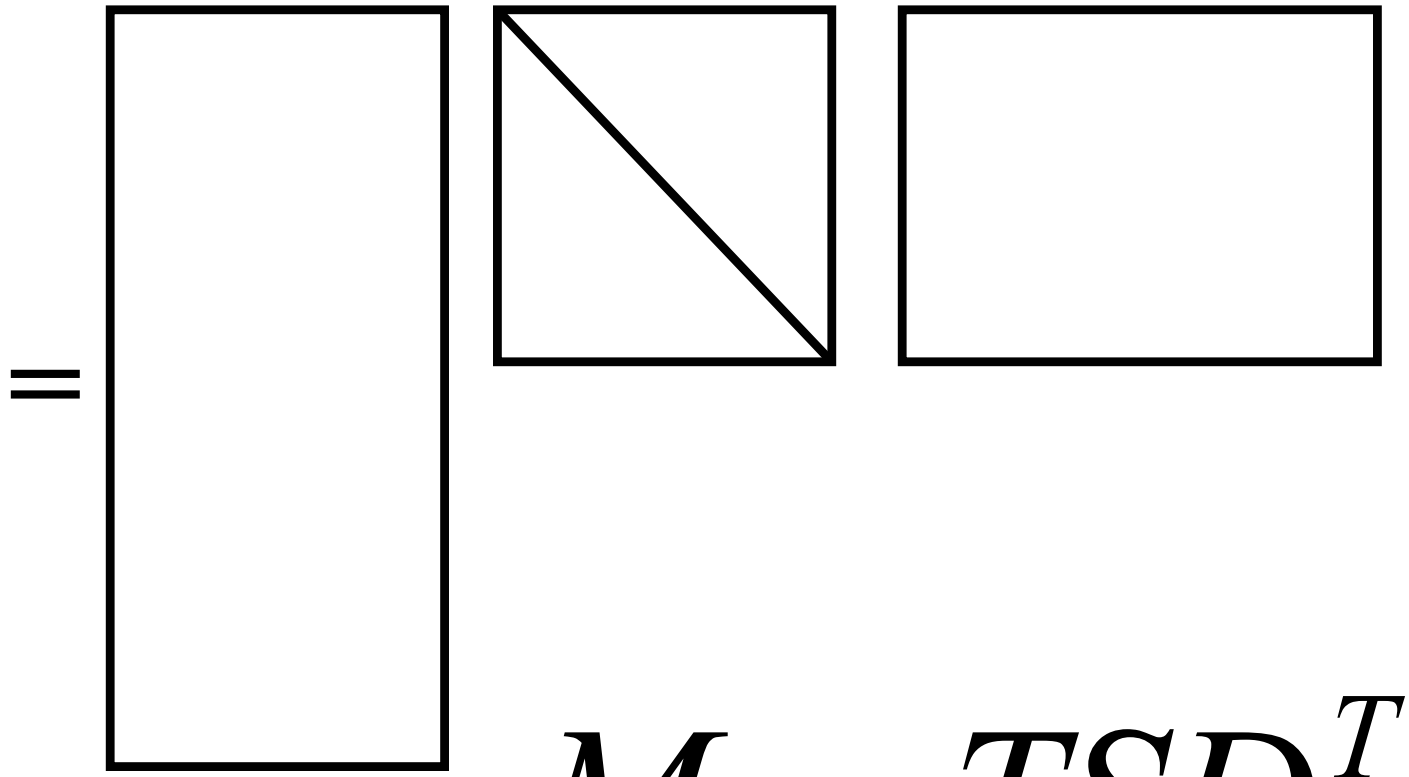


Singular value Decomposition of the words by contexts matrix

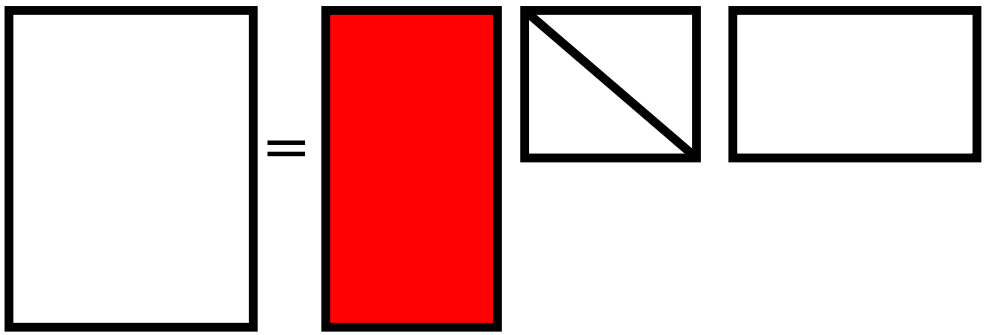
Contexts

Words (states)

	c1	c2	c3	c4	c5	m1	m2	m3	m4
human	1	0	0	1	0	0	0	0	0
interface	1	0	1	0	0	0	0	0	0
computer	1	1	0	0	0	0	0	0	0
user	0	1	1	0	1	0	0	0	0
system	0	1	1	2	0	0	0	0	0
response	0	1	0	0	1	0	0	0	0
time	0	1	0	0	1	0	0	0	0
EPS	0	0	1	1	0	0	0	0	0
survey	0	1	0	0	0	0	0	0	1
trees	0	0	0	0	0	1	1	1	0
graph	0	0	0	0	0	0	1	1	1
minors	0	0	0	0	0	0	0	1	1

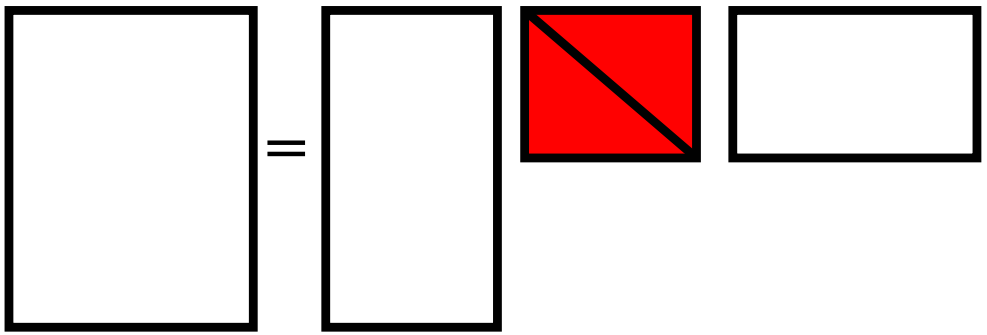


$$M = TSD^T$$



Singular value Decomposition of the words by contexts matrix

0.22	-0.11	0.29	-0.41	-0.11	-0.34	0.52	-0.06	-0.41
0.20	-0.07	0.14	-0.55	0.28	0.50	-0.07	-0.01	-0.11
0.24	0.04	-0.16	-0.59	-0.11	-0.25	-0.30	0.06	0.49
0.40	0.06	-0.34	0.10	0.33	0.38	0.00	0.00	0.01
0.64	-0.17	0.36	0.33	-0.16	-0.21	-0.17	0.03	0.27
0.27	0.11	-0.43	0.07	0.08	-0.17	0.28	-0.02	-0.05
0.27	0.11	-0.43	0.07	0.08	-0.17	0.28	-0.02	-0.05
0.30	-0.14	0.33	0.19	0.11	0.27	0.03	-0.02	-0.17
0.21	0.27	-0.18	-0.03	-0.54	0.08	-0.47	-0.04	-0.58
0.01	0.49	0.23	0.03	0.59	-0.39	-0.29	0.25	-0.23
0.04	0.62	0.22	0.00	-0.07	0.11	0.16	-0.68	0.23
0.03	0.45	0.14	-0.01	-0.30	0.28	0.34	0.68	0.18



Singular value Decomposition of the words by contexts matrix

3.34

2.54

2.35

1.64

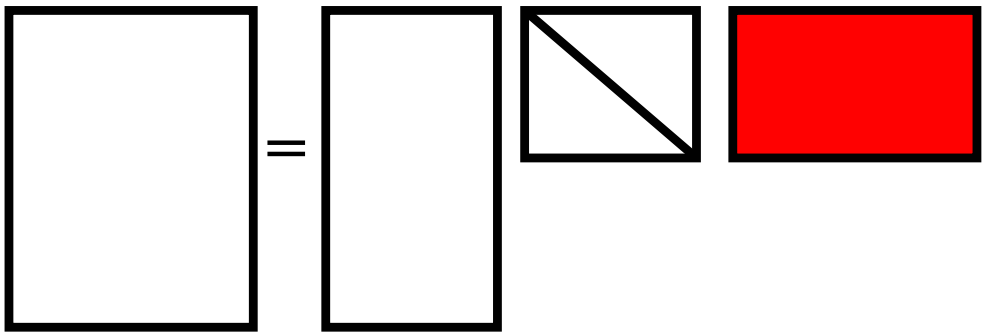
1.50

1.31

0.85

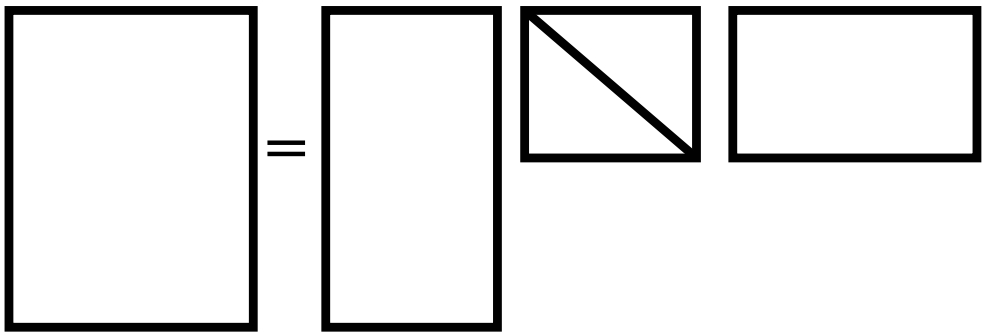
0.56

0.36



Singular value Decomposition of the words by contexts matrix

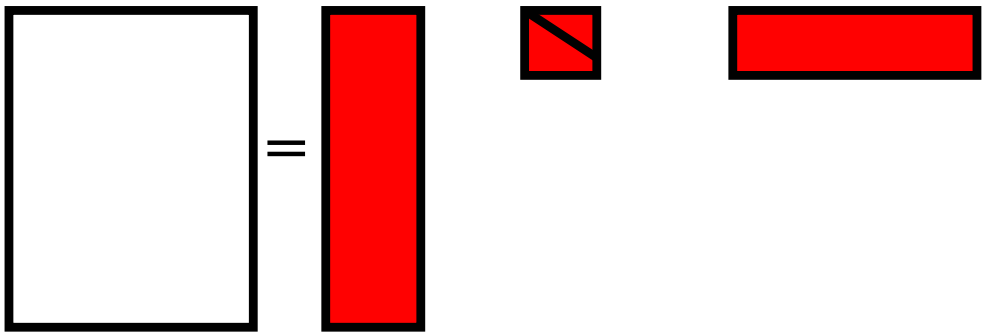
0.20	0.61	0.46	0.54	0.28	0.00	0.01	0.02	0.08
-0.06	0.17	-0.13	-0.23	0.11	0.19	0.44	0.62	0.53
0.11	-0.50	0.21	0.57	-0.51	0.10	0.19	0.25	0.08
-0.95	-0.03	0.04	0.27	0.15	0.02	0.02	0.01	-0.03
0.05	-0.21	0.38	-0.21	0.33	0.39	0.35	0.15	-0.60
-0.08	-0.26	0.72	-0.37	0.03	-0.30	-0.21	0.00	0.36
0.18	-0.43	-0.24	0.26	0.67	-0.34	-0.15	0.25	0.04
-0.01	0.05	0.01	-0.02	-0.06	0.45	-0.76	0.45	-0.07
-0.06	0.24	0.02	-0.08	-0.26	-0.62	0.02	0.52	-0.45



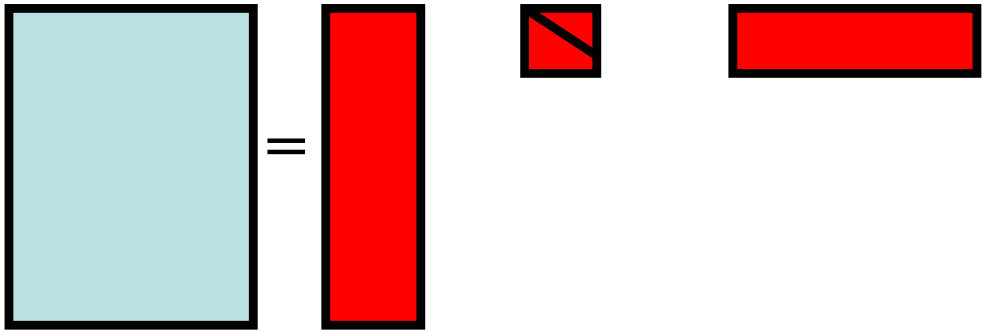
Singular value Decomposition of the words by contexts matrix

3.34

2.54



Singular value Decomposition of the words by contexts matrix



Singular value Decomposition of the words by contexts matrix

	c1	c2	c3	c4	c5	m1	m2	m3	m4
human	0.16	0.40	0.38	0.47	0.18	-0.05	-0.12	-0.16	-0.09
interface	0.14	0.37	0.33	0.40	0.16	-0.03	-0.07	-0.10	-0.04
computer	0.15	0.51	0.36	0.41	0.24	0.02	0.06	0.09	0.12
user	0.26	0.84	0.61	0.70	0.39	0.03	0.08	0.12	0.19
system	0.45	1.23	1.05	1.27	0.56	-0.07	-0.15	-0.21	-0.05
response	0.16	0.58	0.38	0.42	0.28	0.06	0.13	0.19	0.22
time	0.16	0.58	0.38	0.42	0.28	0.06	0.13	0.19	0.22
EPS	0.22	0.55	0.51	0.63	0.24	-0.07	-0.14	-0.20	-0.11
survey	0.10	0.53	0.23	0.21	0.27	0.14	0.31	0.44	0.42
trees	-0.06	0.23	-0.14	-0.27	0.14	0.24	0.55	0.77	0.66
graph	-0.06	0.34	-0.15	-0.30	0.20	0.31	0.69	0.98	0.85
minors	-0.04	0.25	-0.10	-0.21	0.15	0.22	0.50	0.71	0.62

	c1	c2	c3	c4	c5	m1	m2	m3	m4
human	1	0	0	1	0	0	0	0	0
interface	1	0	1	0	0	0	0	0	0
computer	1	1	0	0	0	0	0	0	0
user	0	1	1	0	1	0	0	0	0
system	0	1	1	2	0	0	0	0	0
response	0	1	0	0	1	0	0	0	0
time	0	1	0	0	1	0	0	0	0
EPS	0	0	1	1	0	0	0	0	0
survey	0	1	0	0	0	0	0	0	1
trees	0	0	0	0	0	1	1	1	0
graph	0	0	0	0	0	0	1	1	1
minors	0	0	0	0	0	0	0	1	1

	c1	c2	c3	c4	c5	m1	m2	m3	m4
human	0.16	0.40	0.38	0.47	0.18	-0.05	-0.12	-0.16	-0.09
interface	0.14	0.37	0.33	0.40	0.16	-0.03	-0.07	-0.10	-0.04
computer	0.15	0.51	0.36	0.41	0.24	0.02	0.06	0.09	0.12
user	0.26	0.84	0.61	0.70	0.39	0.03	0.08	0.12	0.19
system	0.45	1.23	1.05	1.27	0.56	-0.07	-0.15	-0.21	-0.05
response	0.16	0.58	0.38	0.42	0.28	0.06	0.13	0.19	0.22
time	0.16	0.58	0.38	0.42	0.28	0.06	0.13	0.19	0.22
EPS	0.22	0.55	0.51	0.63	0.24	-0.07	-0.14	-0.20	-0.11
survey	0.10	0.53	0.23	0.21	0.27	0.14	0.31	0.44	0.42
trees	-0.06	0.23	-0.14	-0.27	0.14	0.24	0.55	0.77	0.66
graph	-0.06	0.34	-0.15	-0.30	0.20	0.31	0.69	0.98	0.85
minors	-0.04	0.25	-0.10	-0.21	0.15	0.22	0.50	0.71	0.62

	Before	After
r (human - user) =	-.38	.94
r (human - minors) =	-.28	-.83

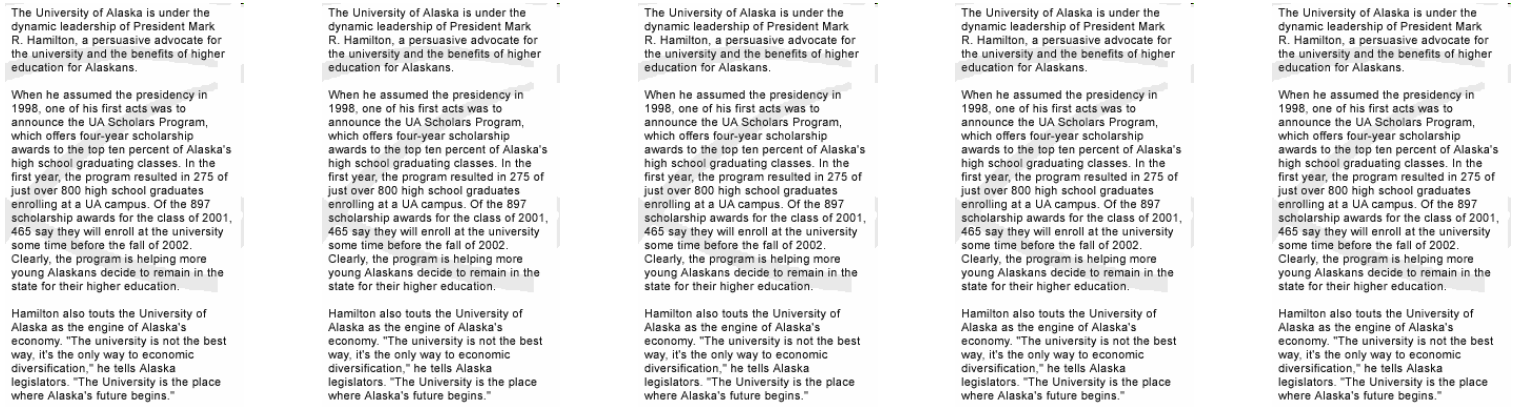
Term Weighting

- Terms are weighted prior to entry into matrix to emphasize content bearing words.

$$Weight = LocalWeight / GlobalWeight$$

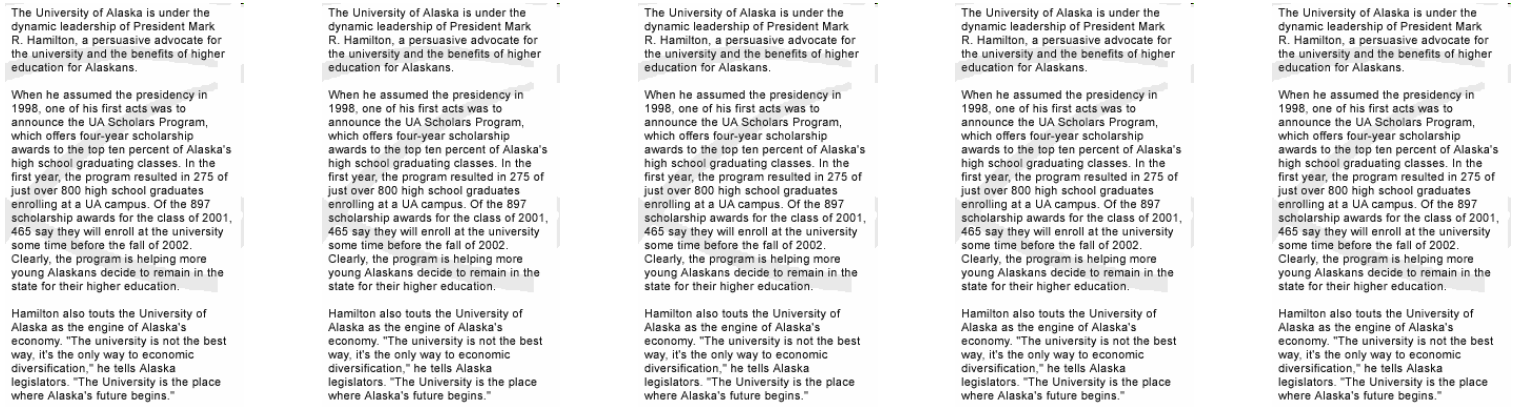
$$LocalWeight = \log(LocalFrequency + 1)$$

$$GlobalWeight = \frac{1 + \sum_{j}^{ncontexts} P_{ij} * \log P_{ij}}{\log ncontexts} \qquad P = \frac{LocalFrequency}{GlobalFrequency}$$



Term Weighting

WORD	WEIGHT
heart	0.197078
tiny	0.760551
knot	0.896875
john	1.000000
lubb-dupp-pause-lubb-dupp-pause	1.000000
the	0.061034
Antibodies	0.710491



Term-term comparisons

- To compare two terms take the dot product of the term vectors multiplied by the singular values.

$$
\begin{aligned}
MM^T &= (TSD^T)(TSD^T)^T \\
&= TSD^T DST^T \\
&= TSST^T \\
&= (TS)(TS)^T
\end{aligned}
$$

Doc-doc comparisons

- To compare two docs take the dot product of the doc vectors multiplied by the singular values.

$$
\begin{aligned}
M^T M &= (TSD^T)^T (TSD^T) \\
&= DST^T TSD^T \\
&= DSSD^T \\
&= (DS)(DS)^T
\end{aligned}
$$

Term-Doc comparisons

- If using dot product just multiply out reduced matrix:

$$dot(T_r, D_q) = T_r S D_q^T$$

- If using cosine or Euclidean distance convert terms and documents into an intermediate space before doing comparison:

$$\cos(T_r, D_q) = \frac{(T_r S^{1/2})(D_q S^{1/2})^T}{\left\| T_r S^{1/2} \right\| \left\| D_q S^{1/2} \right\|}$$

Pseudo Doc

- To create a psuedo doc take the words of the document, multiply by the term vectors and then by the inverse of the singular values.
- The vectors can then be used in the same way as document vectors from D.

$$
\begin{aligned}
[M : M_q] &= TS[D : D_q]^T \\
T^T[M : M_q] &= S[D : D_q]^T \\
S^{-1}T^T[M : M_q] &= [D : D_q]^T \\
[D : D_q] &= [M : M_q]^T TS^{-1} \\
D_q &= M_q^T TS^{-1}
\end{aligned}
$$

Similarity Measures

- Dot Product

$$x.y = \sum_{i=1}^{N} x_i y_i$$

- Cosine

$$\cos(\theta_{xy}) = \frac{x.y}{|x||y|}$$

- Euclidean

$$euclid(x, y) = \sqrt{\sum_{i=1}^{N} (x_i - y_i)^2}$$

- Vector length: Measures influence of term on document meaning

Dimension Reduction for Extracting Lexical Semantics

- http://lsa.colorado.edu/~simon/LexicalSemantics
- Hyperspace Analog to Language (HAL, Lund & Burgess 1996)
- Semi Discrete matrix Decomposition (SDD, Kolda & O'Leary 1998)
- The Syntagmatic Paradigmatic Model (SP, Dennis 2003)
- Pooled Adjacent Context Model (Redington, Chater & Finch 1998)
- Probabilistic Latent Semantic Indexing (PLSI, Hofmann 2001)
- Latent Dirichlet Allocation (LDA, Blei, Ng & Jordan 2002)
- The Topics Model (Griffiths & Steyvers 2002)
- Word Association Space (Steyvers, Shiffrin & Nelson 2000)
- Non-negative matrix factorization (Lee & Seung 1999; Ge & Iwata 2002)
- Local Linear Embedding (Roweis & Saul 2000)
- Independent Components Analysis (Isbell & Viola 1998)
- Information Bottleneck (Slonim & Tishby 2000)
- Local LSI (Schutze, Hull & pedersen 1995)

Session 2: Cognitive Issues and Using the LSA Website

- Cognitive Issues (Jose Quesada)
- The Latent Semantic Analysis Website (Simon Dennis)

lsa.colorado.edu

Cognitive Issues

Limitations of LSA, real and imaginary
and what we are doing about it:

- LSA measures the co-occurrence of words
- LSA is purely verbal, it is not grounded in the real world
- LSA vectors are context-free, but meaning is context dependent
- LSA neglects word order

“LSA measures the local co-occurrence of words”

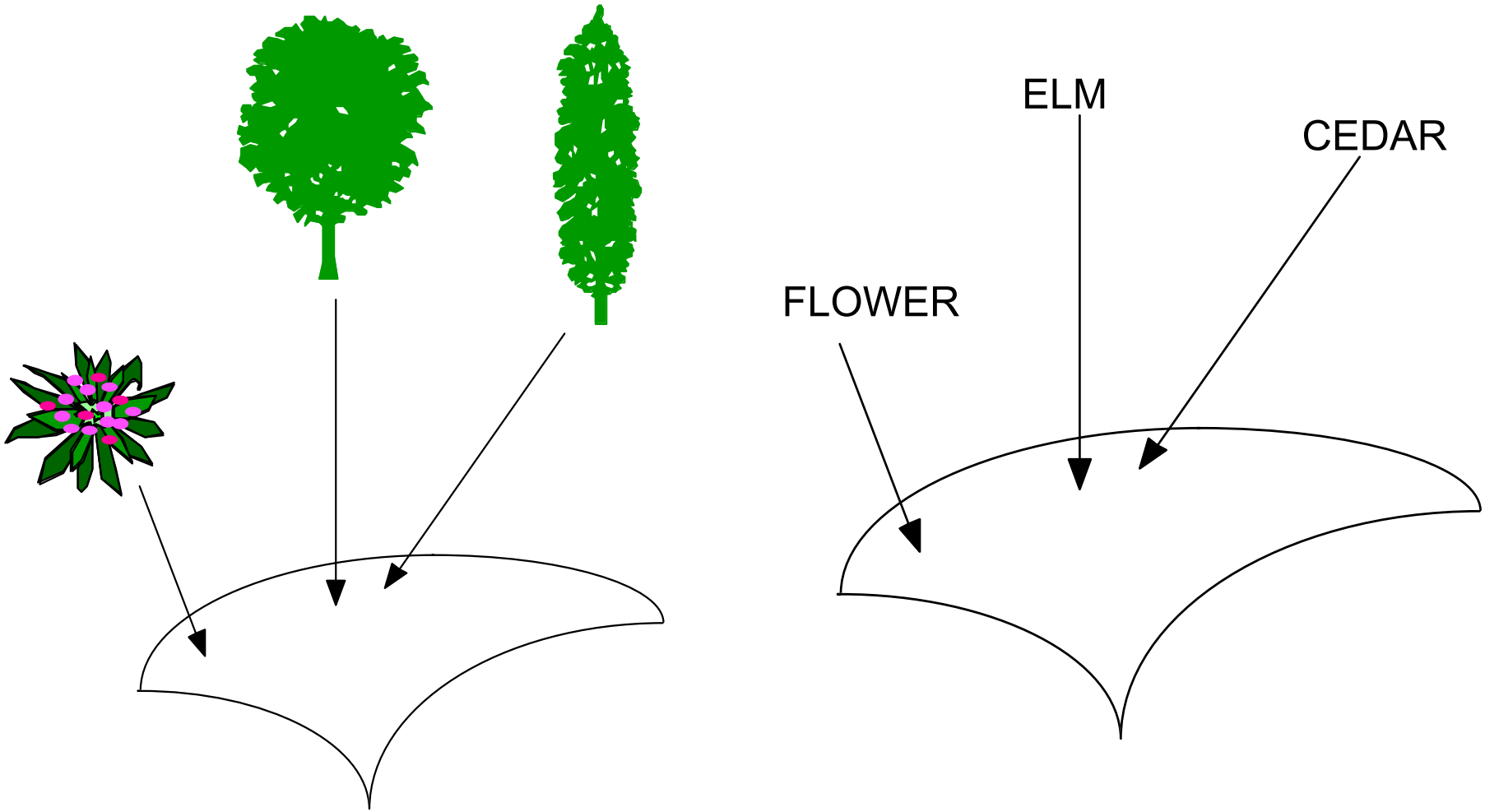
--- false

- Of the approximately 1 billion word-to-word comparisons that could be performed in one LSA less than 1% of the words ever occurred in the same document
- If words co-occur in the same document, the cosine is not necessarily high
- If words never co-occur, the cosine can still be high (e.g. many singular-plural nouns)

“LSA is purely verbal, it is not grounded in the real world”

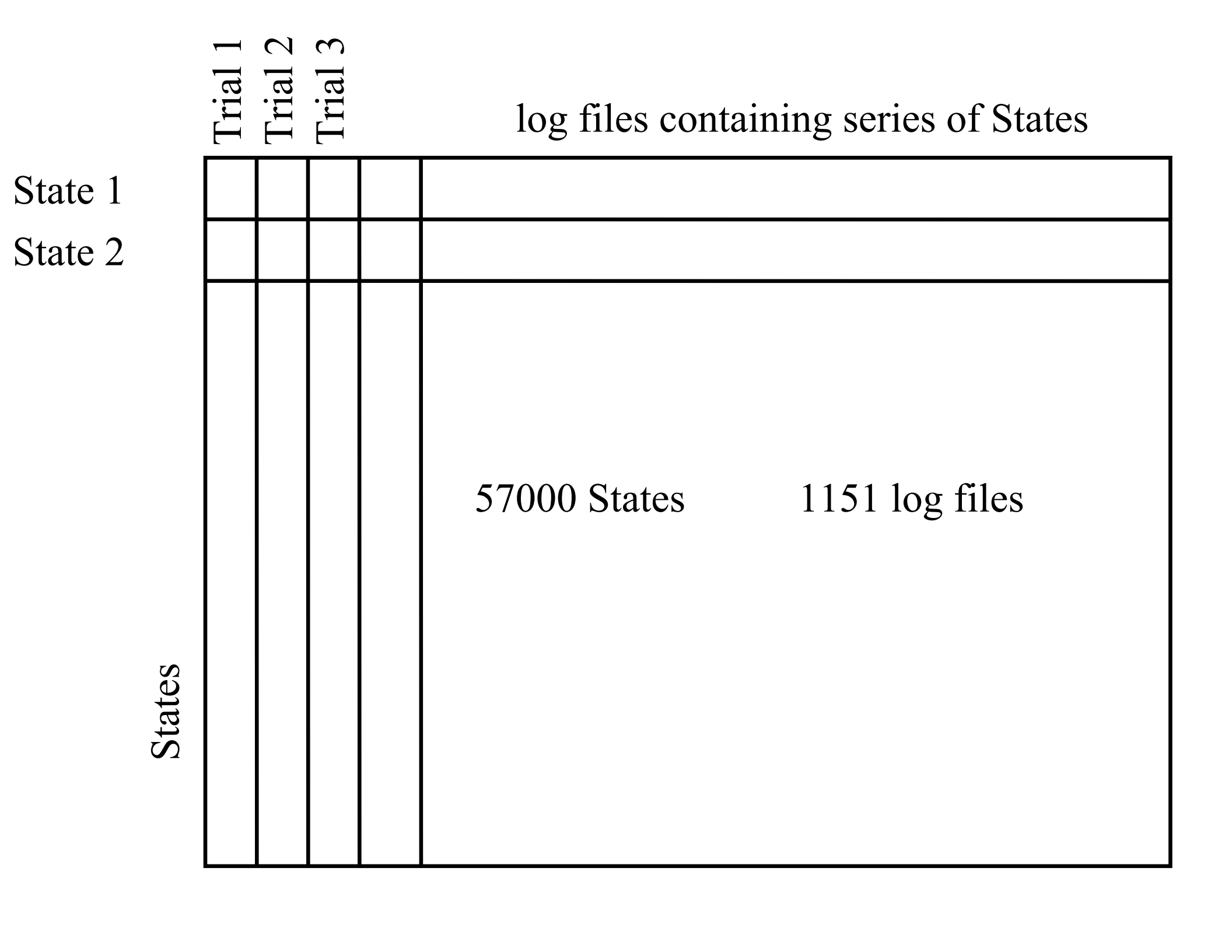
- Some theories that share assumptions with LSA, use objects that are not verbal:
  - PERCEPTION: Edelman’s Chorus of prototypes
  - PROBLEM SOLVING: Quesada’s Latent problem Solving Analysis

Second-order isomorphism (Shepard, 1968)



Latent Problem Solving Analysis (LPSA)

- Quesada (2003) used LSA with non-verbal symbolic information (translated to "words") to construct problem spaces for complex problem solving tasks:
  - "words" are state-action-event descriptions recorded in the problem solving task, e.g., if the task is to land a plane, "altitude X, speed, Y, wind Z, action K"
  - "document" is a problem solving episode, e.g. a particular landing
  - "semantic space" is a problem space constructed solely from what experts actually do in these situations

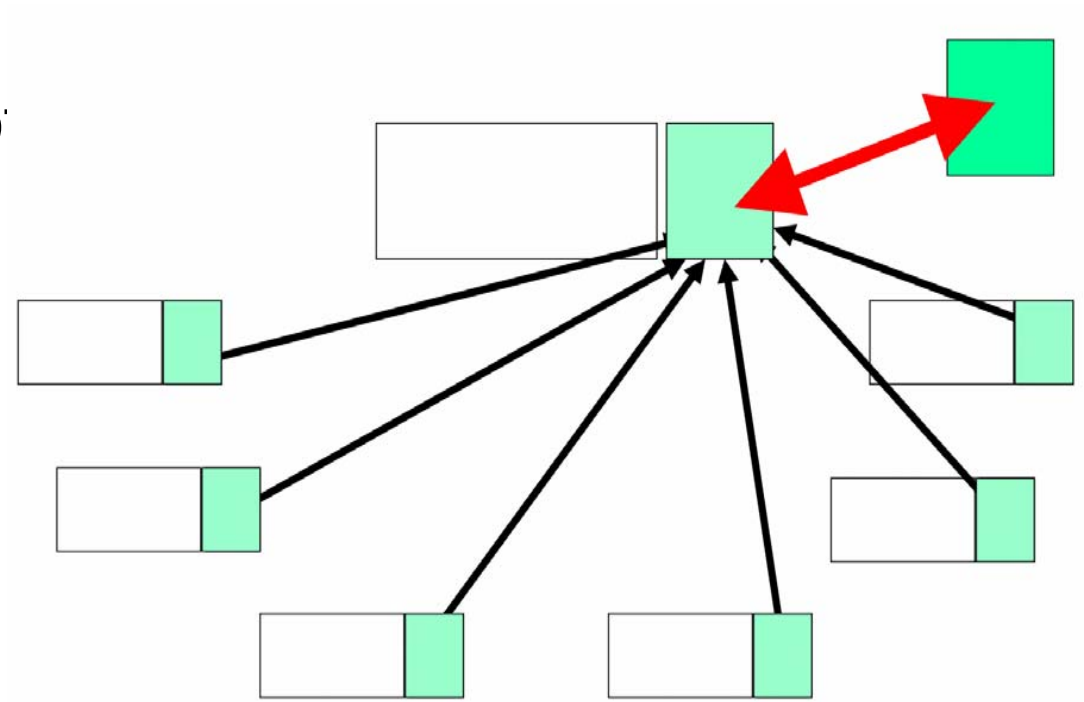

Trial 1
Trial 2
Trial 3
log files containing series of States
State 1
State 2
57000 States
1151 log files
States

Latent Problem Solving Analysis (LPSA)

- Explanation of how problem spaces are generated from experience
- Automatic capture of the environment constraints
- Can be applied to very complex tasks that change in real time, with minimal a-priori assumptions
- Objective comparison between tasks, without need for a task analysis

Latent Problem Solving Analysis (LPSA)

- Evidence:
  - Human judgments o similarity: R = .94
  - Predicting future states: R = .80
- Applications:
  - Automatic Landing technique assesment



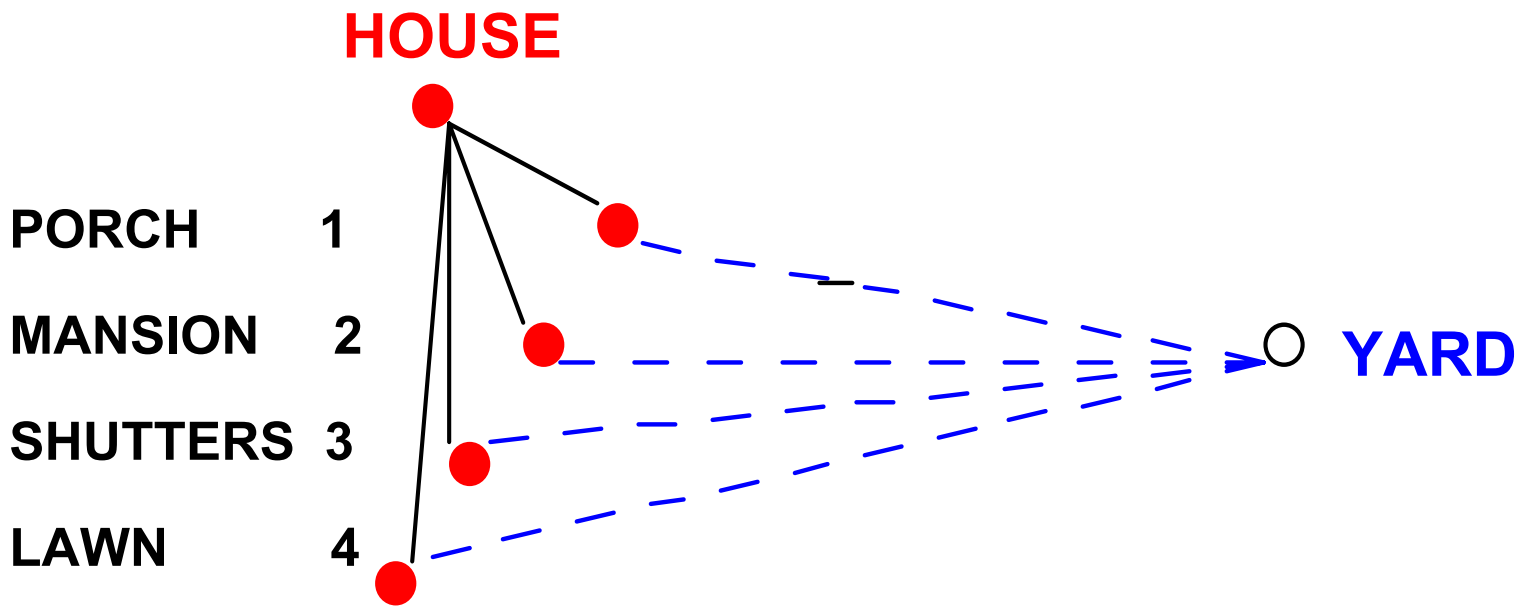
"LSA vectors are context-free, but meaning is context dependent"

- Predication Model (Kintsch 2001):
  - by combining LSA with the Construction-Integration (CI) Model of comprehension, word meanings can be made context sensitive
  - in this way, the different meanings and different senses of a word do not have to be pre-determined in some kind of mental lexicon, but emerge in context: the **generative lexicon**
  - the Predication algorithm searches the semantic neighbors of a vector for context related items and uses those to modify the vector

“the yard of the house”

the predicate “yard” does not affect the meaning of “house”

(the closest neighbors of “house” are also the closest neighbors of “yard”)

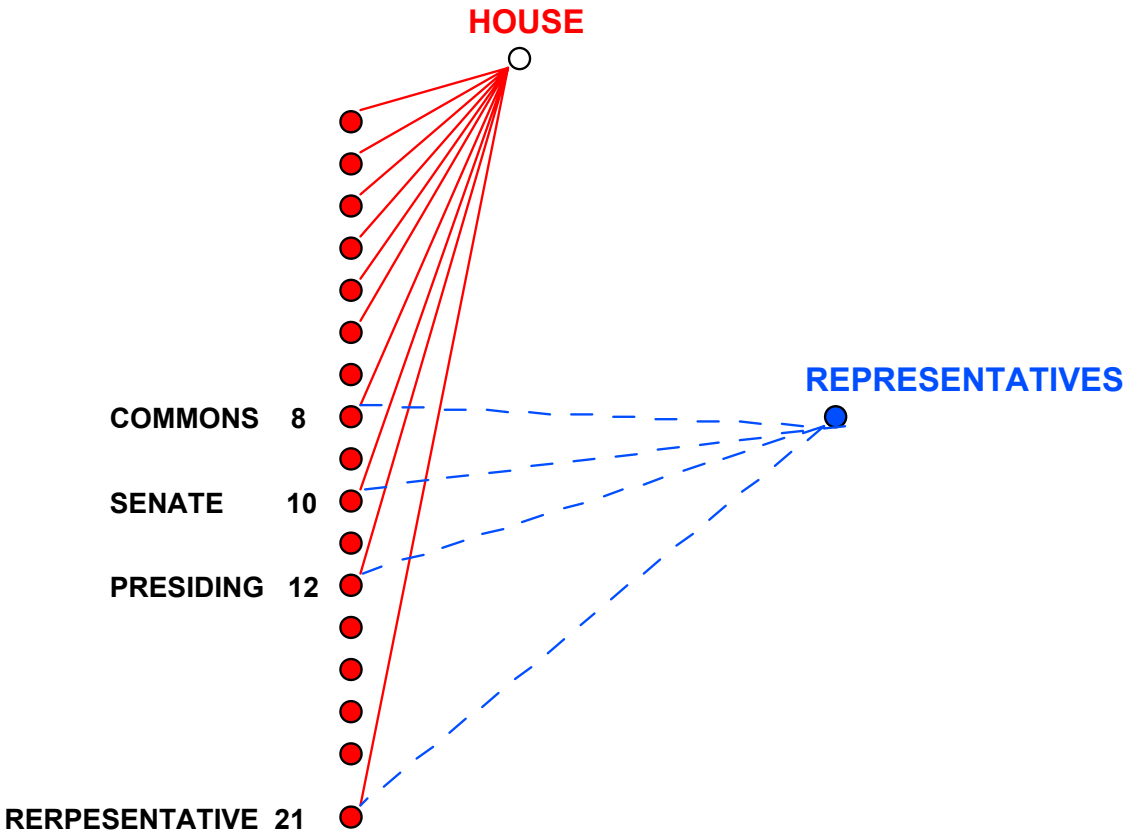


average rank increment: 0

“house of representatives”

the predicate “representatives” strongly modifies the meaning of “house:”

(the neighbors of “house” related to “representatives” are emphasized)



average rank increment: 10.25

Applications of the Predication Model:

- Context dependency of word meanings
  - *Wrapping paper* is like *shredded paper*, but not like *daily paper (Klein & Murphy, 2002)*
- Similarity judgments
  - *shark* and *wolf* are similar in the context of *behavior*, but not in the context of *anatomy (Heit & Rubenstein, 1994)*
- Causal inferences
  - *clean the table* implies *table is clean (Singer et al., 1992)*
- Metaphor comprehension
  - *My lawyer is a shark* - *shark*-related neighbors of *lawyer* are emphasized *(Kintsch, 2000; Kintsch & Bowles, 2002)*

“LSA neglects word order”

- In LSA
  - John loves Mary = Mary loves John
- While it is surprising how far one can get without word order there are occasions when one needs it
- The Syntagmatic Paradigmatic model (Dennis 2003) is a memory-based mechanism that incorporates word order but preserves the distributional approach of LSA.

The SP Model in a Nutshell

- Assumes that people store a large number of sentence instances.
- When trying to interpret a new sentence they retrieve similar sentences from memory and align these with the new sentence (using String Edit Theory).
- A sentence is syntactically well formed to the extent that the instances in memory can be aligned with it.

"**There were three men.**"	is OK
"There were three man."	is not
"There was three men."	is not

- The set of alignments is an interpretation of the sentence.
- Training involves adding new traces to memory and inducing word-to-word correspondences that are used to choose the optimal alignments.

SP Continued

Mary	is	loved	by	John
Ellen	is	adored	by	George
Sue	is	loved	by	Michael
Pat	was	cherished	by	Joe

- The set of words that aligns with each word from the target sentence represents the role that that word plays in the sentence.
- {Ellen, Sue, Pat} plays the role of the lovee role and {George, Michael, Joe} plays the role of the lover role.
- The model assumes that two sentences convey similar factual content to the extent that they contain similar words aligned with similar sets of words.
- Can infer that John loves Mary = Mary is loved by John
- See lsa.colorado.edu/~simon for details.

Using the LSA Website

Latent Semantic Analysis @ CU Boulder

Main Menu

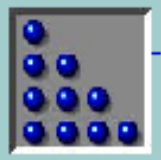
Information | Affiliations
Applications | Guestbook
Demos | Mail to...

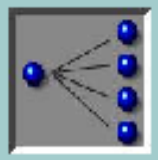
Click on **Main Menu** Items to reveal sub-menus in this frame.

IMPORTANT NOTICE

It is **essential** that you understand the LSA modeling methods before using the applications on this website. Selecting incorrect semantic spaces, number of dimensions, or types of comparisons will

Applications




Near Neighbors	Matrix Comparison	Sentence Comparison	One-To-Many Comparison	Pairwise Comparison
Info	Info	Info	Info	Info

Demonstrations

Educational Text Selection	The Intelligent Essay Assessor™ at Knowledge Analysis Technologies	Summary Street Note: Requires Explorer
Info	Info	Info

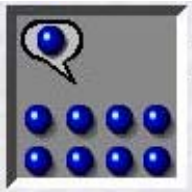
Please Sign our Guestbook **View Guestbook**

Executive Summary	1st Time User Help File	LSA News Updated:11/24/98	Download LSA Publications	Mail to Webmaster

http://lsa.colorado.edu

Tools Available

- Nearest Neighbor
- Matrix comparison
- Sentence comparison
- One to many comparison
- Pairwise comparison



Near Neighbors

This interface allows you to select a set of **n** near neighbor terms based on a submitted term or piece of text **(pseudodoc)**. The terms returned are those in the LSA space which are nearest the submitted term or pseudodoc.

At the end of the return page is a text list of the return items to cut and paste into other applications if you like.

To try the system, enter a term or piece of text in the input area below. Then press the **'Submit Text'** button.

Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Number of terms to return: 20

Number of factors to use: (Leave blank for maximum factors available.)

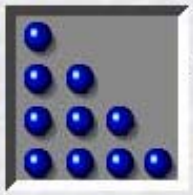
Remove terms from return list that appear in corpus with frequency less than (<=): 0

Select the type of input text: pseudodoc

Note: By selecting *term* no weighting is used. Selecting *pseudodoc* uses log entropy weighting.

Text to submit:

Submit Text | Reset to Defaults



Matrix Comparison

This interface allows you to compare the similarity of multiple texts or terms within a particular LSA space. Each text is compared to all other texts.

To compute the similarity of multiple texts, enter each in the input box below. **Use a blank line to separate each text.** Then press the **'Submit Texts'** button. The system will compute a similarity score between -1 and 1 for each submitted text compared to all submitted texts.

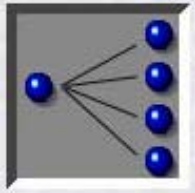
Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Select the comparison type: term to term

Number of factors to use: (Leave blank for maximum factors available.)

Texts to compare (separate different texts with a blank line):

Submit Texts | Reset to Defaults



One-To-Many Comparison

This interface allows you to compare the similarity of multiple texts within a particular LSA space. One designated text is compared to all other texts.

To compute the similarity of a particular text to many other texts, enter the main text in the first edit field and each of the others in the second box below. Use a blank line to separate each text in the second box. Then press the '**Submit Texts**' button. The system will compute a similarity score between -1 and 1 between the main text and the other submitted texts.

Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Select the comparison type: term to term

Number of factors to use: (Leave blank for maximum factors available.)

Show vector lengths:

Main text (to be compared to each of the others):

Texts to compare (separate different texts with a blank line):

Submit Texts | Reset Form

Sentence Comparison

This interface allows you to compare the similarity of sequential sentences within a particular LSA space. Each sentence is compared to next sentence. The program will automatically parse the input into sentences -- you do not have to separate sentences on different lines.

To compute the similarity of multiple sentences, enter your text in the input box below. **Use normal punctuation to separate each sentence.** Then press the **'Submit Texts'** button. The system will compute a similarity score between -1 and 1 for each submitted sentence compared to next submitted sentence.

Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Number of factors to use: (Leave blank for maximum factors available.)

Texts to compare (separate different sentences with a punctuation):

Submit Texts | Reset to Defaults

Pairwise Comparison

This interface allows you to compare the similarity of multiple texts within a particular LSA space. Each pair of texts is compared to one another.

To compute the similarity of any number of text segment pairs, enter them into the edit field below. Use a blank line to separate each text you enter. The first and second texts will be compared to one another, the third and fourth will be compared to one another, and so on. Then press the '**Submit Texts**' button. The system will compute a similarity score between -1 and 1 between each pair of texts.

Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Select the comparison type: term to term

Number of factors to use: (Leave blank for maximum factors available.)

Texts to compare (separate different texts with a blank line):

Submit Texts | Reset Form

Overview of Available Spaces

- **TASAXX -** These spaces are based on representative samples of the text that American students read. They were collected by TASA (Touchstone Applied Science Associates, Inc.) There are spaces for 3rd, 6th, 9th and 12th grades plus one for 'college' level. In total the ~13 M word token corpus closely resembles what one college freshman might have read.
- **Literature -** The literature space is composed of English and American Literature from the 18th and 19th century
- **Literature with idioms -** Literature with idioms is the same space, with idioms considered as single tokens.
- **Encyclopedia -** This space contains the text from 30,473 encyclopedia articles.
- **Psychology -** This space contains the text from three college level psychology textbooks.
- **Smallheart -** This small space contains the text from a number of articles about the heart.
- **French Spaces -** There are 8 French semantic spaces (see website for details).
- Etc.

General rules

- Results (cosine values) are always relative to the corpus used.
- The number of dimensions is relevant. Leave it blank for maximum number of dimensions. Three hundred dimensions is often but not always optimal; fewer dimensions means ‘gross distinctions’, more means more detail. There is no general way to predict, but fewer than 50 rarely gives good results.
- Words that are not in the database are ignored. Warning: typos most probably won’t be in there.
- Documents or terms have to be separated by a blank line

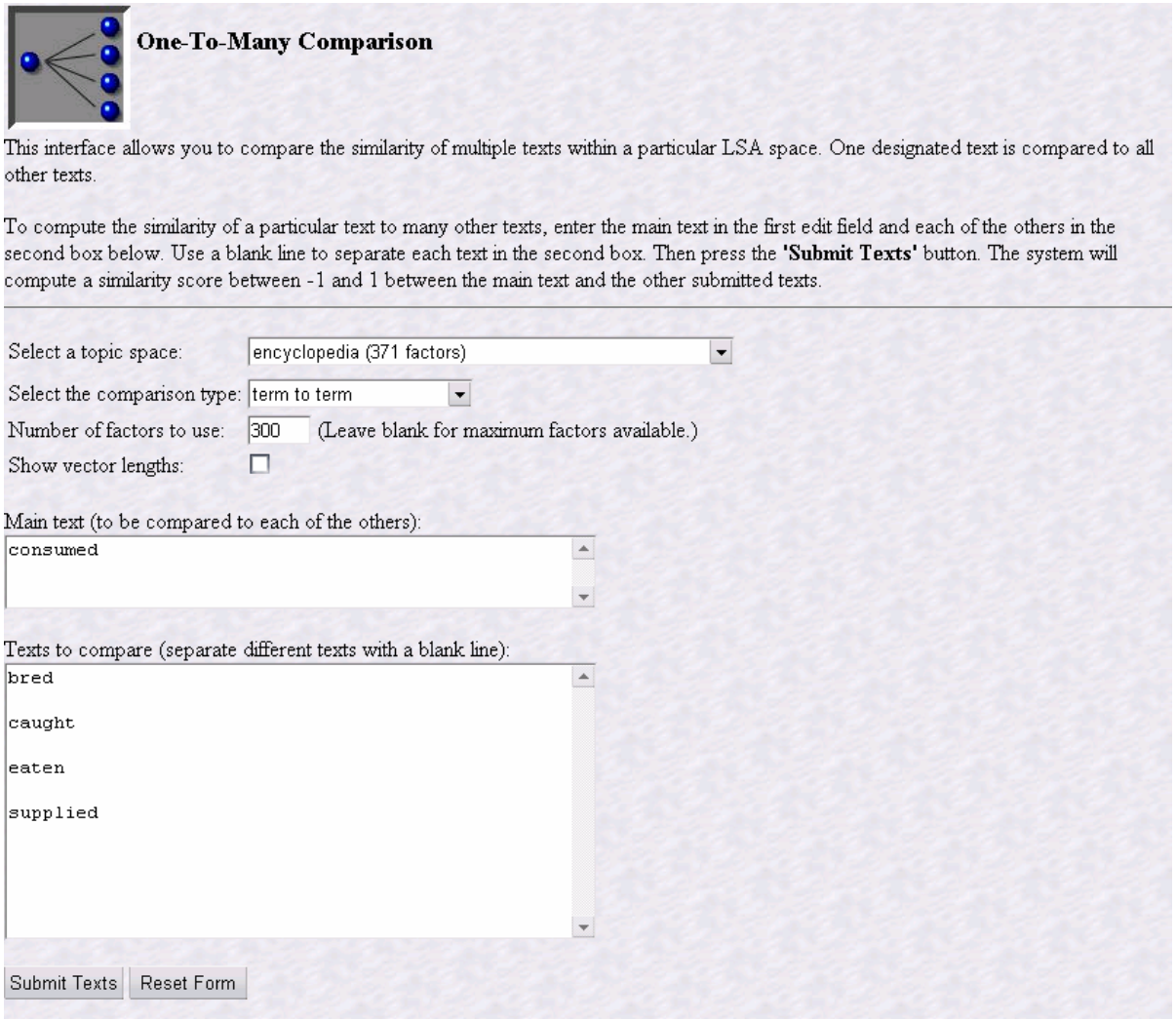
General rules

- Using nearest Neighbors, the pseudodoc scaling gives much better results even if we are interested in retrieving the NN of a term
- In NN, you normally want to drop NN that are less frequent than, say, 5 occurrences. They may be typos
- Vector lengths (VL): indicates how “semantically rich” the term is. Terms with very short VL do not contribute much to the meaning of a passage. That can be problematic, check VL if the results are not what you expect.

Some Common LSA Tasks

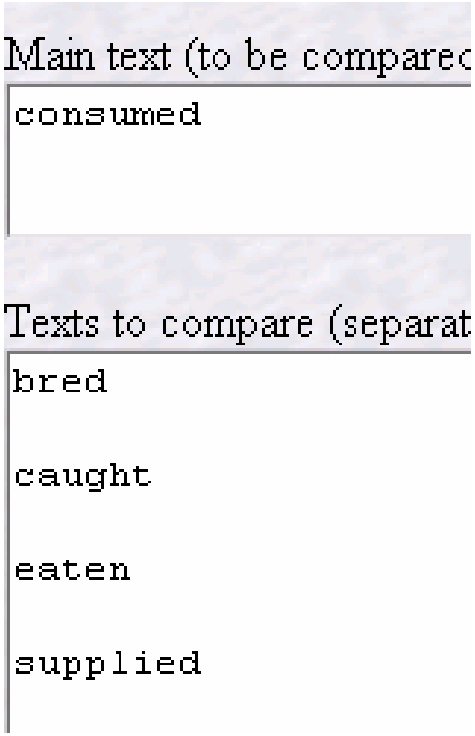
- Estimating word similarities, e.g. to test or measure vocabulary, model priming effects
- Estimating text similarities, e.g., to measure coherence, score essays, do information retrieval

Vocabulary testing



Encyclopedia corpus

300 dimensions

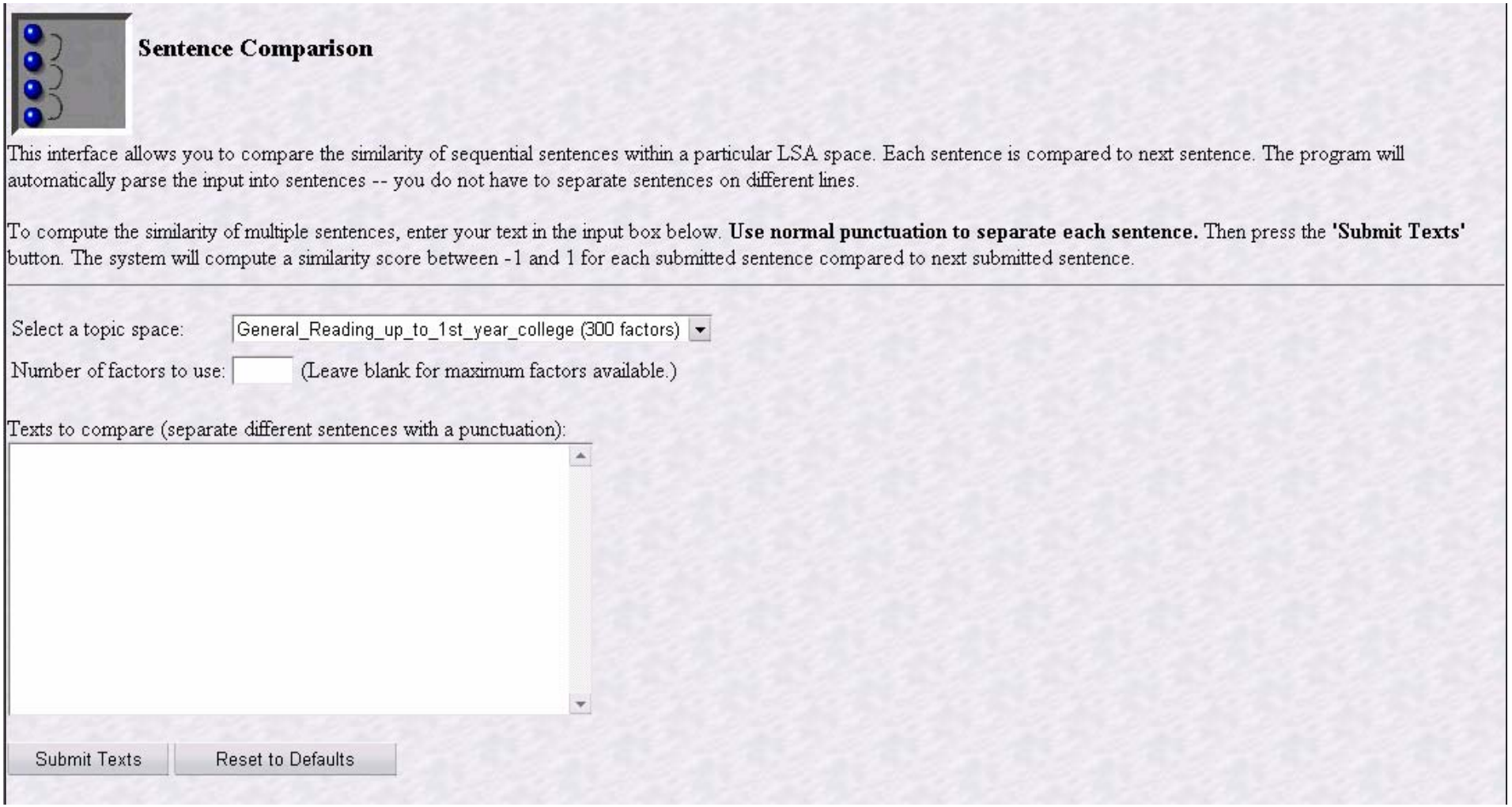


One-to-Many Comparison Results

The submitted texts' similarity matrix (in **term to term** space):

Texts	consumed
bred	0.12
caught	0.04
eaten	0.37
supplied	0.17

Text Coherence



Text Coherence

In a short story, the storyteller is called the narrator

The narrator may or may not be a character of the story

One common point of view in which the author does not pretend to be a character is called “omniscent narrator”

Omniscent means “all-knowing”

Omniscent narrators write as if they posses a magical ability to know what all the characters are thinking and feeling

An omniscent narrator can also describe what is happeing in two different places at the same time

Text Coherence

Sentence to Sentence Coherence Comparison Results

The submitted texts' sentence to sentence coherence:

COS	SENTENCES
0.82	*1:* In a short story the storyteller is called the \"narrator.
0.54	*2:* \" the narrator may or may not be a character in the story.
0.28	*3:* one common point of view in which the author does not pretend to be a character is called \"omniscient narration.
0.23	*4:* \"omniscient\" means \"all-knowing.
0.23	*5:* \" omniscient narrators write as if they possess a magical ability to know what all the characters are thinking and feeling.
	6: an omniscient narrator can also describe what is happening in two different places at the same time.

Mean of the Sentence to Sentence Coherence is: 0.42

Standard deviation of the Sentence to Sentence is: 0.23

Text Coherence

In a short story, the storyteller is called the narrator

.82

The narrator may or may not be a character of the story

.54

One common point of view in which the author does not pretend to be a character is called “omniscent narrator”

.28

Omniscent means “all-knowing”

.23

Omniscent narrators write as if they posses a magical ability to know what all the characters are thinking and feeling

.23

An omniscent narrator can also describe what is happeing in two different places at the same time

Session 3: Applications

- Example Applications (Tom Landauer)

Uses in cognitive science research: an example

- Howard, M. W. and Kahana, M. J. When does semantic similarity help episodic retrieval. Journal of Memory and Language, 46, 85-98.

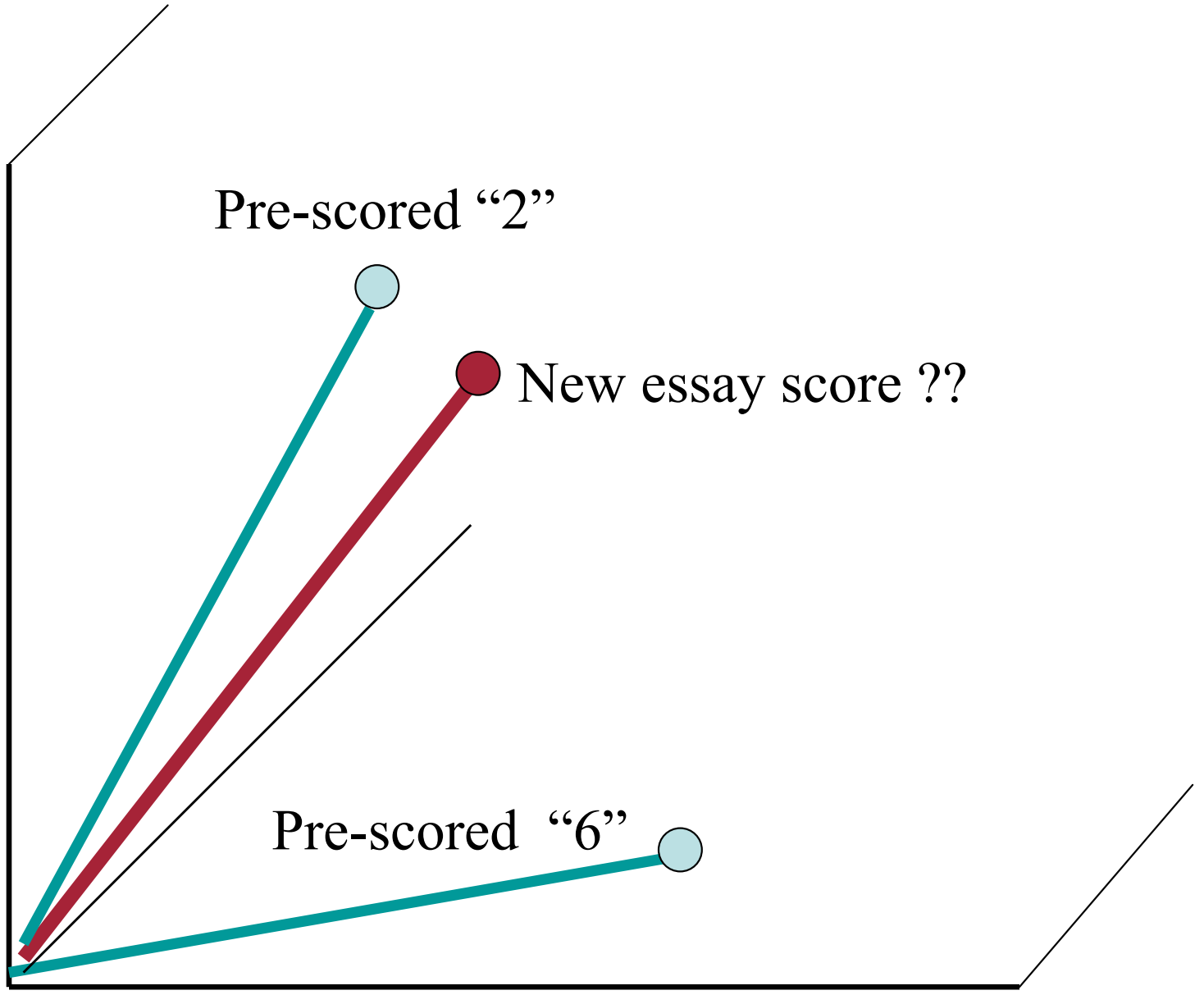
- Significant effect on recall of LSA cosines of successive words r =.75
- Significant effect of LSA cosines <.14

  e.g. oyster-couple, diamond-iron

Other examples

- Modeling word-word, passage-word priming
- Selecting word sets with controlled semantic similarities
- Measuring semantic similarity of responses in experiments, answers to open ended questions, characteristics of texts, etc.

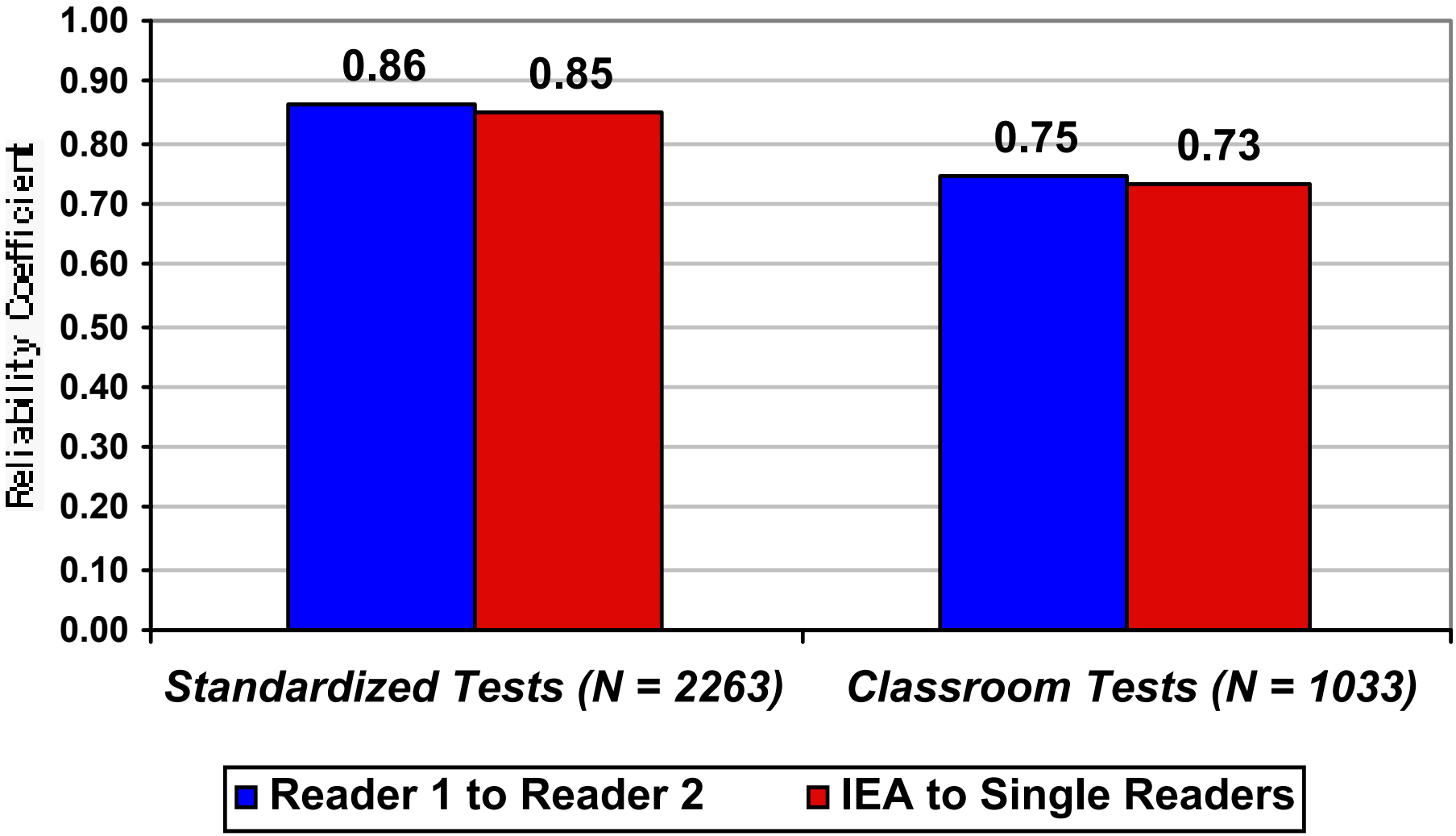
The Intelligent Essay Assessor: more about its LSA component


Pre-scored “2”
New essay score ??
Pre-scored “6”

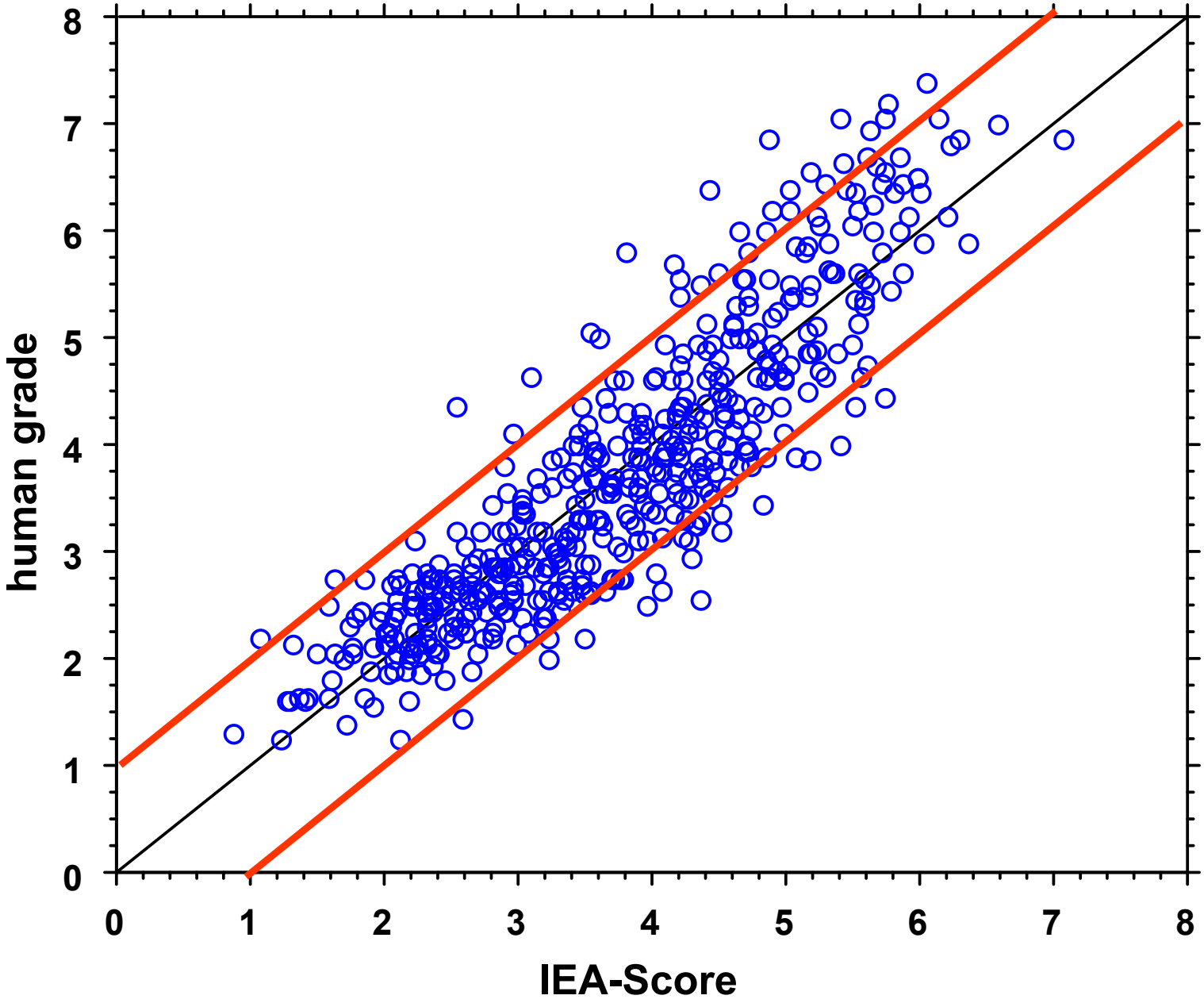
IEA Applications

- **Assessment of Human Grader Consistency—a second reader**
- **Large Scale Standardized Testing**
- **Online Textbook Supplements**
- **Online Learning Integrated into Educational Software: e.g. The Memphis Physics Tutor**

Inter-rater reliability for standardized and classroom tests



Scattergram for Narrative Essays



Testing substantive expository essays and providing substantive feedback

HOLT, RINEHART AND WINSTON

Holt Online Essay Scoring

Prewriting & Writing Tips

Revision Tips

HIGH SCHOOL

Please write about the following persuasive prompt:

Your principal is considering a new grading policy that replaces letter or number grades on report cards with *pass* or *fail*. What is your position concerning this issue? Write a letter to your principal stating your position and supporting it with convincing reasons. Be sure to explain your reasons in detail.

Dear Dr. Newman,
I am writing to you about my thoughts on the new grading policy. I believe that this policy would not be good for the Moravia Hills School System. This new policy would go against everything the students have been taught throughout their years in MH. First of all, we have learned to try our best and to aim for perfection. I believe that we are a school of excellence and are taught to aim for higher than average. I also believe that this would diminish student's determination to succeed. If achieving a passing grade was all that students had to do, then there would be no need to put forth the effort to achieve outstanding grades. This would lower our standards in school and in life. This would greatly reduce Vestavia's

Get Your Score

HOLT, RINEHART AND WINSTON

Holt Online Essay Scoring

Print
Exit

On a 4-point scale, here's your score: 3

3 This response demonstrates competent success with the writing task. For the most part, the essay:

- focuses on a clear thesis or position
- shows effective organization
- offers mostly thoughtful ideas
- provides sufficient support and elaboration, with a mixture of the general and the specific
- exhibits general control of written language, with minor lapses

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Dear Dr. Newman,
I am writing to you about my thoughts on the new grading policy. I believe that this policy would not be good for the Moravia Hills School System. This new policy would go against everything the students have been taught throughout their years in MH. First of all

Holt Online Essay Scoring

Analytic Feedback

Analytic Feedback for Your Essay

Our system has analyzed your essay for five important writing traits:

- Content and Development
- Focus and Organization
- Effective Sentences
- Word Choice
- Grammar, Usage, and Mechanics

Study the statements that describe each trait to help you improve your writing.

Content and Development Your essay shows **limited** ability for this trait. For the most part, the essay:

- uses routine, predictable ideas
- provides limited or uneven elaborations and support of ideas

Focus and Organization Your essay shows **limited** ability for this trait. For the most part, the essay:

- attempts to address the prompt but frequently loses focus
- shows little awareness of audience
- displays basic organization, with noticeable lapses in the logical flow of ideas and few, if any, transitions
- demonstrates minimal unity and completeness

Effective Sentences Your essay shows **competent** ability for this trait. For the most part, the essay:

HOLT, RINEHART AND WINSTON

Holt Online Essay Scoring

Print
Exit

On a 6-point scale, here's your score: 3

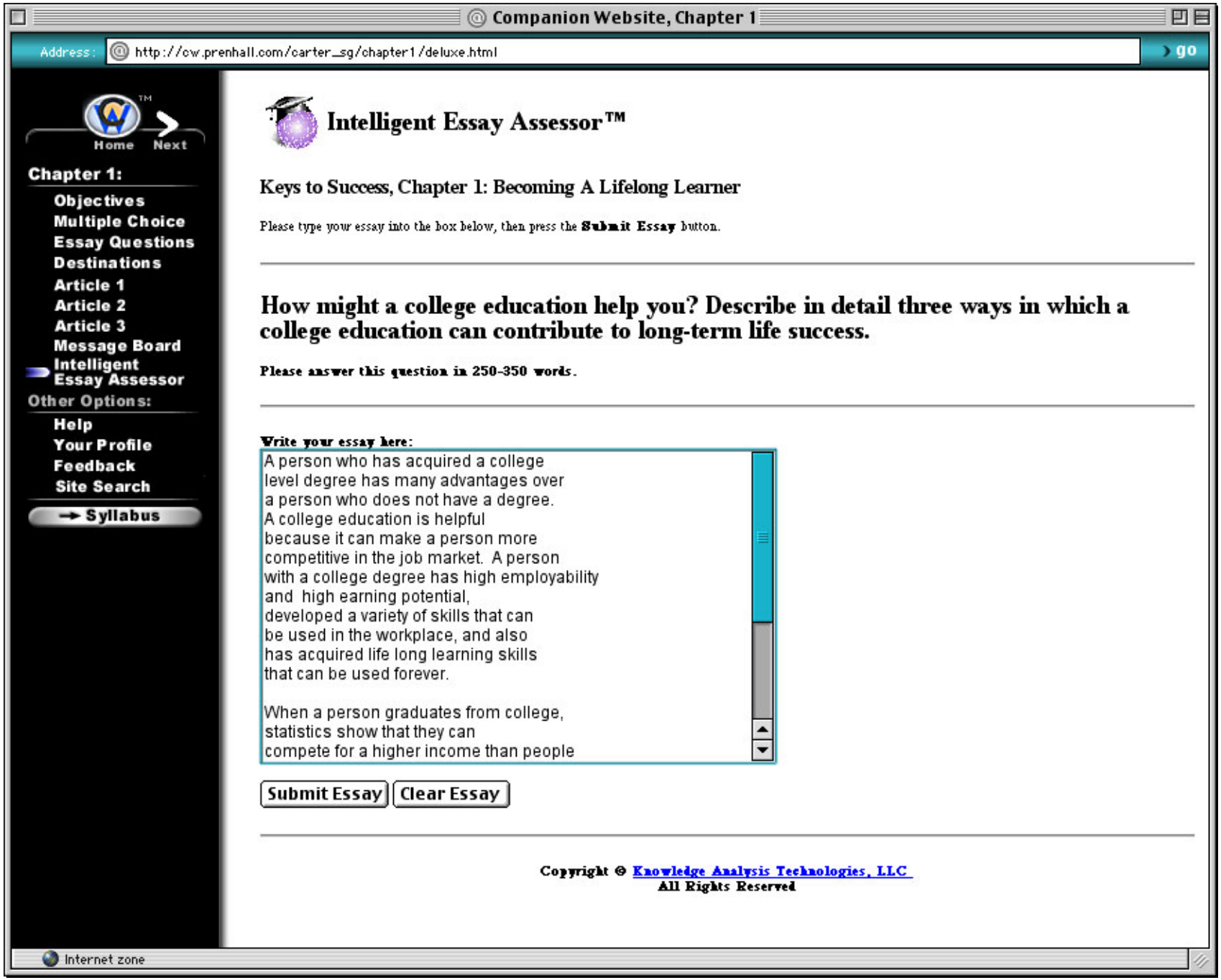
3 The writing is focused but may contain ideas that are loosely connected to the topic. An organizational pattern is demonstrated, but the response may lack a logical progression of ideas. Development of support may be uneven. Word choice is adequate. The response generally follows the conventions of mechanics, usage, punctuation, and spelling.

On a 4-point scale, here are your trait scores:

- Content and Development: 2
- Word Selection: 2
- Effective Sentences: 2
- Focus and Organization: 3
- Grammar, Usage, and Mechanics: 2

Their are a lot of role models of the world. One of my role models is Jackie Chan. He makes great movie, loves to do his own stunts, and has lots of fun in the process. Jackie Chan has a job that you will never get tired of, if you like stuff, like that. The first, time I seen

Prentice Hall Companion Websites



Prentice Hall Companion Websites

Topic	Comments
Education gives you tools for lifelong learning. You learn facts while you are in school, but more importantly, you learn how to think. While some of the facts and figures you learn today may not apply to the world of tomorrow, your ability to think will be useful always, in everything you do.	This is a topic you didn't address.
Education improves your quality of life. Income and employment get a boost from education. The Digest of Education Statistics 1996 reports that income levels rise as educational levels rise. Figure 1-1 shows average income levels for different levels of educational attainment. Figure 1-2, also from a report in the Digest, shows how unemployment rates decrease as educational levels rise.	**You covered this topic well.**
Education expands your self-concept. As you rise to the challenges of education, you will discover that your capacity for knowledge and personal growth is greater than you imagined. As your abilities grow, so do opportunities to learn and do more in class, on the job, and in your community.	**You addressed this topic, though you might have said more.**
Education enlarges your possibilities. Education gives you a base of choices and increased power, as shown in Figure 1-3. First, through different courses of study, it introduces you to more choices of career and life goals. Second, through the training you receive, it gives you more power to achieve the goals you choose. For example, while taking a writing class, you may learn about careers in journalism. This experience may lead you to take a class in journalistic writing that teaches you about reporting. Down the road, you may decide to work on a newspaper and to make journalism your career. Looking back, you realize that two classes you took in college changed the course of your life.	This is a topic you didn't address.
Education improves your employability and earning potential. Learning additional skills raises your competency so you can fulfill the requirements of higher-level jobs. In addition, having a college degree makes an impression on potential employers and makes you eligible for higher-salaried positions.	**You covered this topic well.**
Education makes you a well-rounded person. As it widens your understanding about what is possible in the world, education increases your awareness and appreciation of areas that affect and enrich human lives, such as music, art, literature, science, politics, and economics.	**You addressed this topic, though you might have said more.**
Education affects both community involvement and personal health. Education helps to prepare individuals for community activism by helping them understand political, economic, and social conditions. Education also increases knowledge about health behaviors and preventive care. The more education you have, the more likely you are to practice healthy habits in your daily life and to make informed decisions.	**You addressed this topic, though you might have said more.**

Student Plagiarism Detected by the Intelligent Essay Assessor™

The example is one of 7 actual cases of plagiarism detected in a recent assignment at a major university scored by IEA.

- There were 520 student essays total.
- For a reader to detect the plagiarism 134,940 essay-to-essay comparisons would have to be made.
- In this case, both essays were scored by the same reader and the plagiarism went undetected.

An example of plagiarism

MAINFRAMES

Mainframes are primarily referred to large computers with rapid, advanced processing capabilities that can execute and perform tasks equivalent to many Personal Computers (PCs) machines networked together. It is characterized with high quantity Random Access Memory (RAM), very large secondary storage devices, and high-speed processors to cater for the needs of the computers under its service.

Consisting of advanced components, mainframes have the capability of running multiple large applications required by many and most enterprises and organizations. This is one of its advantages. Mainframes are also suitable to cater for those applications (programs) or files that are of very high demand by its users (clients). Examples of such organizations and enterprises using mainframes are online shopping websites such as Ebay, Amazon, and computing-giant

MAINFRAMES

Mainframes usually are referred those computers with fast, advanced processing capabilities that could perform by itself tasks that may require a lot of Personal Computers (PC) Machines. Usually mainframes would have lots of RAMs, very large secondary storage devices, and very fast processors to cater for the needs of those computers under its service.

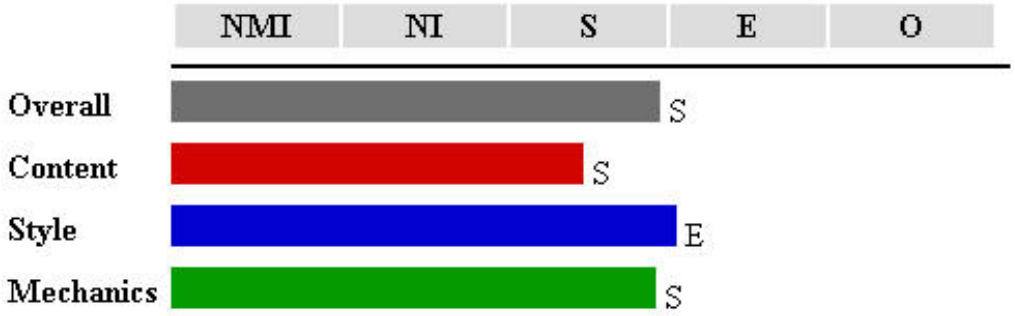
Due to the advanced components mainframes have, these computers have the capability of running multiple large applications required by most enterprises, which is one of its advantage. Mainframes are also suitable to cater for those applications or files that are of very large demand by its users (clients). Examples of these include the large online shopping websites -i.e. : Ebay, Amazon, Microsoft, etc.

Intelligent Essay Assessor| - Netscape

File Edit View Go Communicator Help

Intelligent Essay Assessor™ Scoring Results

Results Summary



Results Detail

Assessment Type	Feedback
Reading Level:	Most memos on this topic demonstrate a reading level between 11.7 and 14.4. Yours is a 14.47.
Overall Format:	There were some formatting problems with your memo. The following items need improvement: • Distribution • Addressee
Component Format:	Extraneous section: Assistance Requested

Component	Feedback	Raw Score (0 - 1)
References:	This section is adequate	0.95
Purpose:	You might consider revising this section	0.26
Background:	You might consider revising this section	0.34
Summary:	You might consider revising this section	0.26
POC:	This section is adequate	0.67

Document: Done

More potential applications:

- Examples from K-A-T products and prototypes

- Automatic “smartening” of courses
- Meta-data tagging assistant
- Naval Library navigator

Individualization by

- aided self-guidance
- system adaptation

- Overcoming vocabulary problem
  - from varying expertise
  - from system and version differences

Advances in basic technologies: LSA

- New large-scaling methods, algorithms, processing clusters: e.g., 500 million token training corpus, containing 2.5 million docs, 725,000 unique words
- To semantic space in ca. 5 hours
  - (Note that with such a large space, retraining is needed only when a great amount of new vocabulary is needed.)
- Response as rapid as desired a matter of hardware.

A working prototype: The Naval Knowledge Navigator

File Help

- ch320
  - 320 ELECTRIC POWER DISTRIBUTION SYSTEMS
    - 1. DESCRIPTION OF ELECTRICAL SYSTEMS AND
      - 320-1.1 GENERAL
      - 320-1.2 ALTERNATING CURRENT DISTRIBU
        - 320-1.2.1 VOLTAGE, PHASE, AND FRE
          - 320-1.2.1.1 System Grounding.
          - 320-1.2.1.2 Types of Power.
          - 320-1.2.1.3 Special Power Types.
          - 320-1.2.1.4 Key Power Character
          - 320-1.2.1.5 Power Interruption.
          - 320-1.2.1.6 Phase Loading.
        - 320-1.2.2 SHIP SERVICE DISTRIBUTIO
        - 320-1.2.3 EMERGENCY DISTRIBUTION
        - 320-1.2.4 SPECIAL FREQUENCY POWE
          - 320-1.2.4.1 Aircraft Starting and
        - 320-1.2.5 LIGHTING SYSTEM.
        - 320-1.2.6 SHORE POWER.
        - 320-1.2.7 ALONGSIDE POWER.
        - 320-1.2.8 CASUALTY POWER.
      - 320-1.3 POWER PLANT RELIABILITY.
        - 320-1.3.1 GENERAL.
        - 320-1.3.2 NORMAL AND ALTERNATE
        - 320-1.3.3 LOAD SHEDDING SYSTEMS.
        - 320-1.3.4 PLANT RELIABILITY.
        - 320-1.3.5 PROTECTION AGAINST POW
      - 320-1.4 POWER OUTLETS
      - 320-1.5 DIRECT CURRENT DISTRIBUTION
      - 320-1.6 DISTRIBUTION SYSTEM EQUIPME
      - 320-1.7 SYSTEM PROTECTION

Search

Submit Query | Clear

S9086-KY-STM-010/CH-320R2

320-1.2.1.6 Phase Loading. In the original design plans, power and lighting distribution are carefully designed to ensure equal or nearly equal division of the load among the three system phases. Equal division of single-phase loads among the phases should be maintained, as much as possible, whenever lighting or power equipment is relocated or added. Imbalance can be corrected by reconnecting single-phase loads in one or more local distribution panels or boxes from heavily loaded phases to those that are less heavily used. When loads are shifted to other phases, ensure that loads that are required to remain on the same phase as another component (such as syn-chro reference leads) are also shifted.

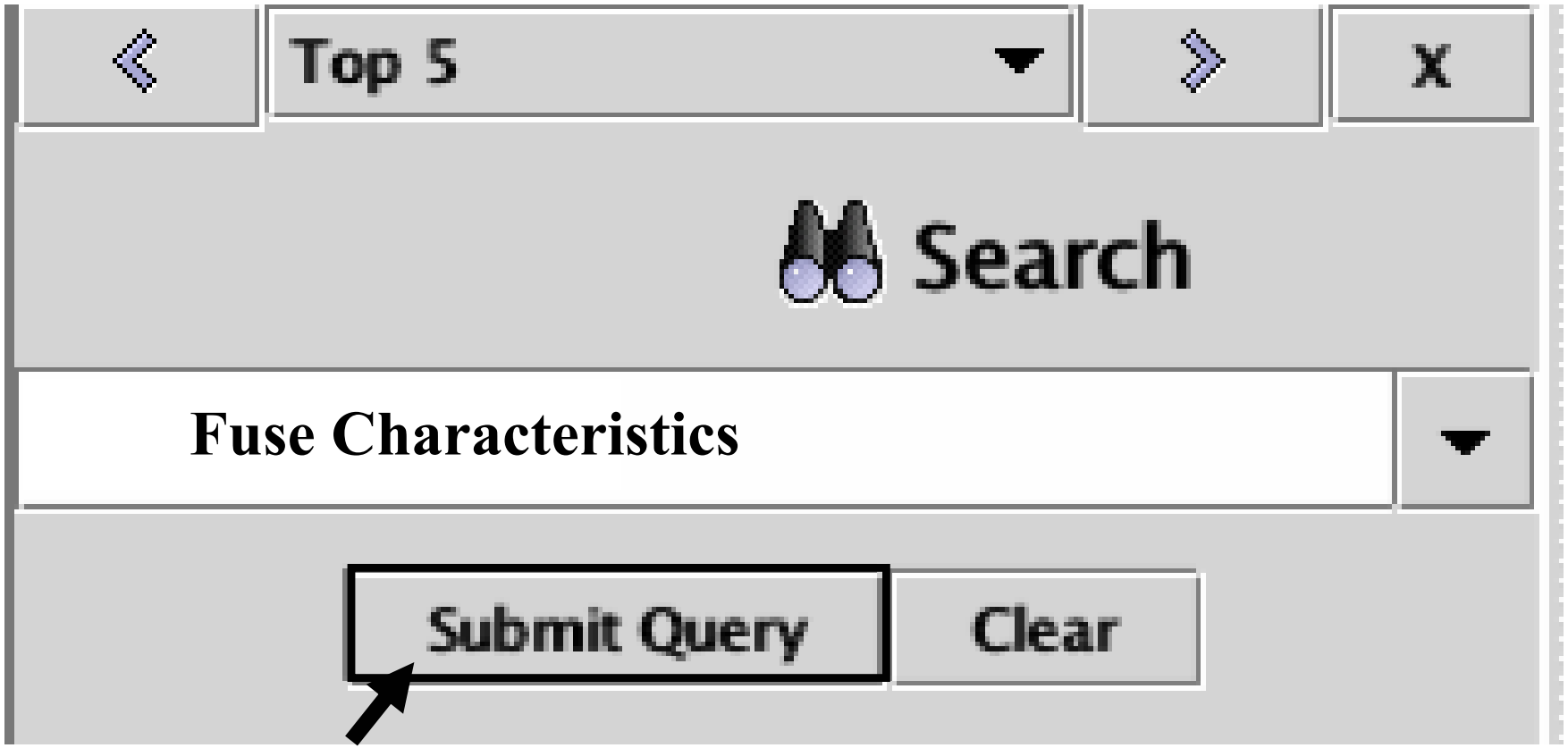
320-1.2.2 SHIP SERVICE DISTRIBUTION SYSTEM. Most ship service power distribution systems are either radial or combination radial and zonal systems. Power flows outward from the switchboards to the loads either directly or through load centers and power distribution panels. In a radial system, each load is connected to only one switchboard at any one time. Figure 320-1-1 and Figure 320-1-2 illustrate the distribution systems for typical combatant ships. Figure 320-1-3 illustrates a combined radial and zonal distribution system. The major components distributing power from the generating sources to the individual loads are described as follows:

a. Ship Service Switchboards. Switchboards provide a point of connection for ship service generators and local generator controls. They are the starting points of the distribution system, feeding power directly to large and vital loads (such as steering gear) and supplying power to load centers and power panels for further distribution to loads. The number and location of ship service switchboards depends on the main machinery compartmentation, as well as the number and location of the ship service generators. Switchboards are usually located near the generators they serve and are spread as far apart as possible to minimize the possibility of a single casualty damaging more than one

document retrieved.

(such as a fire pump), tripping a generator off-line, or operating a circuit breaker to clear a fault can result in system voltages or frequencies that are outside the normal tolerances. However, power generators' governors and voltage regulators respond to these large system changes and restore voltage and frequency to normal values within approximately 2 seconds (within 0.25 second for type III power systems). Wider voltage and frequency tolerances are allowed during the transient condition, provided values return to the normal tolerance limits within the specified recovery time.

320-1.2.1.5 Power Interruption. From time to time, electric power will be interrupted. These interruptions can occur because of a loss of the power source, power system fault or user equipment casualty, training exercise, system test, or operator error. Power interruptions can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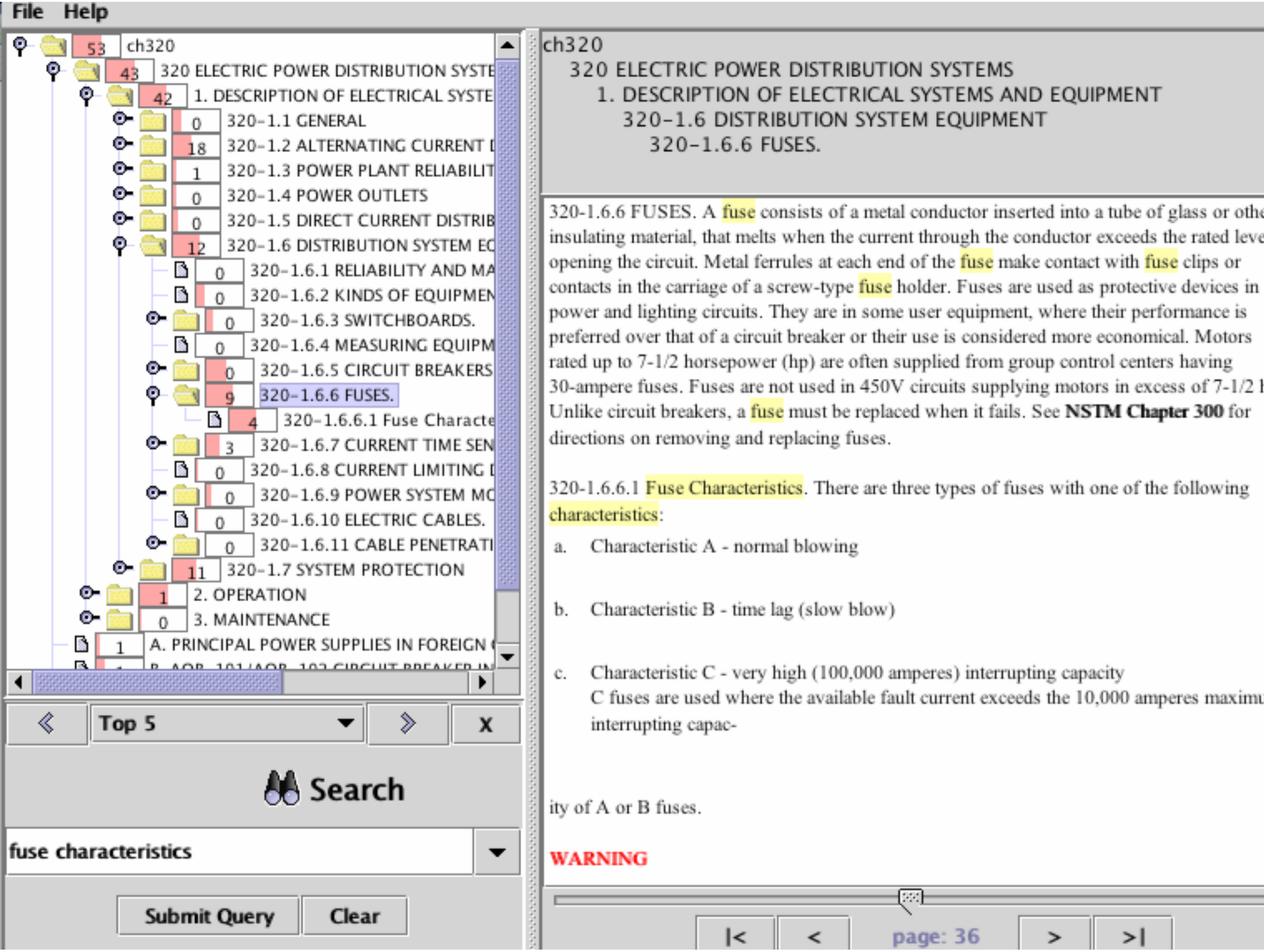
File Help
53 ch320
43 320 ELECTRIC POWER DISTRIBUTION SYSTE
42 1. DESCRIPTION OF ELECTRICAL SYSTE
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0 320-1.6.1 RELIABILITY AND MA
0 320-1.6.2 KINDS OF EQUIPMEN
0 320-1.6.3 SWITCHBOARDS.
0 320-1.6.4 MEASURING EQUIPM
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4 320-1.6.6.1 Fuse Characte
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0 320-1.6.9 POWER SYSTEM MC
0 320-1.6.10 ELECTRIC CABLES.
0 320-1.6.11 CABLE PENETRATI
11 320-1.7 SYSTEM PROTECTION
1 2. OPERATION
0 3. MAINTENANCE
1 A. PRINCIPAL POWER SUPPLIES IN FOREIGN
Top 5
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fuse characteristics
Submit Query
Clear
ch320
320 ELECTRIC POWER DISTRIBUTION SYSTEMS
1. DESCRIPTION OF ELECTRICAL SYSTEMS AND EQUIPMENT
320-1.6 DISTRIBUTION SYSTEM EQUIPMENT
320-1.6.6 FUSES.
320-1.6.6 FUSES. A fuse consists of a metal conductor inserted into a tube of glass or othe
insulating material, that melts when the current through the conductor exceeds the rated leve
opening the circuit. Metal ferrules at each end of the fuse make contact with fuse clips or
contacts in the carriage of a screw-type fuse holder. Fuses are used as protective devices in
power and lighting circuits. They are in some user equipment, where their performance is
preferred over that of a circuit breaker or their use is considered more economical. Motors
rated up to 7-1/2 horsepower (hp) are often supplied from group control centers having
30-ampere fuses. Fuses are not used in 450V circuits supplying motors in excess of 7-1/2 h
Unlike circuit breakers, a fuse must be replaced when it fails. See NSTM Chapter 300 for
directions on removing and replacing fuses.
320-1.6.6.1 Fuse Characteristics. There are three types of fuses with one of the following
characteristics:
a. Characteristic A - normal blowing
b. Characteristic B - time lag (slow blow)
c. Characteristic C - very high (100,000 amperes) interrupting capacity
C fuses are used where the available fault current exceeds the 10,000 amperes maximu
interrupting capac-
ity of A or B fuses.
WARNING
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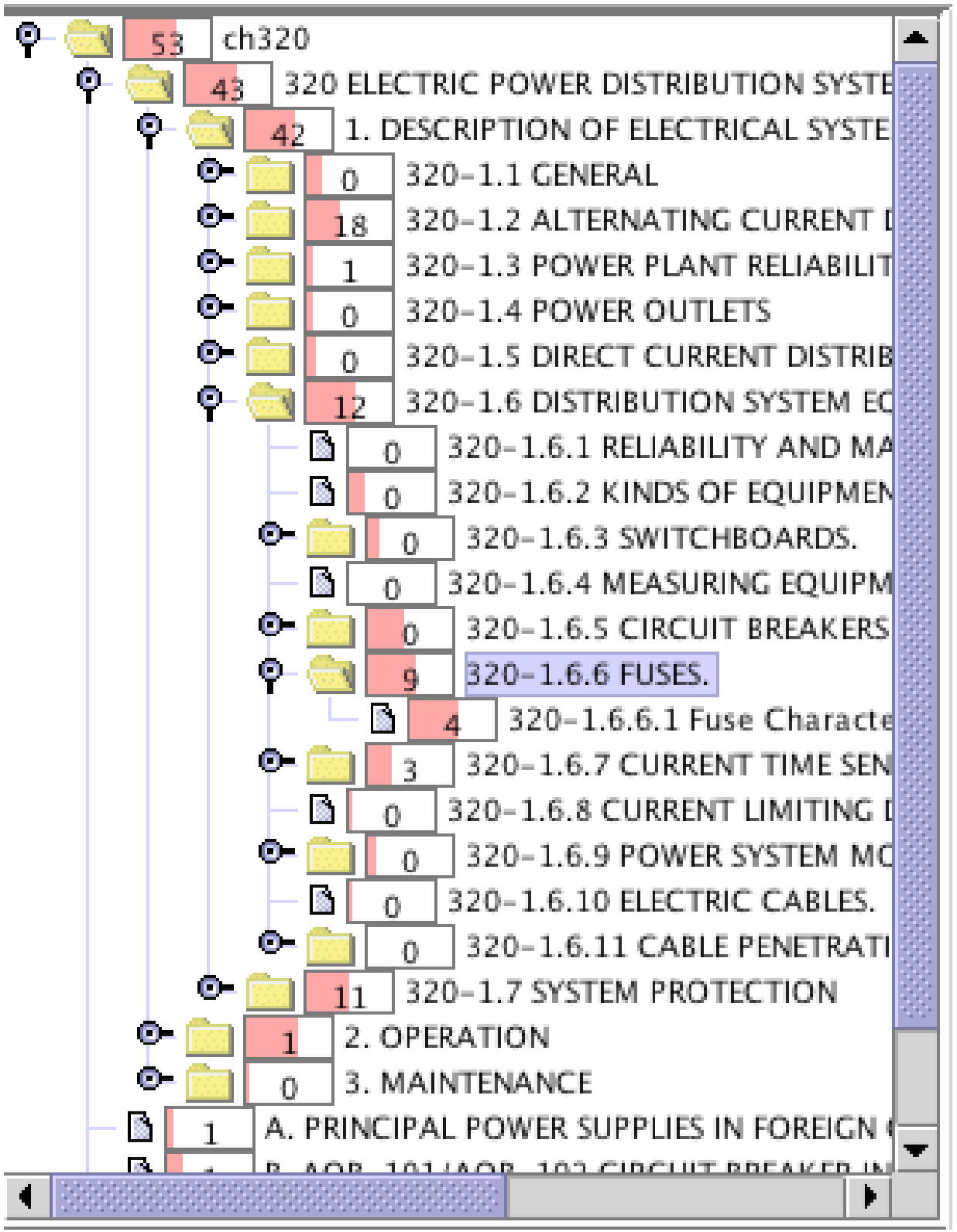
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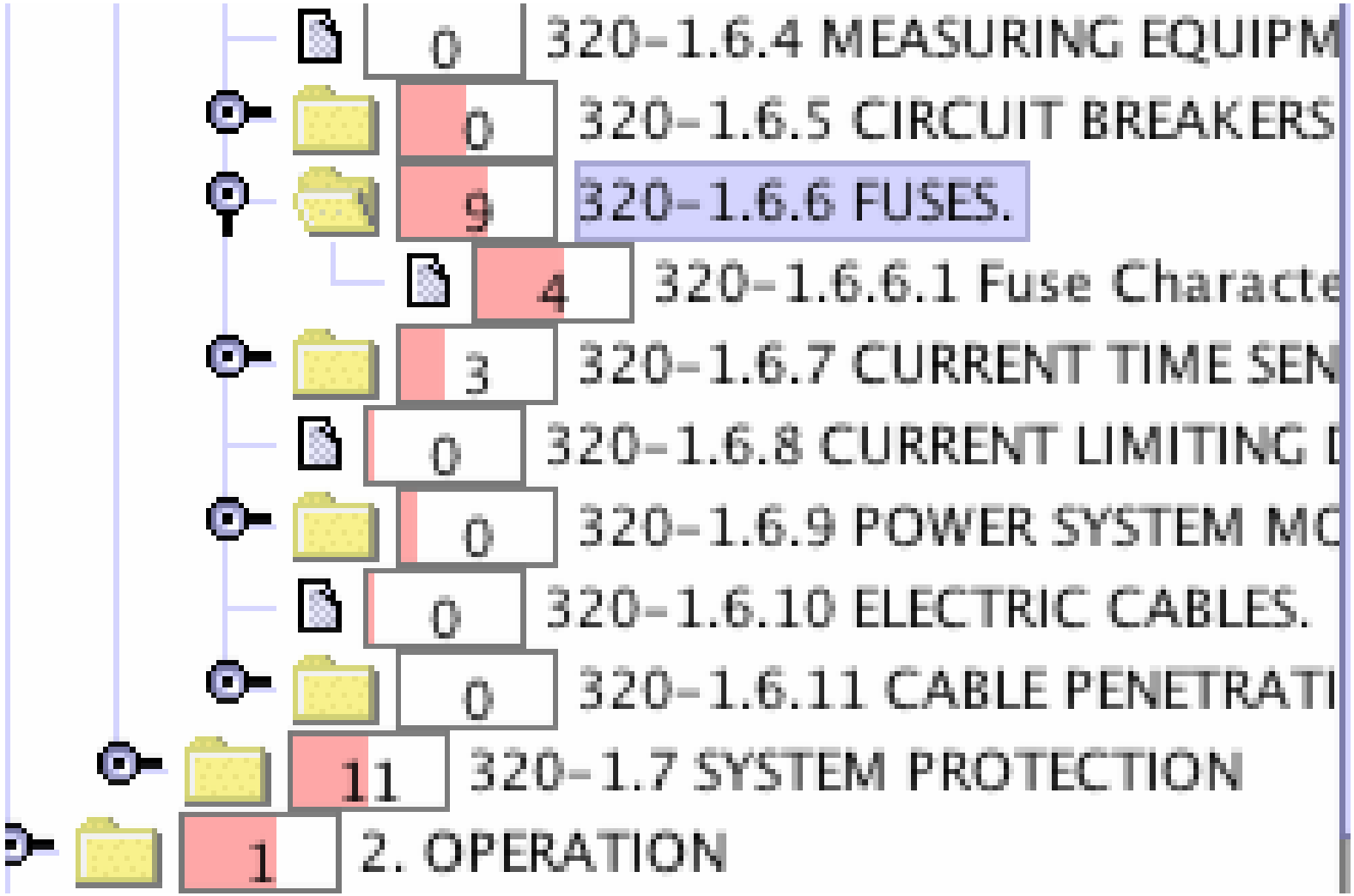
0 320-1.6.2 KINDS OF EQUIPMEN
0 320-1.6.3 SWITCHBOARDS.
0 320-1.6.4 MEASURING EQUIPM
0 320-1.6.5 CIRCUIT BREAKERS
9 320-1.6.6 FUSES.
4 320-1.6.6.1 Fuse Characte
3 320-1.6.7 CURRENT TIME SEN
0 320-1.6.8 CURRENT LIMITING D
0 320-1.6.9 POWER SYSTEM MC
0 320-1.6.10 ELECTRIC CABLES.
0 320-1.6.11 CABLE PENETRATI
11 320-1.7 SYSTEM PROTECTION
1 2. OPERATION
0 3. MAINTENANCE
1 A. PRINCIPAL POWER SUPPLIES IN FOREIGN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320-1.6.4 MEASURING EQUIPM
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320-1.6.5 CIRCUIT BREAKERS
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320-1.6.6 FUSES.
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320-1.6.6.1 Fuse Characte
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320-1.6.7 CURRENT TIME SEN
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320-1.6.8 CURRENT LIMITING
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320-1.6.9 POWER SYSTEM MC
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320-1.6.10 ELECTRIC CABLES.
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320-1.6.11 CABLE PENETRATI
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320-1.7 SYSTEM PROTECTION
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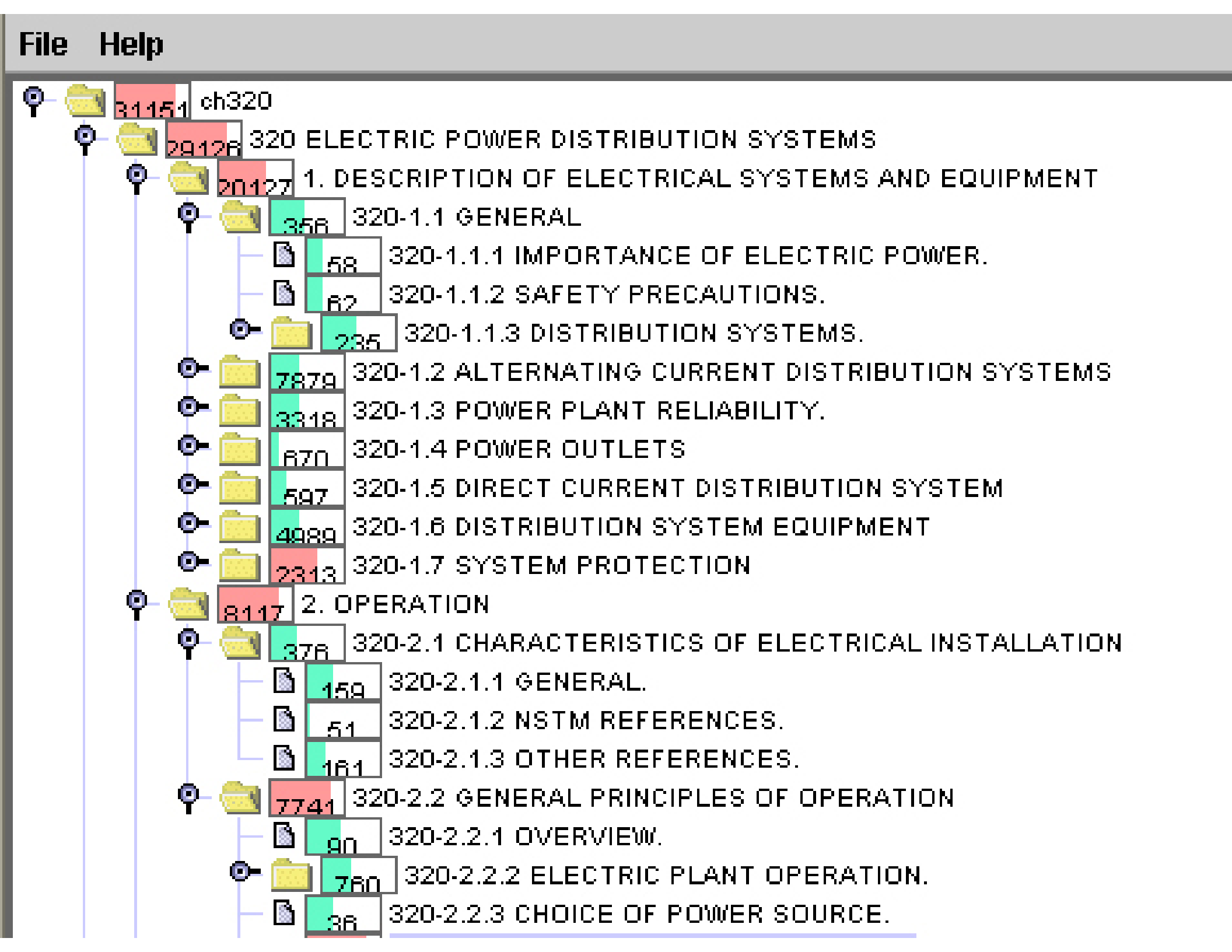
2. OPERATION

File Help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29128 320 ELECTRIC POWER DISTRIBUTION SYSTEMS
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36 320-2.2.3 CHOICE OF POWER SOURCE.

SuperManual Concept Demo

Return to main demo page

POWER PLANT - REMOVAL/ INSTALLATION

- ① Prepare For Removal of PowerPlant
  - Prepare Airplane for Removal of PowerPlant
    - Engine Core Disconnects on the Right Side
      - S 034-221-COO
      - S 034-222-COO
    - Engine Core Disconnects on the left Side
    - Fan Case Disconnects on the left Side
    - Fan Case Disconnects on the Right Side
- Power Plant Removal - Bootstrap Method
  - Install the Bootstrap Equipment
  - ② Remove the Power Plant
- ③ Prepare For the installation of the Power Plant
  - ④ Power Plant installation - Bootstrap Method
  - Prepare for the Power Plant installation
  - Install the Power Plant BIRDSEYE PATH
- Put the Airplane Back To Its Usual Condition
  - Core Area Connections on the left Side
  - Core Area Connections on the Right Side

Search

deactivation of thrust reversers

Reset Submit

Boeing 737 Powerplant removal

Prepare for the installation of the Power Plant

Install the Power Plant

Install the Power Plant

H. Install the Power Plant

S 494-114-COO

(1) If the bootstrap equipment is not already installed, install the bootstrap equipment.

S 494-115-COO

(2) Put the transportation base, with the cradle attached to the engine, below the strut.
(a) Move the transportation base/cradle assembly/power plant in front of the strut and move it rearward until it is below the strut.

S 494-068-COO

(3) Attach the inboard and outboard forward cradle mounts to the cradle (Fig. 413).
(a) Use the four ball lock pins.

StandardSeeker/aka Metadata tagging aid

Match

Problem statements, Textbook content,

Learning objects…

to:

Published standards, learning objectives, …

Auto-autodidact/ Repository, information tracker

Knowledge Post

- Read notes including vignette description
- Respond to vignette and notes of others
- Search for semantically similar notes
- Receive feedback on contributions
- Search large libraries

LSA in Knowledge Post

- Corpus of Army documents plus general English
- Semantic space of 89K passages and 118K words
- Related Notes: closeness in semantic space
- Summary: sentence most similar to all others

TLAC Vignettes

- Think Like a Commander
  - Developed by ARI Ft. Leavenworth
  - Teach tactical and strategic skills

Trouble in McLouth: *A large group of refugees is climbing over and onto a serial of Bradleys and tankers en route to a refueling station. Another serial is approximately 10 minutes behind the first. The news media are present observing the conflict between the Army personnel and the refugees. Commander, how will you think about this?*

Sample Response

I would tell that LT in charge of the city that he needs to take control fire shots in the air, get the mob of people to back away from the trucks so that he can continue his mission. Send one of his bradley's, a reliable NCO and a team or squad of some sorts that he has just freed up from the mob to go to HWY 92 to try and resolve the issue there. Finally, deal with the press, talk to them its better to talk than to keep quiet.

TLAC Scenario Response

KNOWLEDGE POST

Main Index | Search | Messages | Who's Online | Profile | Logout | Help

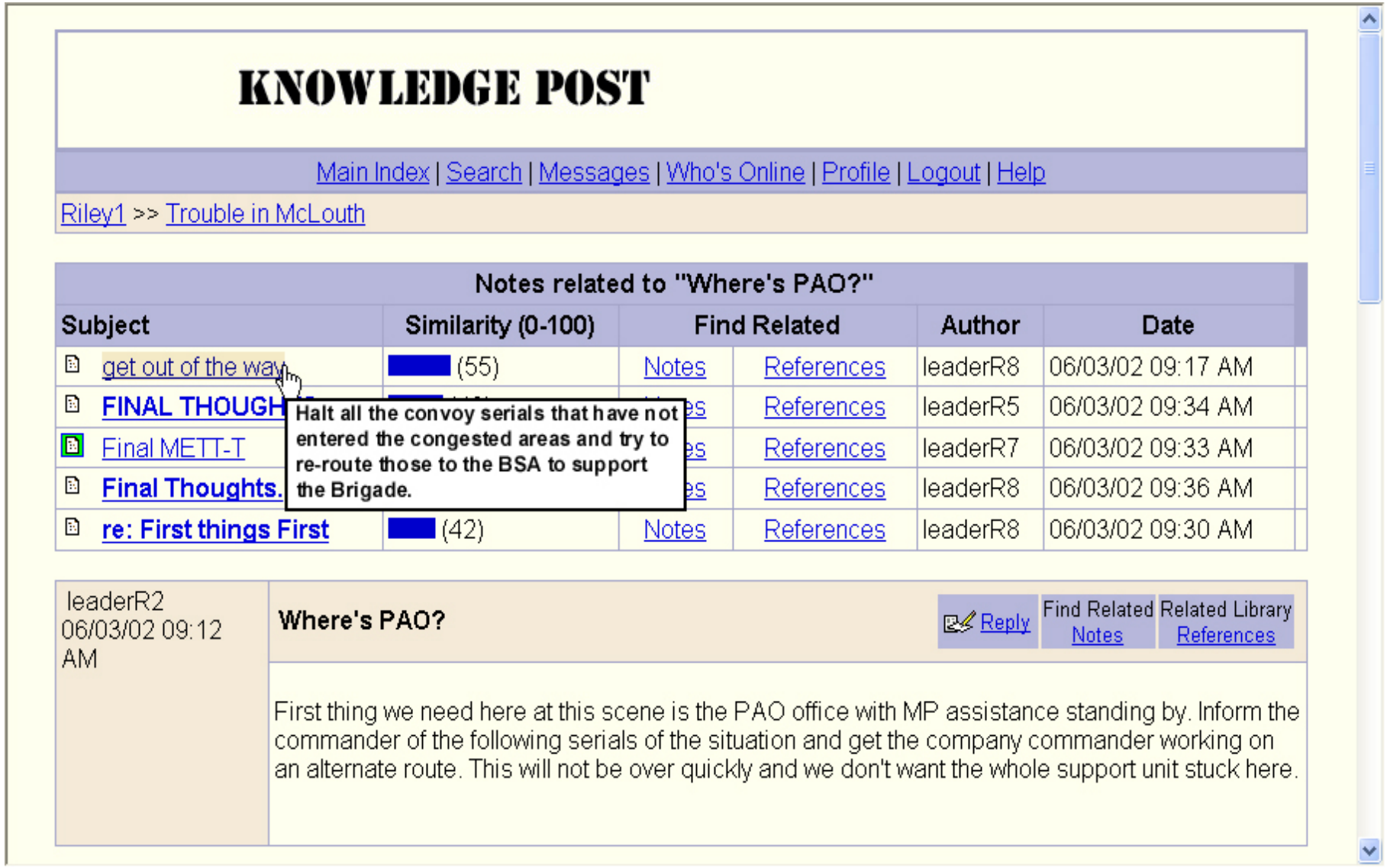
Riley1 >> Trouble in McLouth

leaderR2 06/03/02 09:12 AM	**Where's PAO?** Reply | Find Related Notes | Related Library References
	First thing we need here at this scene is the PAO office with MP assistance standing by. Inform the commander of the following serials of the situation and get the company commander working on an alternate route. This will not be over quickly and we don't want the whole support unit stuck here.

Entire thread

Subject	Find Related		Author	Date
Trouble in McLouth	Notes	References	general	05/13/02 08:39 AM
Mob Mentality	Notes	References	leaderR5	06/03/02 09:11 AM
correct	Notes	References	leaderR9	06/03/02 09:27 AM
I agree	Notes	References	leaderR7	06/03/02 09:29 AM
Where's PAO?	Notes	References	leaderR2	06/03/02 09:12 AM
What next	Notes	References	leaderR5	06/03/02 09:14 AM

Related Notes



IEA in KP

KNOWLEDGE POST

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Riley1 >> Trouble in McLouth

New Note

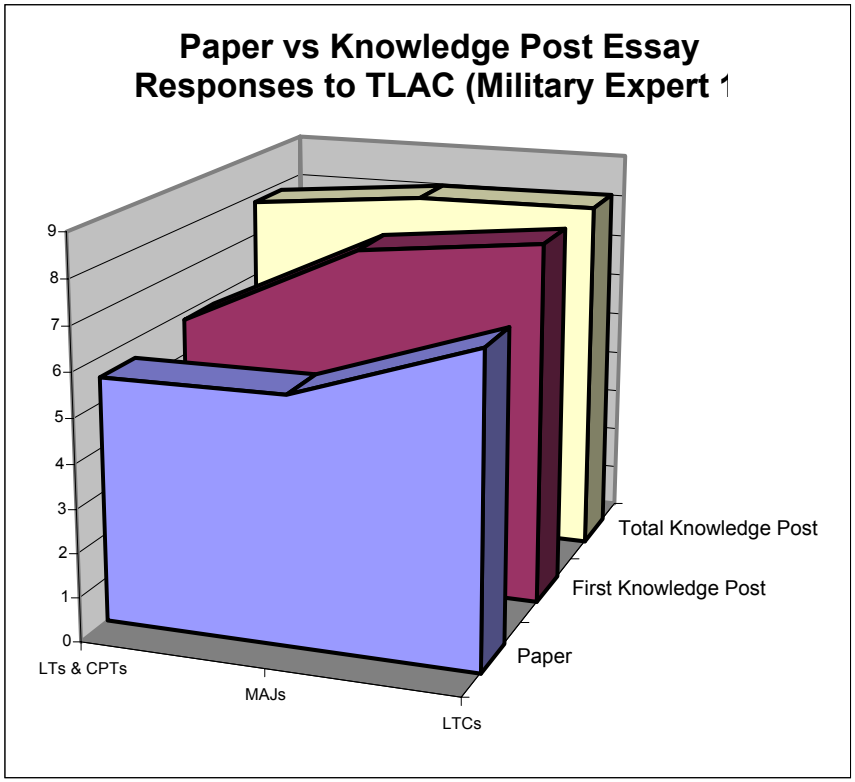
Your contributions to the discussion group rate a score of **Excellent** overall. To improve your score, you might think about the following components and whether or not you've addressed them sufficiently in the contributions you've made to the discussion: **Next Serial**, **Alternate Route**.

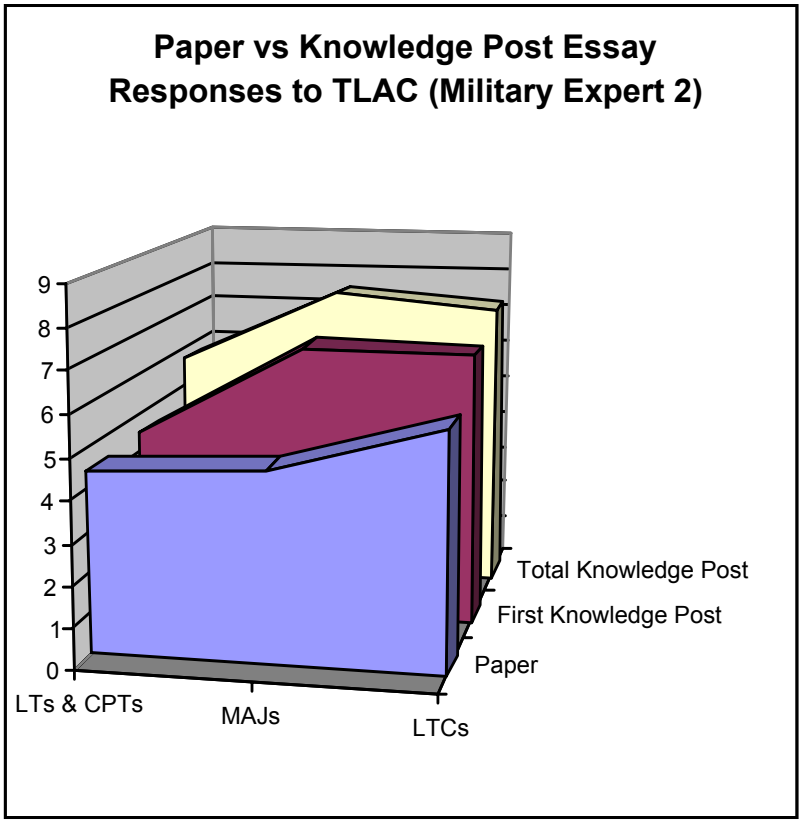
Your Contributions				
Subject	**Find Related**		**Author**	**Date**
Mob Mentality	Notes	References	leaderR5	06/03/02 09:11 AM
What next	Notes	References	leaderR5	06/03/02 09:14 AM
Fixes	Notes	References	leaderR5	06/03/02 09:27 AM
Fixes II	Notes	References	leaderR5	06/03/02 09:31 AM
FINAL THOUGHTS	Notes	References	leaderR5	06/03/02 09:34 AM

KP vs. Paper & Pencil

- Collected responses from over 200 officers at different posts
- Officers' responses graded by two military experts
  - 72 TLAC responses (50% online, 50% paper)
  - 181 TKML responses (30% online, 70% paper)
- Higher quality responses using KP
- Demonstrable learning using KP

TLAC Results





Summary Street

Provides feedback to students writing a summary of a textbook chapter or unit text

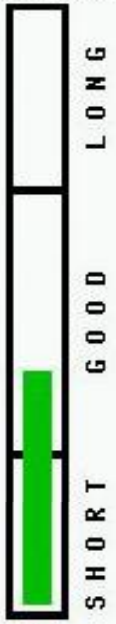
Summary Street

Summary Scoreboard

Good work, Guest Student !
The following sections still need work:

The Nuclear Fuel Cycle : View Text
Nuclear Waste Repositories, Use and Power Plants : View Text
Economics of Nuclear Energy and the Environment : View Text

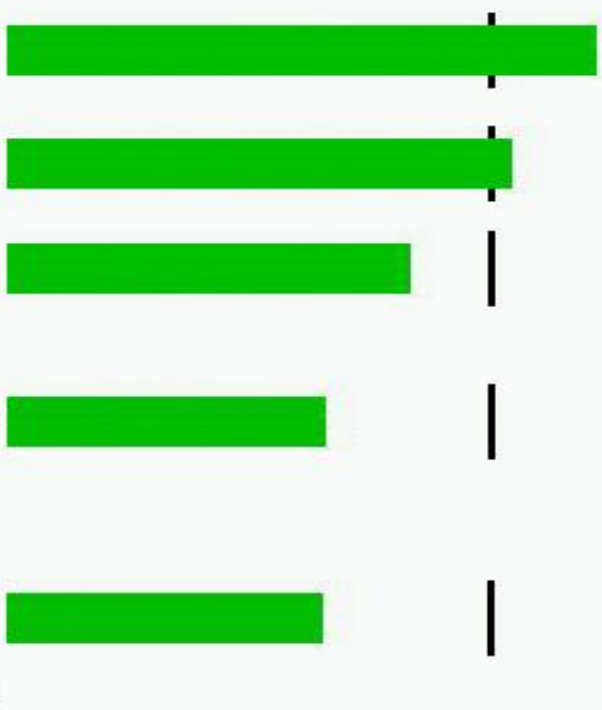
Summary Length



Good length

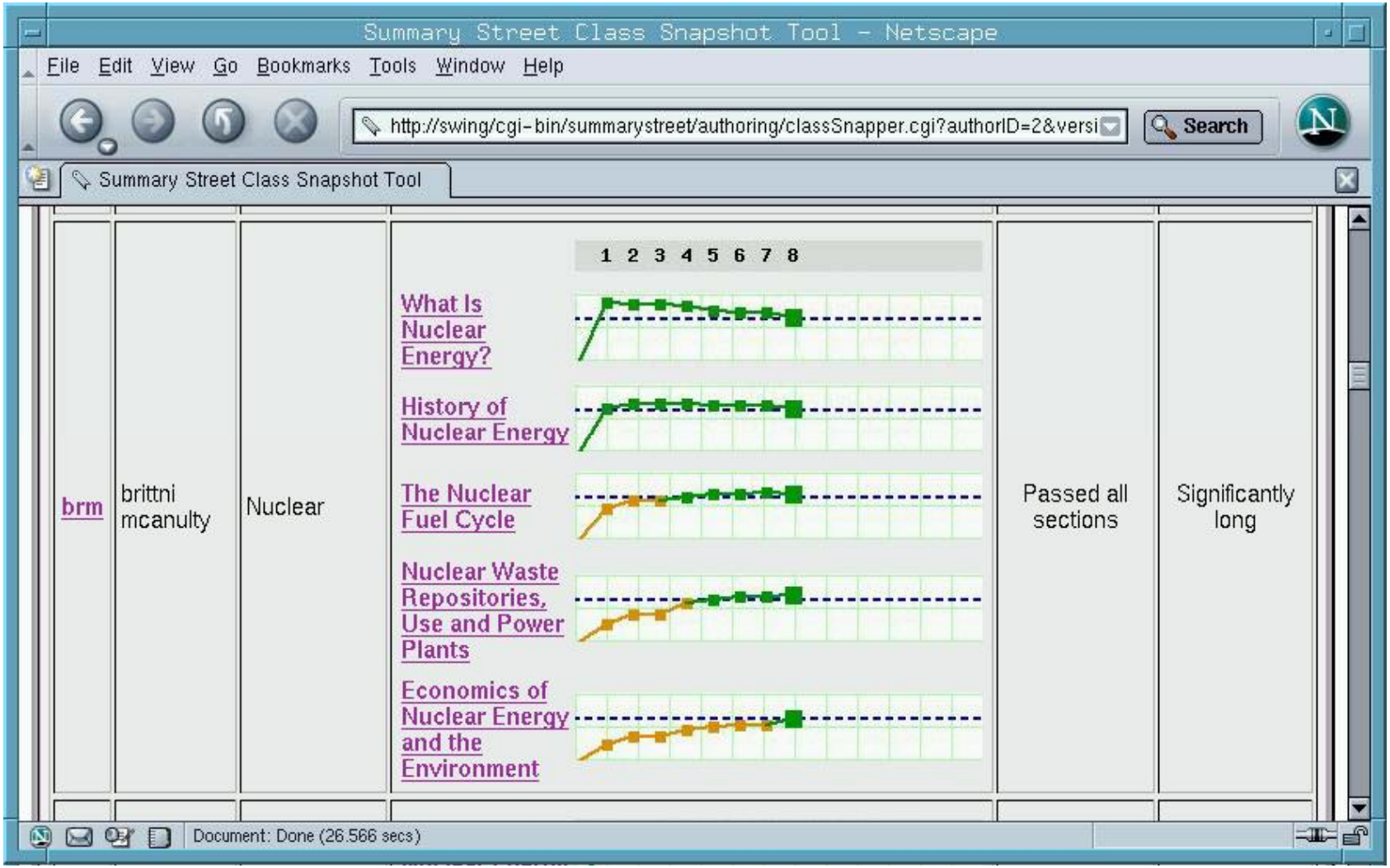
Help on Summary Length

Text Sections



Help on coverage graph

The teacher keeps track of how much and how well the student did:



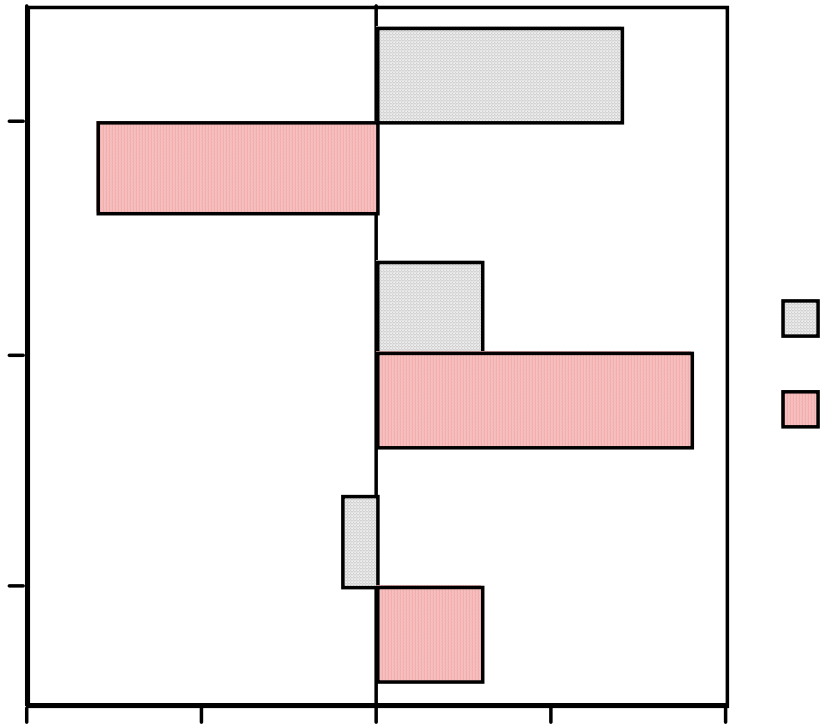
Provides hints about how the summary could be shortened:

- **Sentences are flagged that are very similar in meaning:**
  - **…...*They also wrote books on paper. The books were made from bark paper that they folded together…..***
- **Sentences that appear unrelated to the topic are questioned:**
  - **…..*We also learned about the Incas*…..**

How effective is *Summary Street*?

- **Students write better summaries:**
  - **Time on task is doubled**
  - **Summaries for difficult texts are improved by a whole grade point**

Transfer: 6-week practice in writing summaries improved scores on CSAP test for INFERENCE items but not for OTHER items; for SUMMARY items, only the students using Summary Street showed improvement, but not the students using a word processor with no feedback:



Cross-language information retrieval

Local and foreign businesses alike in Hong Kong have been calling for a trade deal, but the timing of the pact has aroused suspicions among democracy advocates in Hong Kong. Hong Kong's rulers, acting partly at Beijing's behest, are now pushing stringent internal security laws through the territory's Legislative Council. A vote is expected in early July despite considerable public hostility here and large demonstrations against the legislation. In addition, July 1 will be the sixth anniversary of Britain's hand-over of Hong Kong to Chinese rule. Under the hand-over agreement, Hong Kong retained autonomy to negotiate its own trade agreements as a special administrative region of China.

في هون كونغ، كانت الشركات المحلية والعالمية تطالب على السواء باتفاقية تجارية ولكن توقيت الاتفاقية حرك الشكوك لدى مناصري الديموقراطية. وبناء على أمر من بكين، يعمل حكام هون كونغ على اقرار أحكام أمنية داخلية شديدة عبر الهيئة الاقليمية التشريعية. وفي أوائل شهر تموز سوف يصار الى اقتراع ، بالرغم من معارضة شعبية مهمة ومظاهرات عارمة مناهضة لهذا التشريع. ويصادف توقيت الاقتراع مع ذكرى العيد السادس لتسليم السلطات البريطانية هون كونغ للحكم الصيني. بناء على أتفاقية التسليم،تحتفظ هون كونغ باستقلالها في مفاوضة الاتفاقيات التجارية الخاصة بها باعتبارها منطقة ادارية مميزة من الصين.

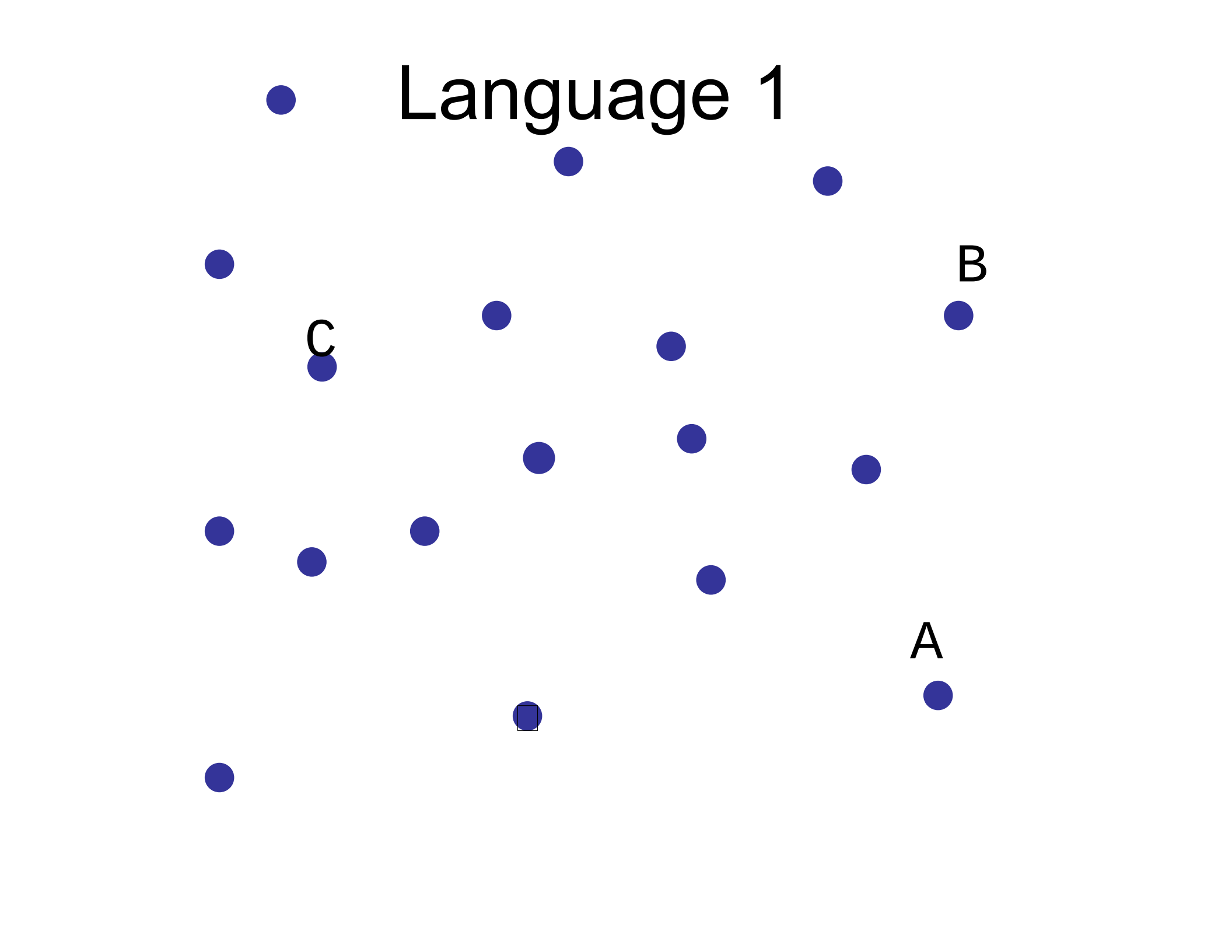
CLASSICAL CL-LSI

- Parallel documents from two languages are concatenated
- The SVD is performed on parallel documents
- Monolingual documents are folded in by averaging the term vectors corresponding to terms in documents

Procrustes CL-LSI

- Two monolingual spaces, one for each language
- Form two matrices of document vectors or term vectors from each space
- Rotation matrix produced from SVD that is the best possible map of document or term vectors from one space to another

- Rapid development of CL systems
  - Chinese CL system developed in 10 person days
  - No need for: parallel corpora, dictionaries, ontologies, grammars, linguists, …


Language 1
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C
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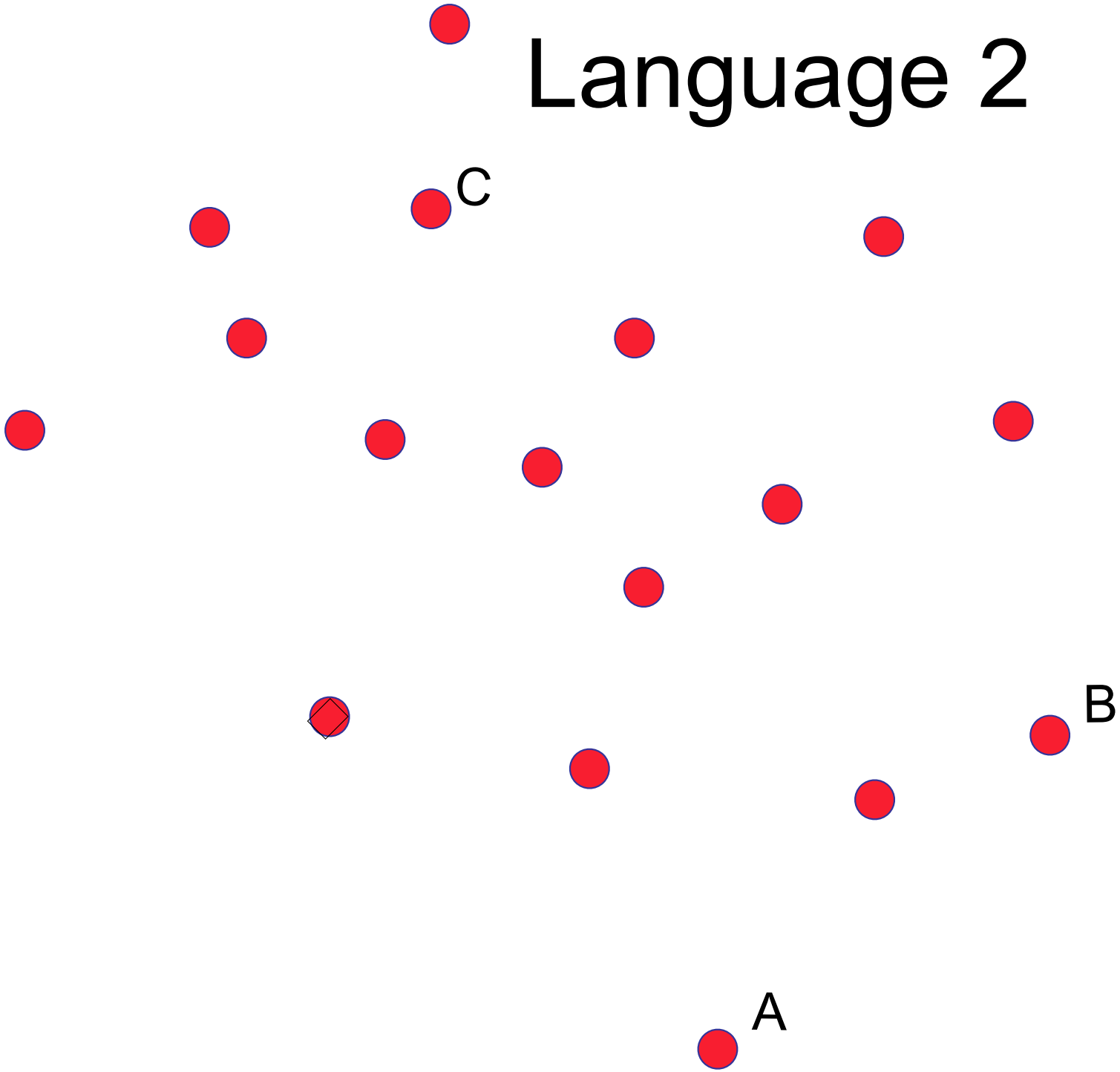
Language 2
C
B
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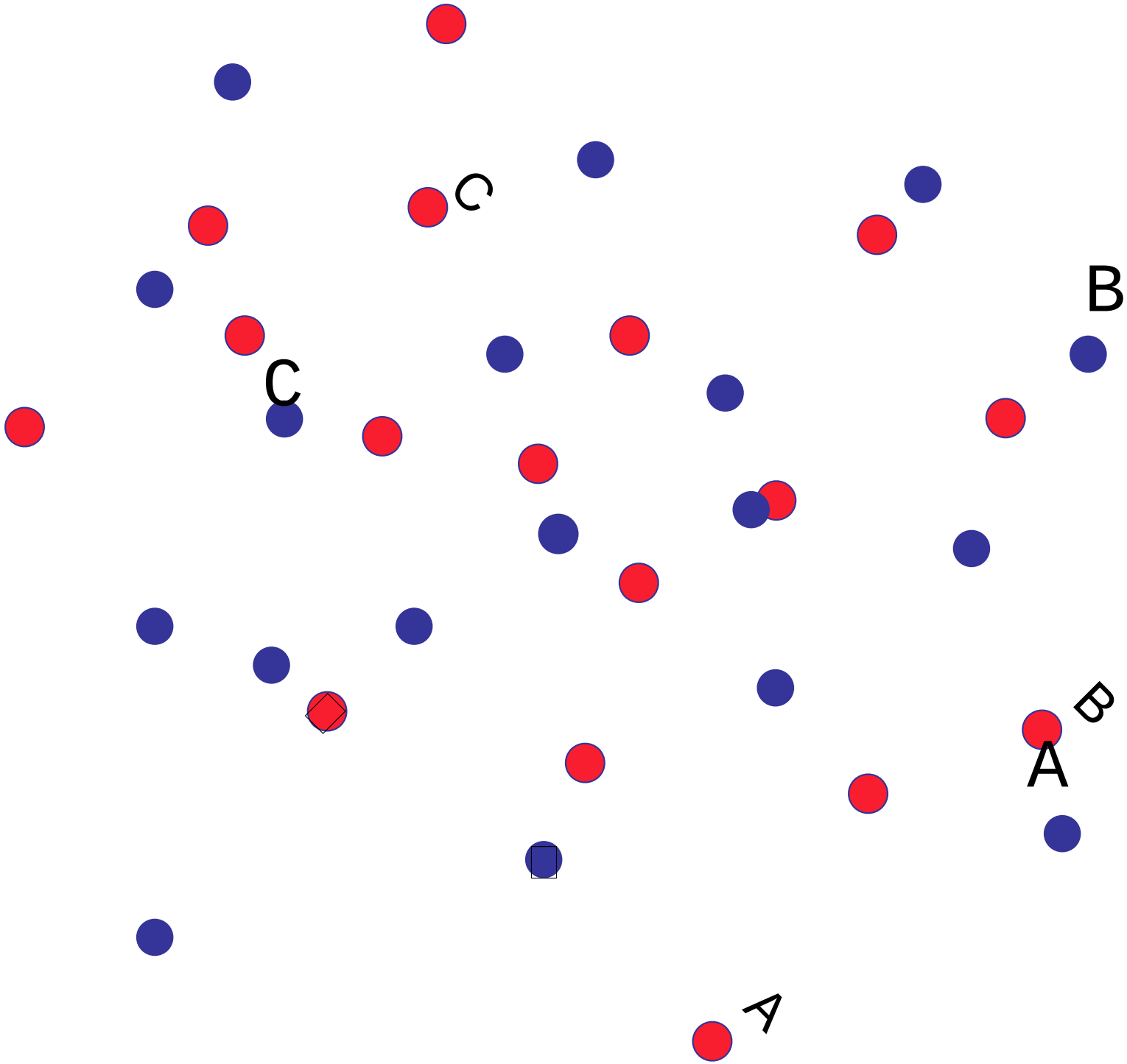
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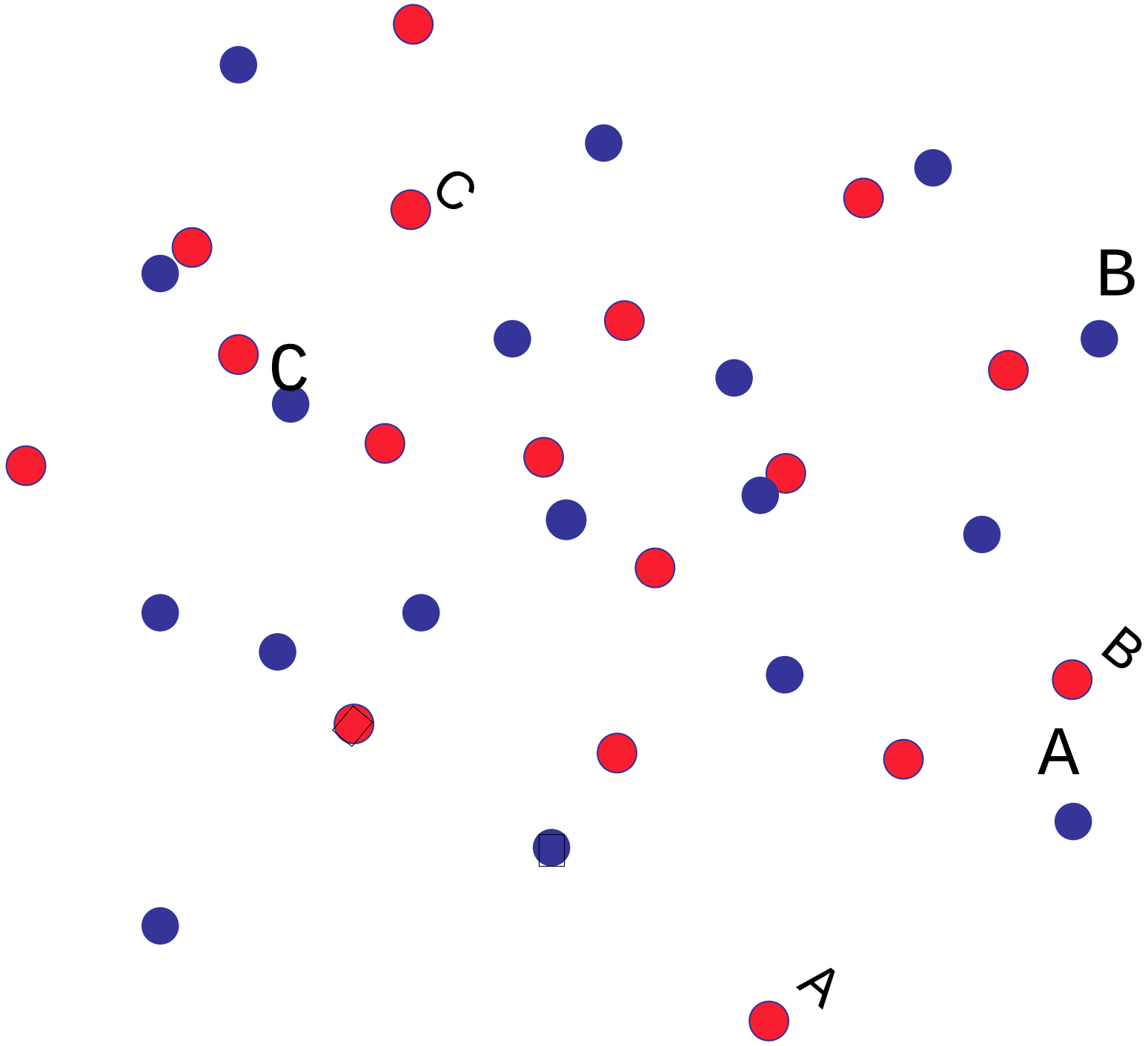
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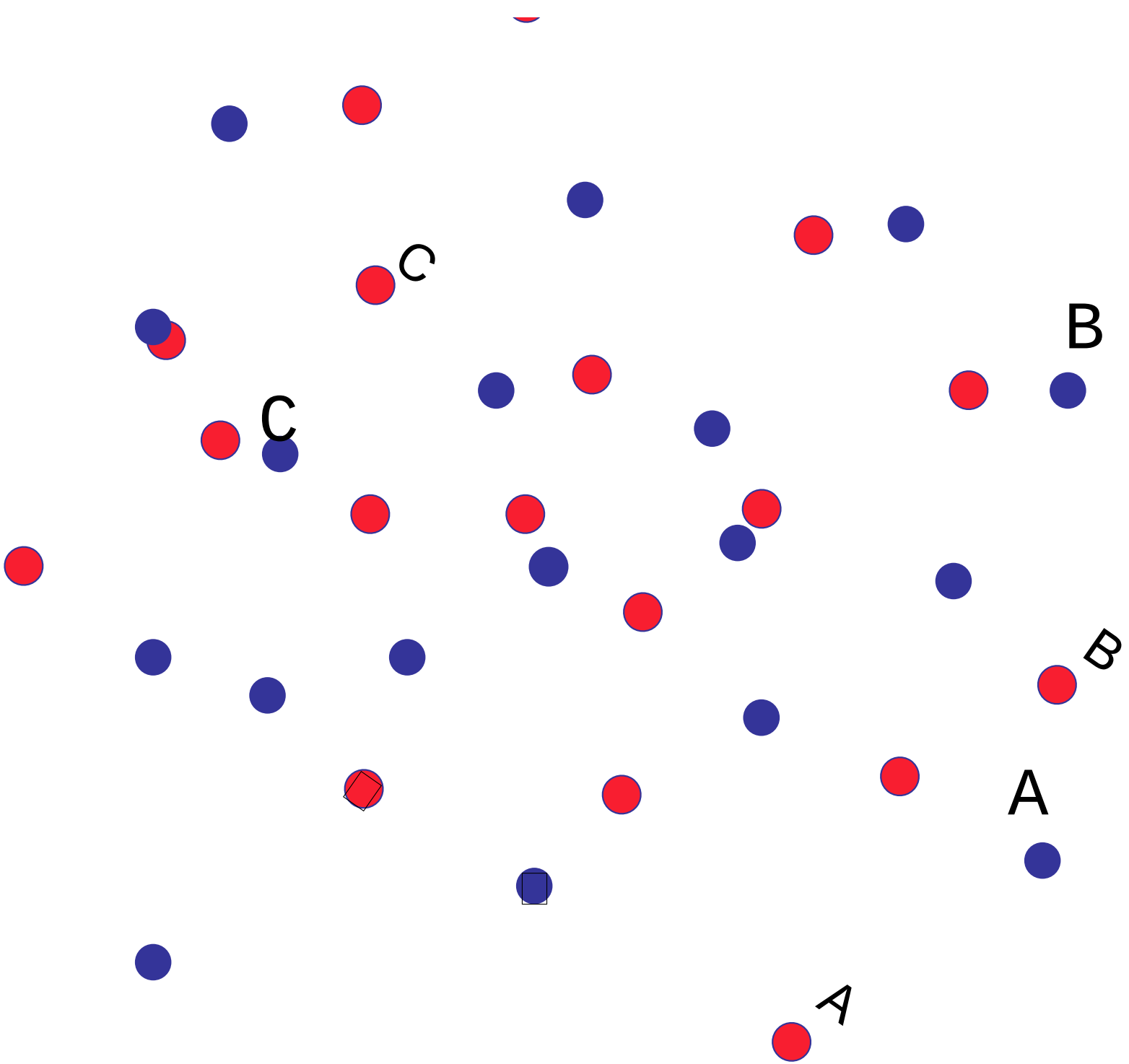
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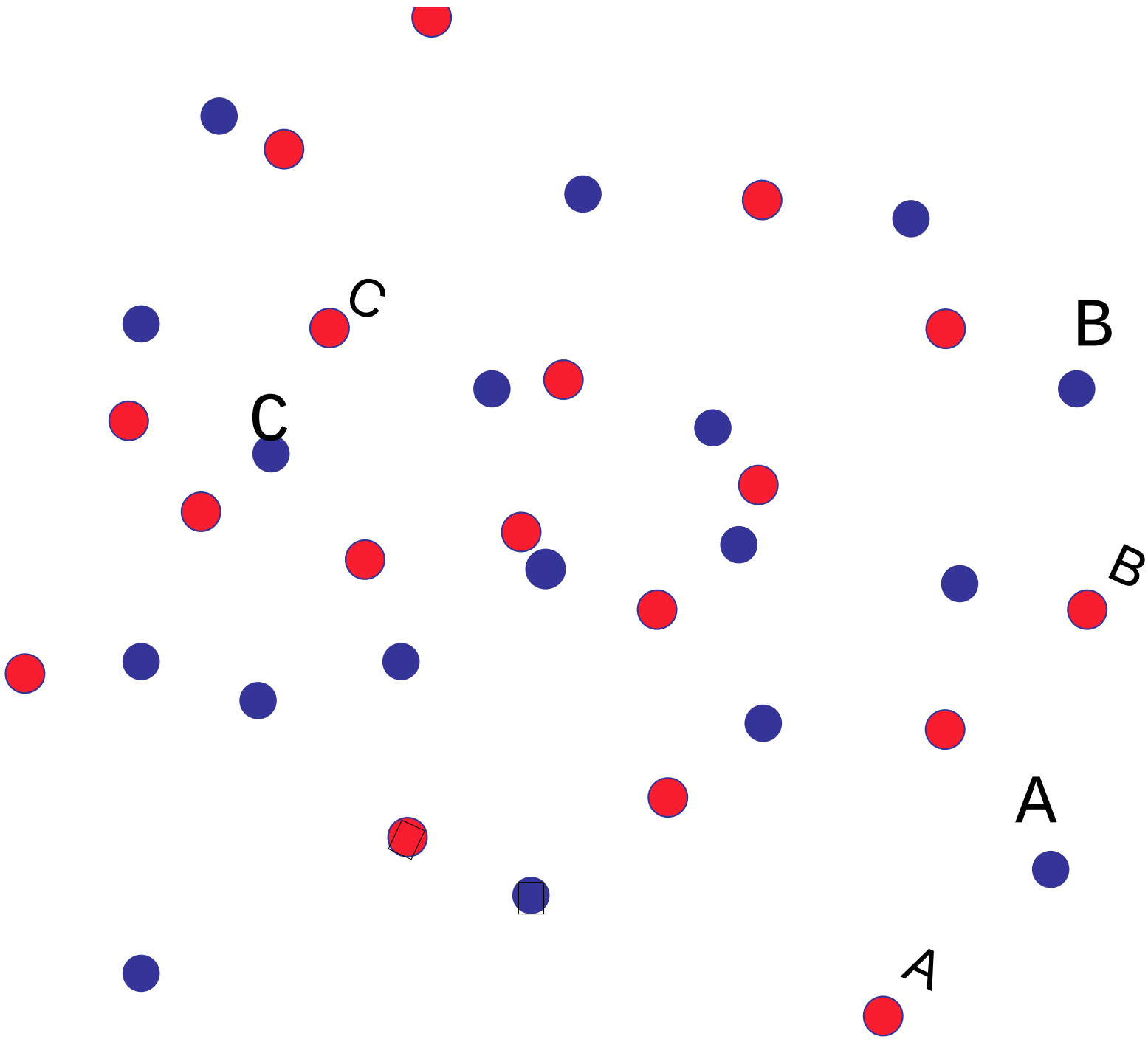
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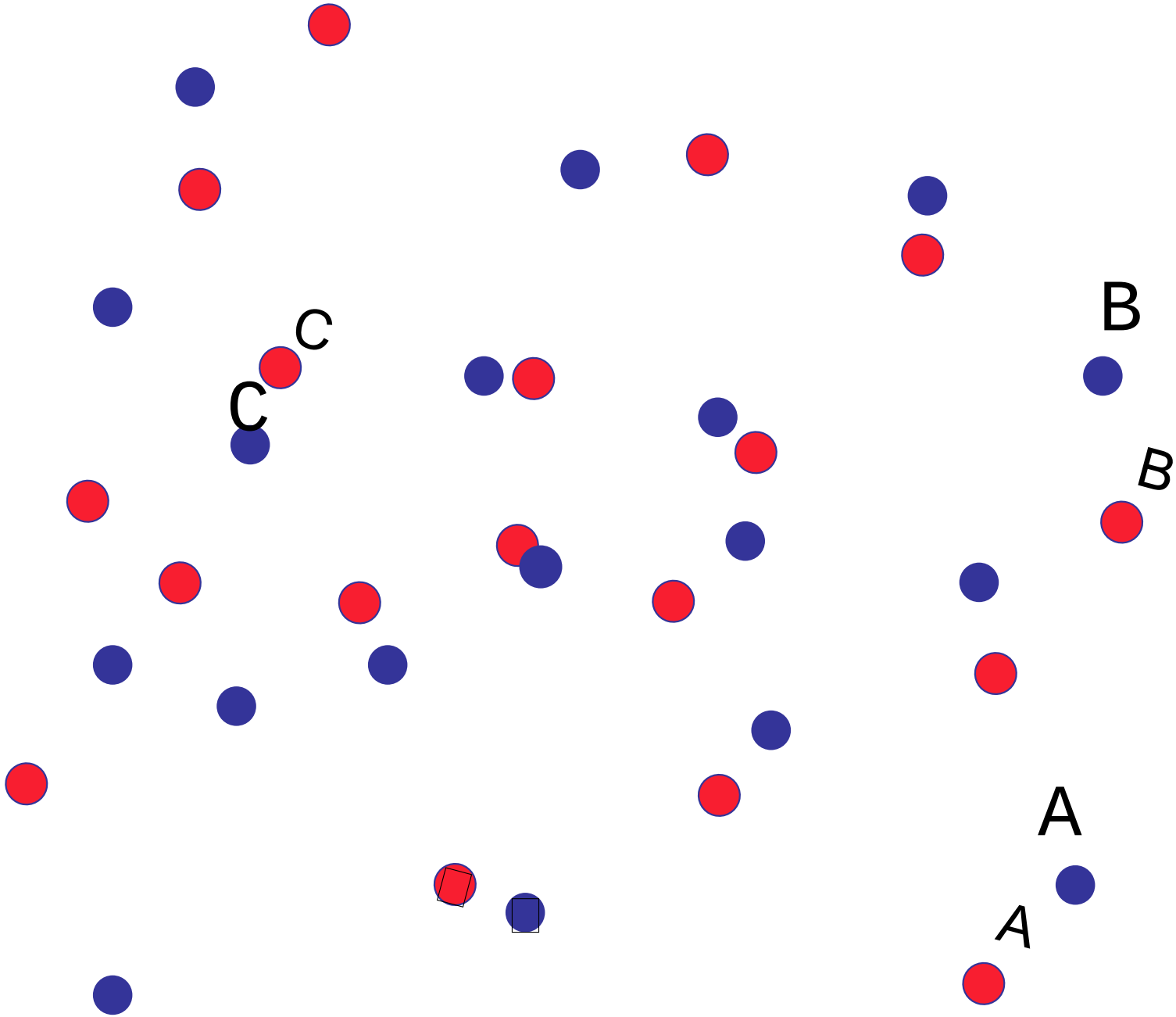
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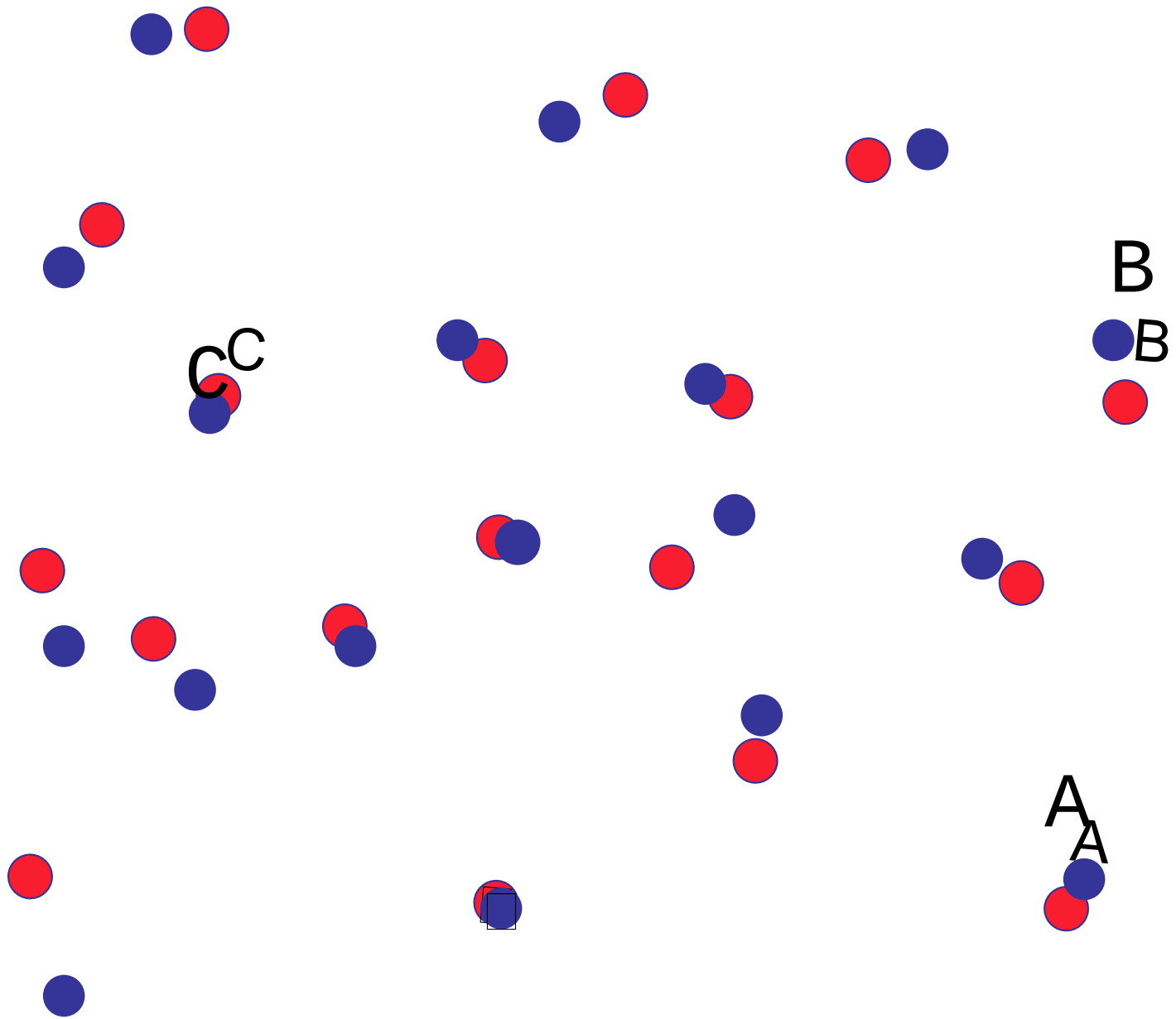
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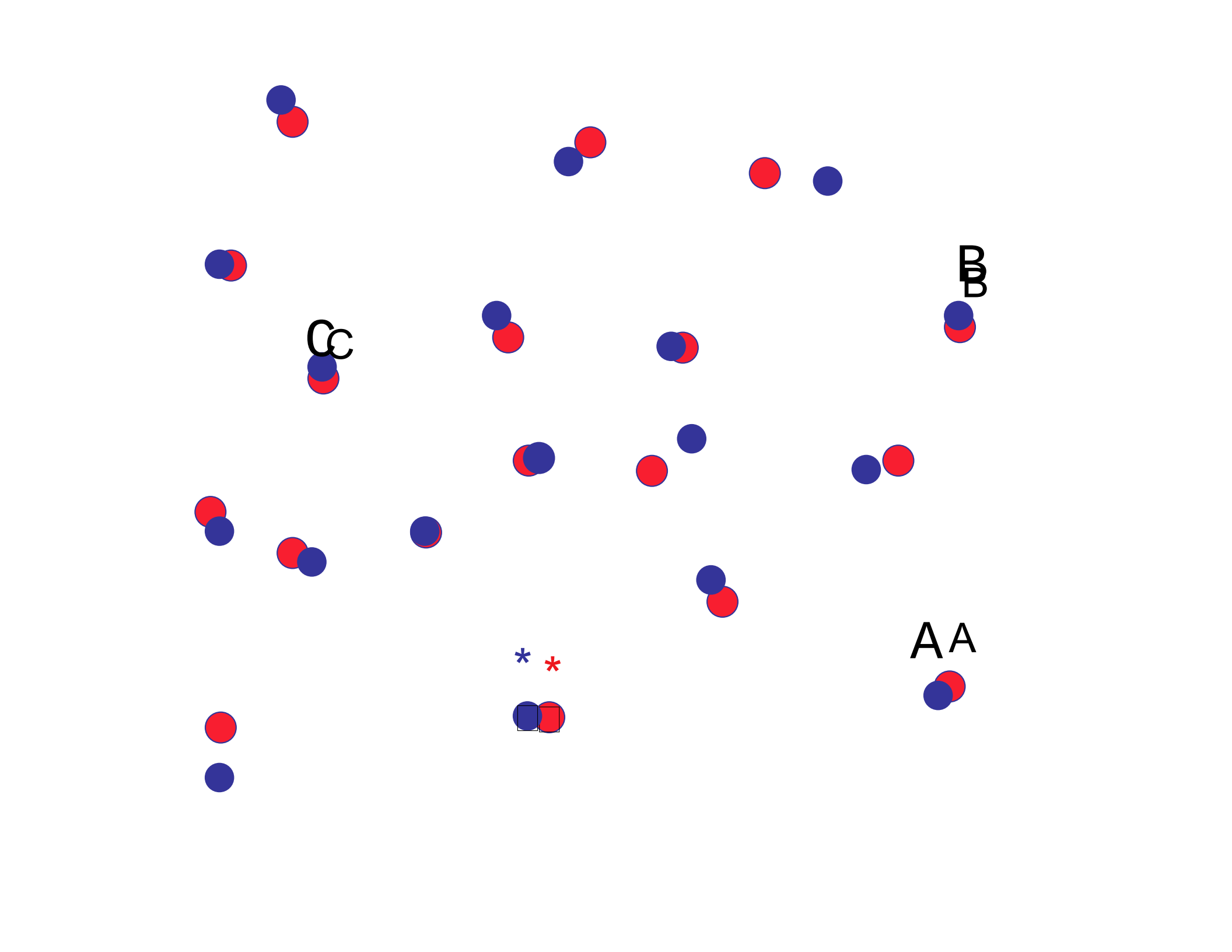
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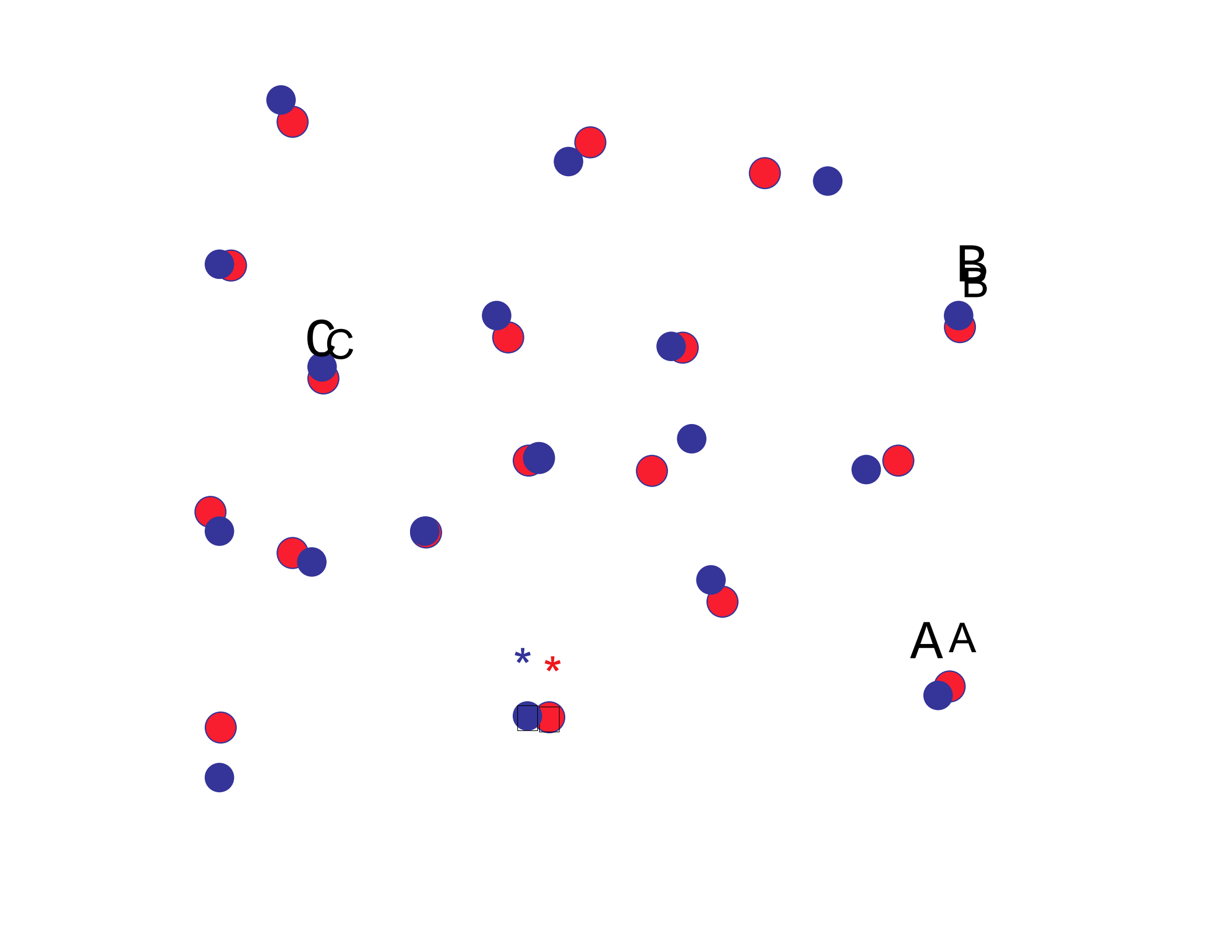
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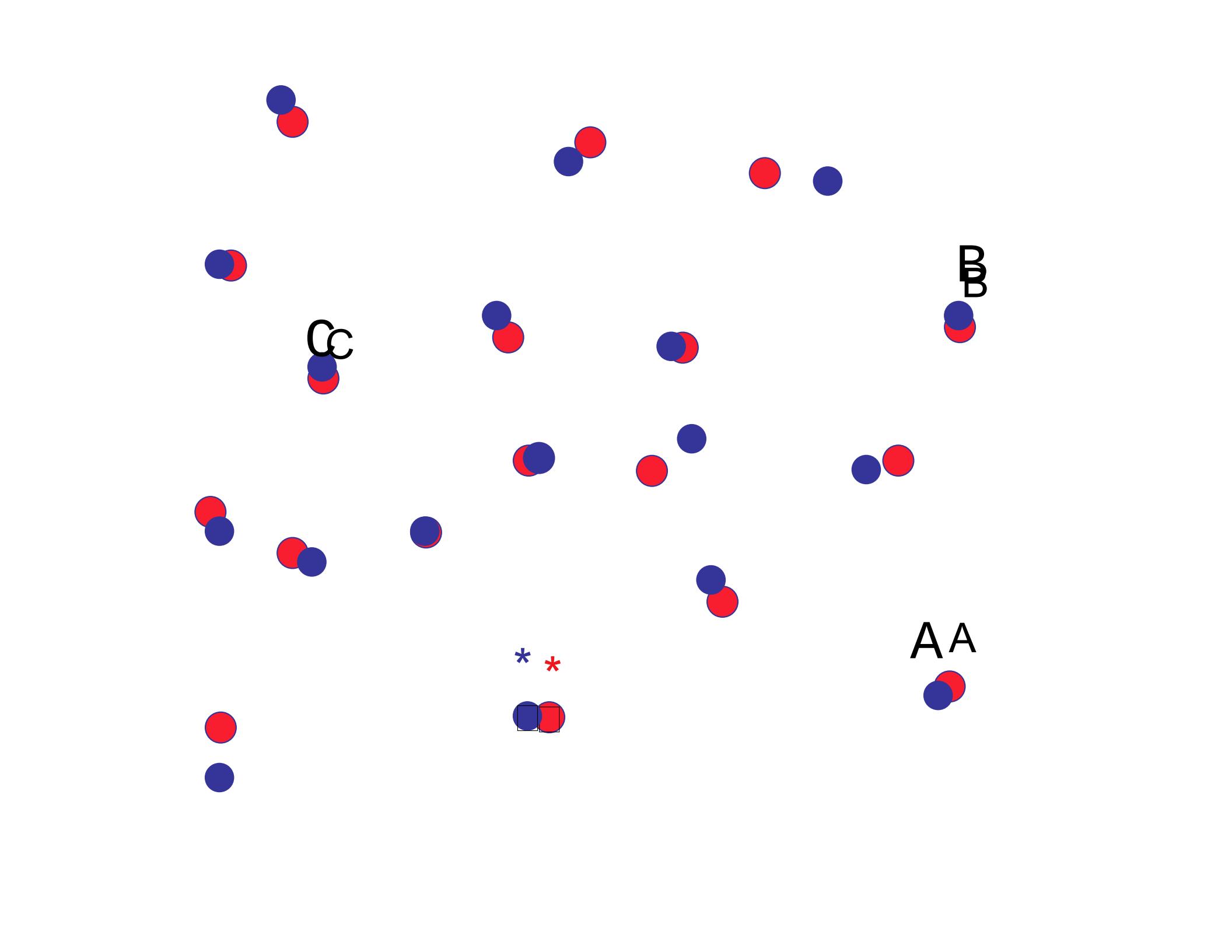
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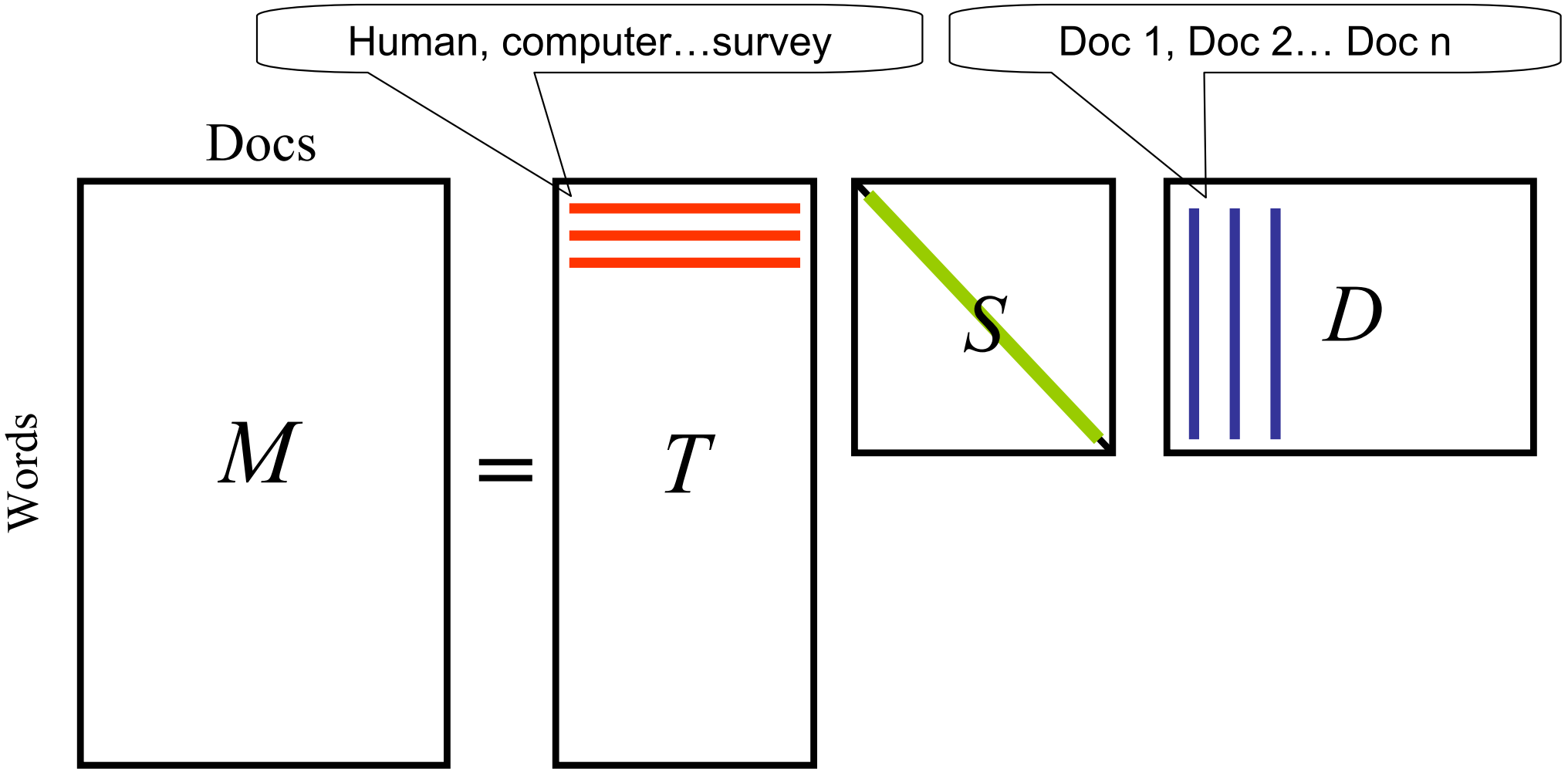
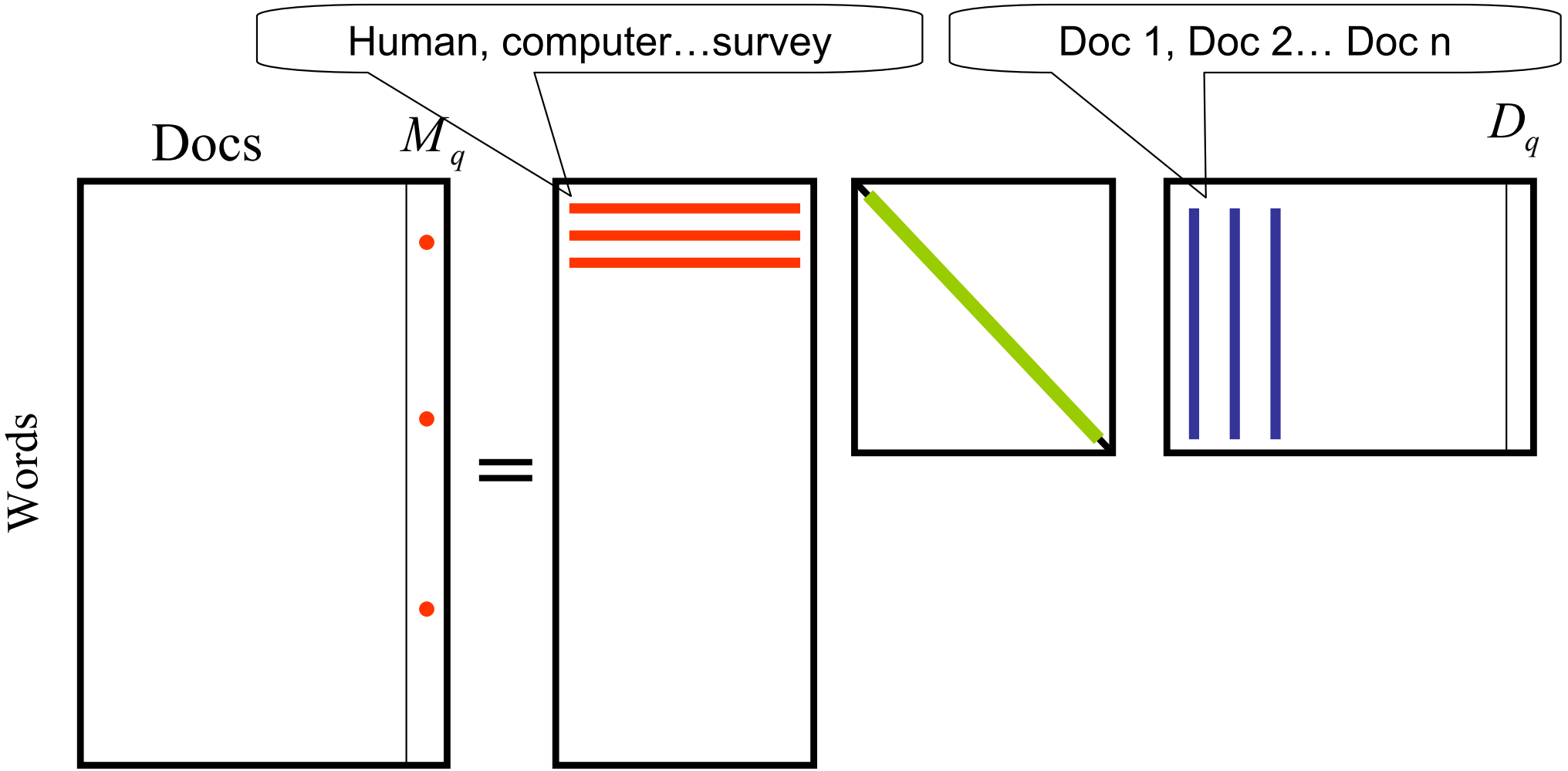
The End

Using the Model



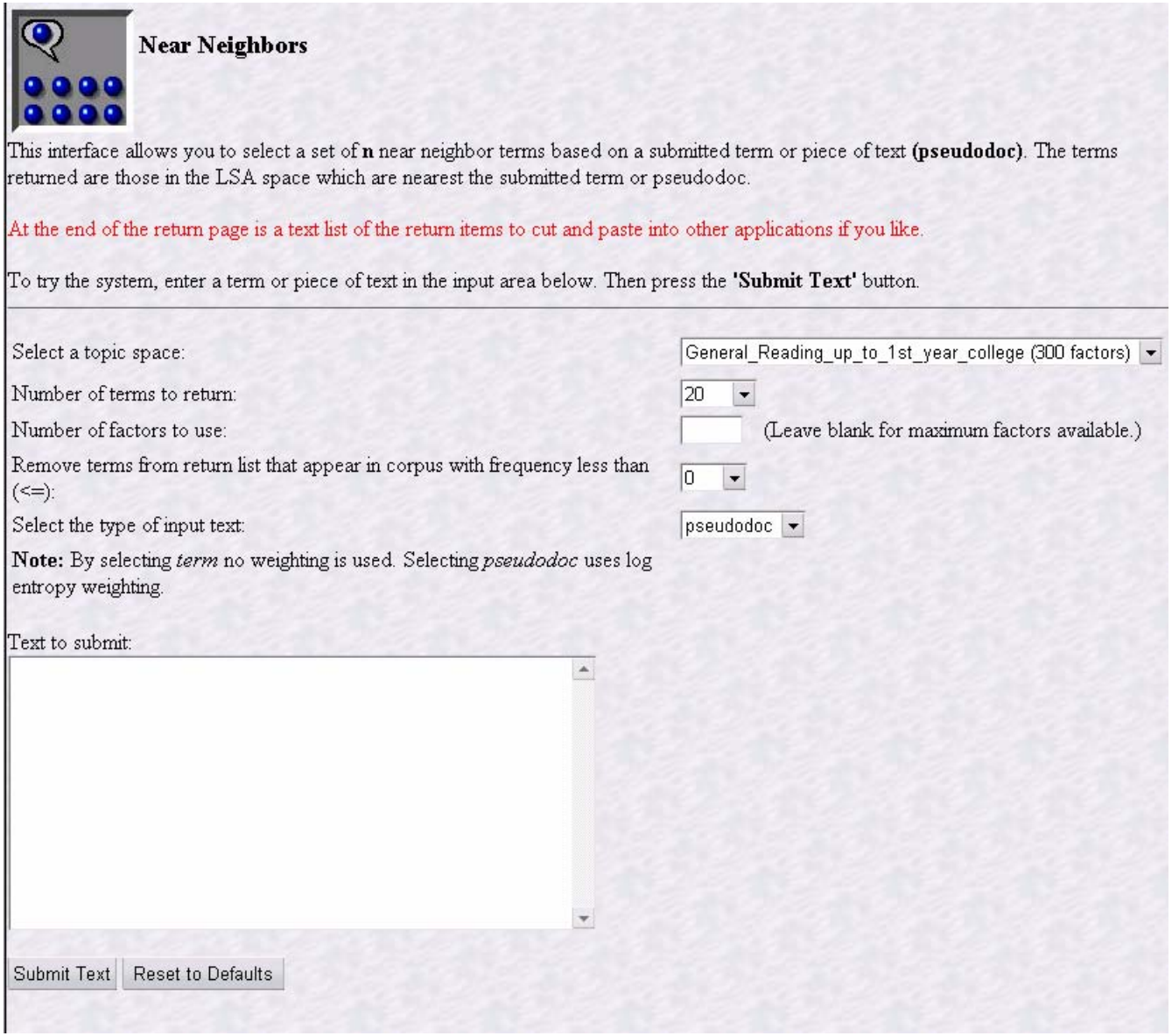
Psuedo Doc Comparisons



For essay grading (e.g., Foltz, Laham, and Landauer (1999)

- The system needs a “semantic space” trained with relevant text, i.e., a biology textbook if for a biology exam
- Calibration on expert-scored essays is usually required. The number of pre-scored tests needed may vary
- Working systems need additional components.
- In the LSA component, the current essay is compared to all essays in memory, and the grades of close neighbors are used to predict what grade the expert would have given.

Essay Grading (e.g., Foltz, Laham, and Landauer (1999)



Near Neighbors

This interface allows you to select a set of **n** near neighbor terms based on a submitted term or piece of text **(pseudodoc)**. The terms returned are those in the LSA space which are nearest the submitted term or pseudodoc.

At the end of the return page is a text list of the return items to cut and paste into other applications if you like.

To try the system, enter a term or piece of text in the input area below. Then press the **'Submit Text'** button.

Select a topic space: General_Reading_up_to_1st_year_college (300 factors)

Number of terms to return: 20

Number of factors to use: (Leave blank for maximum factors available.)

Remove terms from return list that appear in corpus with frequency less than (<=): 0

Select the type of input text: pseudodoc

Note: By selecting *term* no weighting is used. Selecting *pseudodoc* uses log entropy weighting.

Text to submit:

Submit Text | Reset to Defaults