# P, R, F值总计

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Ftag** | **ManCE qualified** | **SysCE** | **SysCE rigidly matched** | **P\_e** | **R\_e** | **F\_e** |
| f0001 | 71 | 144 | 61(entirely) + 2(partly) | 42.36 | 85.92 | 56.74 |
| f0002 | 25 | 42 | 19(entirely) + 2(partly) | 45.24 | 76 | 56.72 |
| f0003 | 129 | 248 | 98(entirely) + 9(partly) | 39.52 | 75.97 | 51.99 |
| f0014 | 30 | 40 | 17(entirely) + 5(partly) | 42.5 | 56.67 | 48.57 |
| f0015 | 25 | 50 | 20(entirely) + 3(partly) | 40 | 80 | 53.33 |
| f0016 | 30 | 48 | 18(entirely) + 3(partly) | 37.5 | 60 | 46.15 |
| f0027 | 17 | 18 | 9(entirely) + 3(partly) | 50 | 52.94 | 51.43 |
| f0028 | 37 | 50 | 24(entirely) + 2(partly) | 48 | 64.86 | 55.17 |
| f0029 | 31 | 31 | 24(entirely) | 77.42 | 77.42 | 77.42 |
| Average |  |  |  | 46.94889 | 69.97556 | 55.28 |

Entirely: 指完全匹配，即所用pattern没有问题，原因结果片段也几乎完整

Partly: 指部分匹配

这里计算的P,R,F 使用entirely匹配的例子来计算。

## 模板正确性 ---- 系统抽取的伪正例分析与分类

### 分类说明

* 人工标记但未被完整抽取的CE links
  + 未使用最合适的pattern ---- 标记为 n\_1
  + 因为多句或句子不相邻而无法完整抽取 ---- 标记为n\_2
* 虽是CE links但未被人工标记出来 ---- 标记为m
* 匹配的句子中没有句子级别因果含义 ---- 标记为 a
* 没有使用最合适的pattern ---- 标记为 s
* 原因或结果片段界定不对 ---- 标记为f

### 数据总计

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Paper ID | 伪正例 | **n\_1** | **n\_2** | **m** | **a** | **f** | **s** |
| F0001 | 83 | 2 | 9 | 22 | 42 | 5 | 3 |
| F0002 | 23 | 2 | 0 | 15 | 5 | 1 | 0 |
| F0003 | 156 | 16 | 5 | 50 | 73 | 9 | 3 |
| F0014 | 23 | 7 | 2 | 6 | 4 | 3 | 1 |
| F0015 | 30 | 0 | 3 | 5 | 11 | 6 | 5 |
| F0016 | 30 | 3 | 2 | 6 | 15 | 3 | 1 |
| F0027 | 9 | 3 | 0 | 2 | 3 | 0 | 1 |
| F0028 | 26 | 3 | 2 | 7 | 10 | 2 | 2 |
| F0029 | 7 | 0 | 0 | 0 | 5 | 1 | 1 |

## F0001

### PTID:55, According to – 17: m-2, a-13, f-1, s-1

**CASE: 1 a**

Stag: 16

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: A good summary should be able to quickly attract attention , represent the core idea , and effectively convey the meaning according to interests .

Cause: interests

Effect: A good summary should be able to quickly attract attention , represent the core idea , and effectively convey the meaning

**CASE: 5 f**

Stag: 35

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Important sentences can be extracted out according to the statistical analysis and experience on the input text while making abstraction needs knowledge on and beyond the text .

Cause: the statistical analysis

Effect: Important sentences can be extracted out

**CASE: 20** **m**

Stag: 157

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Rational study derives new theories and methods according to existing theories , methods and phenomena .

Cause: existing theories , methods and phenomena

Effect: Rational study derives new theories and methods

**CASE: 44 a**

Stag: 259

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Some implicit citations have mark words such as `` someone says '' and according to `` someone 's opinion '' .

Cause: `` someone 's opinion ''

Effect: Some implicit citations have mark words such as `` someone says '' and

**CASE: 45 s**

Stag: 260

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: These implicit citations can be located and transformed into explicit citation by searching these mark words and the references according to author names mentioned in text and then inserting uniform citation marks like scientific papers .

Cause: author names mentioned in text

Effect: These implicit citations can be located and transformed into explicit citation by searching these mark words and the references

**CASE: 47 a**

Stag: 268

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: explaining , evidencing , complementing , commenting , or revising a representation , either explicitly or implicitly , according to individual motivation and knowledge

Cause: individual motivation and knowledge

Effect: explaining , evidencing , complementing , commenting , or revising a representation , either explicitly or implicitly

**CASE: 56 a**

Stag: 309

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The basic behaviors of summarization include emerging , selecting , citing -LRB- explicitly or implicitly -RRB- , and organizing representations according to requirement and motivation .

Cause: requirement and motivation

Effect: The basic behaviors of summarization include emerging , selecting , citing -LRB- explicitly or implicitly -RRB- , and organizing representations

**CASE: 62** **m**

Stag: 340

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Sub-dimensions can be arranged according to the measure of relevance between coordinates .

Cause: the measure of relevance between coordinates

Effect: Sub-dimensions can be arranged

**CASE: 70 a**

Stag: 387

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- b -RRB- Rank the paragraphs of the text according to the interest .

Cause: the interest

Effect: -LRB- b -RRB- Rank the paragraphs of the text

**CASE: 82 a**

Stag: 455

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Many applications have incorporated pictures into summaries , e.g. , transforming a paper into slides or a poster , transforming a novel into a carton book , and creating a webpage according to a set of texts and pictures .

Cause: a set of texts and pictures

Effect: Many applications have incorporated pictures into summaries , e.g. , transforming a paper into slides or a poster , transforming a novel into a carton book , and creating a webpage

**CASE: 84 a**

Stag: 456

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: There could be different ways to arrange pictures in displays but picture should be selected according to the core sentences and arranged near the core sentences

Cause: the core sentences

Effect: There could be different ways to arrange pictures in displays but picture should be selected

**CASE: 92 a**

Stag: 489

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: a -RRB- Use pictures to replace the corresponding representations in the original text , to summarize the rest representation , and to organize the summary according to the original structure .

Cause: the original structure

Effect: a -RRB- Use pictures to replace the corresponding representations in the original text , to summarize the rest representation , and to organize the summary

**CASE: 103 a**

Stag: 516

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: In real application , a summarization system should enable readers to adjust the radius according to requirement .

Cause: requirement

Effect: In real application , a summarization system should enable readers to adjust the radius

**CASE: 111 a**

Stag: 553

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: A semantic link network of video components enables users to query the interested components and navigates in the network according to interest , e.g. , the semantic link network of video components can help play the main thread of a story development .

Cause: interest , e.g.

Effect: A semantic link network of video components enables users to query the interested components and navigates in the network

**CASE: 115 a**

Stag: 579

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The main purpose of summarizing pictures is to generate a small set of pictures from a large set of pictures according to interest .

Cause: interest

Effect: The main purpose of summarizing pictures is to generate a small set of pictures from a large set of pictures

**CASE: 121 a**

Stag: 596

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 4 -RRB- Generating a small network of texts according to a large set of pictures .

Cause: a large set of pictures

Effect: -LRB- 4 -RRB- Generating a small network of texts

**CASE: 143 a**

Stag: 700

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The basic interactions include selecting , citing and organizing representations according to requirement and motivation .

Cause: requirement and motivation

Effect: The basic interactions include selecting , citing and organizing representations

### PTID:56, According to – 6: a-6

**CASE: 66 a**

Stag: 366

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: The function ` Classifying & Linking ' classifies representations according to the given dimensions , connects representations by discovering implicit relations , transforming implicit relations into explicit relations , discovering communities , and identifying appropriate representations .

Cause: the given dimensions

Effect: connects representations by discovering implicit relations , transforming implicit relations into explicit relations , discovering communities , and identifying appropriate representations .

**CASE: 73 a**

Stag: 401

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: It is particularly useful in making slides or posters for scientific research according to papers , and summarizing historical and literature works .

Cause: papers

Effect: and summarizing historical and literature works .

**CASE: 105 a**

Stag: 534

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Humans are able to make operations to summarize a movie according to their understandings and requirements , but are limited in ability to view and summarize huge volumes of videos generated everyday .

Cause: their understandings and requirements

Effect: but are limited in ability to view and summarize huge volumes of videos generated everyday .

**CASE: 118 a**

Stag: 588

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Select the representative tags of these pictures , search relevant texts according to these tags -LRB- or select the texts that contain or link to these pictures -RRB- , and then summarize these texts .

Cause: these tags -LRB- or select the texts that contain or link to these pictures -RRB-

Effect: and then summarize these texts .

**CASE: 119 a**

Stag: 593

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Transform pictures into texts according to the way described in -LRB- 1 -RRB- , summarize the texts , and then select a picture to represent the summary by matching its tags and the core words of the summary .

Cause: the way described in -LRB- 1 -RRB-

Effect: summarize the texts , and then select a picture to represent the summary by matching its tags and the core words of the summary .

**CASE: 122 a**

Stag: 597

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: A solution is to discover the communities of the semantic link network of pictures , to select one text to represent one community according to the tags of pictures within the community , and to construct a semantic link network of the representative texts .

Cause: the tags of pictures within the community

Effect: and to construct a semantic link network of the representative texts .

### PTID:44, For – 15: n\_1-1, m-2, a-11, f-1

**CASE: 13 a**

Stag: 100

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Actually , reviews and comments in cyberspace are open , easily available , and valuable for composing and improving summaries .

Cause: composing and improving summaries

Effect: Actually , reviews and comments in cyberspace are open , easily available , and valuable

**CASE: 14 a**

Stag: 103

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: It is critical for developing summarization research through thinking the following questions :

Cause: developing summarization research through thinking the following questions

Effect: It is critical

**CASE: 15 a**

Stag: 107

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: -LRB- 4 -RRB- What is the appropriate research methodology for studying summarization and developing summarization systems ?

Cause: studying summarization and developing summarization systems

Effect: -LRB- 4 -RRB- What is the appropriate research methodology

**CASE: 34 a**

Stag: 217

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The openness principle implies that establishing static criteria for evaluating summarization is unnecessary , and that a closed system is incapable for reaching a satisfied summary .

Cause: evaluating summarization

Effect: The openness principle implies that establishing static criteria

**CASE: 46 a**

Stag: 268

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Citation is an individual selection of relevant representations for explaining , evidencing , complementing , commenting , or revising a representation , either explicitly or implicitly , according to individual motivation and knowledge .

Cause: explaining , evidencing , complementing , commenting , or revising a representation , either explicitly or implicitly , according to individual motivation and knowledge

Effect: Citation is an individual selection of relevant representations

**CASE: 60 a**

Stag: 319

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The following are some dimensions for organizing a summary .

Cause: organizing a summary

Effect: The following are some dimensions

**CASE: 63 a**

Stag: 341

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Figure 5 shows a three-dimensional space for organizing representations through time dimension , author dimension and topic dimension .

Cause: organizing representations through time dimension , author dimension and topic dimension

Effect: Figure 5 shows a three-dimensional space

**CASE: 65 a**

Stag: 365

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The summarization system is responsible for classifying , linking and reorganizing representations .

Cause: classifying , linking and reorganizing representations

Effect: The summarization system is responsible

**CASE: 96 m**

Stag: 502

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Online picture-sharing systems like Flicker provide rich picture resources for implementing this idea .

Cause: implementing this idea

Effect: Online picture-sharing systems like Flicker provide rich picture resources

**CASE: 107 a**

Stag: 548

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Modern movies provide more channels -LRB- e.g. , voice and music -RRB- for understanding than early silent movies .

Cause: understanding than early silent movies

Effect: Modern movies provide more channels -LRB- e.g. , voice and music -RRB-

**CASE: 108 n\_1**

Stag: 549

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Current online movies contain subtitles , which provide a new condition for making summarization of videos through natural language processing .

Cause: making summarization of videos through natural language processing

Effect: Current online movies contain subtitles , which provide a new condition

**CASE: 109 a**

Stag: 550

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: These subtitles provide the basis for generating a piece of text as the summary of movies .

Cause: generating a piece of text as the summary of movies

Effect: These subtitles provide the basis

**CASE: 127 a**

Stag: 617

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Cognitive psychologists argue that people usually remember meaning rather than exact representation and that meaning represents through the perceptual and motor systems for interacting with the world .

Cause: interacting with the world

Effect: Cognitive psychologists argue that people usually remember meaning rather than exact representation and that meaning represents through the perceptual and motor systems

**CASE: 130** **f**

Stag: 626

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Knowledge representation approaches such as the production rule -LSB- Davis , et al , 1977 -RSB- , the frame -LSB- Minsky , 1975 -RSB- and the semantic net -LSB- Quillian , 1966 -RSB- are symbol systems that can carry out reasoning for solving problems .

Cause: solving problems

Effect: Knowledge representation approaches such as the production rule -LSB- Davis , et al , 1977 -RSB- , the frame -LSB- Minsky , 1975 -RSB- and the semantic net -LSB- Quillian , 1966 -RSB- are symbol systems that can carry out reasoning

**CASE: 142 m**

Stag: 697

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Different representations of the same thing can be linked to the same semantic image for understanding and thinking -LSB- Zhuge , 2010 , 2011 , 2012 -RSB- .

Cause: understanding and thinking -LSB- Zhuge , 2010 , 2011 , 2012 -RSB-

Effect: Different representations of the same thing can be linked to the same semantic image

### PTID:68, By/ through – 9: m-8, f-1

**CASE: 7** **m**

Stag: 54

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: Summary is generated by identifying themes in text and selecting appropriate sentences for composition -LSB- Barzilay , 1999 -RSB- -LSB- Barzilay & KcKeown , 2005 -RSB- .

Cause: identifying themes in text and selecting appropriate sentences for composition

Effect: Summary is generated

**CASE: 41** **m**

Stag: 253

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: It is feasible to transform a citation network into a text by using some language patterns -LRB- for example , `` the idea of A was extended by B '' , `` the idea of A was used by B '' , and `` the idea of A inspired B '' -RRB- to represent different citations , main roles , relations , and development track .

Cause: using some language patterns -LRB- for example , `` the idea of A was extended by B '' , `` the idea of A was used by B '' , and `` the idea of A inspired B '' -RRB- to represent different citations , main roles , relations , and development track

Effect: It is feasible to transform a citation network into a text

**CASE: 51** **m**

Stag: 293

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: This helps enhance the memory of the core by focusing and refocusing on the core when building or retrieving the semantic images in the mental space .

Cause: focusing and refocusing on the core when building or retrieving the semantic images in the mental space

Effect: This helps enhance the memory of the core

**CASE: 94** **m**

Stag: 496

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: The strategy is to make use of sensors and create semantic links between pictures and texts by detecting common projections at physical and social dimensions .

Cause: detecting common projections at physical and social dimensions

Effect: The strategy is to make use of sensors and create semantic links between pictures and texts

**CASE: 98** **m**

Stag: 505

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: The core words such as `` CIKM2012 '' , `` hotel '' , `` golf '' and `` garden '' can be identified by comparing the source text and tags .

Cause: comparing the source text and tags

Effect: core words such as `` CIKM2012 '' , `` hotel '' , `` golf '' and `` garden '' can be identified

**CASE: 110 m**

Stag: 551

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: A semantics-based approach to summarizing videos is to construct a semantic structure on videos by introducing semantic links into videos .

Cause: introducing semantic links into videos

Effect: A semantics-based approach to summarizing videos is to construct a semantic structure on videos

**CASE: 120 f**

Stag: 593

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: summarize the texts , and then select a picture to represent the summary by matching its tags and the core words of the summary .

Cause: matching its tags

Effect: the texts , and then select a picture to represent the summary

**CASE: 128** **m**

Stag: 620

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: Humans represent what they have seen or felt as semantic images in the mental space through interacting and experiencing in the physical space , and summarizing representations and revising representations during communicating with each other in social space where motivations are generated .

Cause: interacting and experiencing in the physical space , and summarizing representations and revising representations during communicating with each other in social space where motivations are generated

Effect: Humans represent what they have seen or felt as semantic images in the mental space

**CASE: 131** **m**

Stag: 638

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: A unified method for summarizing different forms can be developed by transforming texts , videos , pictures and graphs into semantic link networks .

Cause: transforming texts , videos , pictures and graphs into semantic link networks

Effect: A unified method for summarizing different forms can be developed

### **PTID:80, As – 8: n\_1-1, m-1, a-5, s-1**

**CASE: 18 a**

Stag: 121

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The physical space including the nature and versatile artificial physical space like museum can be represented as a space of multiple dimensions such as time , region , and type -LRB- different types of museums may include different samples -RRB- .

Cause: a space of multiple dimensions such as time , region , and type -LRB- different types of museums may include different

Effect: The physical space including the nature and versatile artificial physical space like museum can be represented

**CASE: 22 n\_1**

Stag: 165 166

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: This paper attempts to explore the problem of summarization from multiple dimensions -LRB- especially from empiricism , rationalism , evolutionism , and social/individual constructionism -RRB- so as to form a general summarization methodology . As a kind of language representation , summarization should be based on the basic principles of language use .

Cause: a kind of language representation , summarization should be based on the basic principles of language use .

Effect: This paper attempts to explore the problem of summarization from multiple dimensions -LRB- especially from empiricism , rationalism , evolutionism , and social/individual constructionism -RRB- so as to form a general summarization methodology .

**CASE: 23 a**

Stag: 167

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Observing and rethinking the basic characteristics of human language use can inspire research on summarization as language use including listening , speaking , reading , writing , understanding , and thinking .

Cause: language use including listening ,

Effect: the basic characteristics of human language use can inspire research on summarization

**CASE: 39 a**

Stag: 246 247

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: A research area emerges and evolves through continual citing a set of papers on the same set of concepts through time . As shown in Figure 3 , a new paper A -LRB- denoting the title , author , abstract , etc. -RRB- becomes an often-cited paper and then becomes a source paper when the area is gradually formed .

Cause: shown in Figure 3 , a new paper A -LRB- denoting the title , author , abstract , etc. -RRB- becomes an often-cited paper and then becomes a source paper when the area is gradually formed .

Effect: A research area emerges and evolves through continual citing a set of papers on the same set of concepts through time .

**CASE: 40 m**

Stag: 248

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: A survey paper summarizes an area through citing many papers in the area , and it is often cited as it helps later researchers to quickly know this area .

Cause: it helps later researchers to quickly know this area .

Effect: many papers in the area , and it is often cited

**CASE: 68 a**

Stag: 383

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: A summary can be in form of a hypertext , where some texts are summarized as a hyperlink , and some texts containing hyperlinks are summarized as a hyperlink at the higher level .

Cause: a hyperlink , and some texts containing hyperlinks are summarized as a hyperlink at the higher

Effect: A summary can be in form of a hypertext , where some texts are summarized

**CASE: 114 a**

Stag: 578

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If we regard a text as a graph of words or sentences , text summarization can be regarded as a problem of summarizing a semantic link network -LSB- Zhuge , 2009 -RSB- , where nodes and edges can be texts , pictures and videos .

Cause: a graph of words or sentences , text summarization can be regarded as a problem of summarizing a semantic link network -LSB- Zhuge , 2009 -RSB- , where nodes and edges can be texts , pictures and videos .

Effect: we regard a text

**CASE: 141 s**

Stag: 691 692

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: It is important to ensure the understandability and expressiveness of the integrated representation . As a kind of union , data integration enables users to get a global view of data generated from different sources -LSB- Friedman , et al , 1999 ;

Cause: a kind of union , data integration enables users to get a global view of data generated from different sources -LSB- Friedman , et al , 1999 ;

Effect: It is important to ensure the understandability and expressiveness of the integrated representation .

### PTID:81, Ving – 7: a-5, f-1, s-1

**CASE: 10 a**

Stag: 81

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Summarizing videos is a research topic in multimedia area -LSB- DeMenthon , et al. , 1998 -RSB- -LSB- Ekin , et al. , 2004 -RSB- .

Cause: Summarizing videos

Effect: is a research topic in multimedia area -LSB- DeMenthon , et al.

**CASE: 12 s**

Stag: 96

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Adding a ground with more indicators to a summary is a way to help representation and understanding , e.g. , ' A love story in Qing Dynasty of China ' includes a time indicator ` Qing Dynasty ' and a location indicator ` China ' .

Cause: Adding a ground with more indicators to a summary is a way to help representation and understanding

Effect: e.g. , ' A love story in Qing Dynasty of China ' includes a time indicator ` Qing Dynasty ' and a location indicator ` China ' .

**CASE: 43 a**

Stag: 256

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from scientific papers , webpages can be changed , and links can be also changed

Cause: Different from scientific papers

Effect: webpages can be changed , and links

**CASE: 57 a**

Stag: 316

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from previous notions of summarization , this definition gives the minimum summary -LRB- the summary of the intention -RRB- and the maximum summary -LRB- the summary of the intention and the extension -RRB- of a representation , and it regards citation as the fundamental behavior and mechanism of summarization .

Cause: Different from previous notions of summarization

Effect: this definition gives the minimum summary -LRB- the summary of the intention -RRB- and the maximum summary -LRB- the summary of the intention and the extension -RRB- of a representation , and it

**CASE: 71 a**

Stag: 396

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from linear reading , a semantic link network enables readers to know a general view and the main measures of large representations immediately .

Cause: Different from linear reading

Effect: a semantic link network enables readers to know a general view and the main measures of large representations immediately .

**CASE: 72 f**

Stag: 400

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Coordinating texts , pictures and videos can render a summary from different channels of sense .

Cause: Coordinating texts

Effect: pictures and videos can render a summary from different channels of sense .

**CASE: 100 a**

Stag: 509

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from image retrieval -LRB- e.g. , search images according to keywords -RRB- , the picture-based summarization approach has a ground of texts -LRB- a network of source texts or summaries -RRB- when searching the picture-text repository .

Cause: Different from image retrieval -LRB- e.g. , search images according to keywords -RRB-

Effect: the picture-based summarization approach has a ground of texts -LRB- a network of source texts or summaries -RRB- when searching the picture-text repository .

### PTID:48, Based on – 4: m-3, a-1

**CASE: 9** **m**

Stag: 77

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: Evaluation concerns human , semi-automatic and automatic methods based on the pre-defined standards -LSB- Mani and Maybury , 1999 -RSB- .

Cause: the pre-defined standards -LSB- Mani and Maybury , 1999 -RSB-

Effect: Evaluation concerns human , semi-automatic and automatic methods

**CASE: 19 m**

Stag: 139

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: More phenomena have shown that what a man -LRB- especially a child -RRB- learns about the world is based on an innate mental structure -LSB- MacCarthy , 2007 , 2008 -RSB- .

Cause: an innate mental structure -LSB- MacCarthy , 2007 , 2008 -RSB-

Effect: More phenomena have shown that what a man -LRB- especially a child -RRB- learns about the world is

**CASE: 59** **a**

Stag: 318

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: An appropriate form concerns the innovative cyber display based on human mental structure , psychological structure and innovative display .

Cause: human mental structure , psychological structure and innovative display

Effect: An appropriate form concerns the innovative cyber display

**CASE: 64 m**

Stag: 362

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: The personal spaces reflect personal reading experience , interests and knowledge based on the texts that have been read .

Cause: the texts that have been read

Effect: The personal spaces reflect personal reading experience , interests and knowledge

### PTID:47, Based on – 1: a-1

**CASE: 135 a**

Stag: 659

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: The definition of summarization based on citation given in section 4 gives the range of T , and -LRB- di , ... , dj -RRB- reflects the basic cognitive level of reader .

Cause: citation given in section 4 gives the range of T

Effect: and -LRB- di , ... , dj -RRB- reflects the basic cognitive level of reader .

### PTID:88, indicate/realize/ensure/imply – 4: n\_2-2, m-2

**CASE: 31 n\_2**

Stag: 207

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: The inexact principle and the relativity principle indicate the following principles :

Cause: The inexact principle and the relativity principle

Effect: the following principles

**CASE: 35 n\_2**

Stag: 218

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: The above fundamental characteristics and principles indicate the following strategies for summarization .

Cause: The above fundamental characteristics and principles

Effect: the following strategies for summarization

**CASE: 89 m**

Stag: 482

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: The semantic link networks of texts , pictures , tags and users indicate a kind of social semantics of picture usage

Cause: The semantic link networks of texts , pictures , tags and users

Effect: a kind of social semantics of picture usage

**CASE: 91** **m**

Stag: 485

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Language representations like tags indicate the usage of the pictures .

Cause: Language representations like tags

Effect: the usage of the pictures

### PTID:86, Lead to – 2: n\_2-1, m-1

**CASE: 26 n\_2**

Stag: 183

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&V-ing/&NP@C@', '(&CAN/have/has/had)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: The above separation principles lead to the natural obstacle of summarization .

Cause: The above separation principles

Effect: the natural obstacle of summarization

**CASE: 95 m**

Stag: 501

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&V-ing/&NP@C@', '(&CAN/have/has/had)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Research can lead to a new form of summary that can increase readability and understandability .

Cause: Research

Effect: a new form of summary that can increase readability and understandability

### PTID:95, Lead to – 1: n\_2-1

**CASE: 24 n\_2**

Stag: 173 174

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 5 -RRB- The representation of knowledge is not unique , and the understanding of representation is not unique . These characteristics lead to the following principles :

Cause: -LRB- 5 -RRB- The representation of knowledge is not unique , and the understanding of representation is not unique

Effect: the following principles

### PTID:0, So – 2: n\_2-2

**CASE: 52 n\_2**

Stag: 294

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Humans have been composing complex representations and making summarization through times , so we have the following axiom .

Cause: Humans have been composing complex representations and making summarization through times

Effect: we have the following axiom .

**CASE: 99 n\_2**

Stag: 506 507

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Then , the relations like `` back of '' relying on the core words can be identified . So , the techniques of text summary can be extended to the construction of semantic link network and image retrieval -LSB- Gudivada and Raghavan , 1995 -RSB- .

Cause: Then , the relations like `` back of '' relying on the core words can be identified

Effect: the techniques of text summary can be extended to the construction of semantic link network and image retrieval -LSB- Gudivada and Raghavan , 1995 -RSB- .

### PTID:1, Therefore – 2: n\_2-1, m-1

**CASE: 53 n\_2**

Stag: 297 298

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: This axiom is the basis of representation -LRB- including using languages -RRB- and summarization -LRB- especially , for multi-document summarization -RRB- . Therefore , a representation p can be formalized as a structure of representations :

Cause: This axiom is the basis of representation -LRB- including using languages -RRB- and summarization -LRB- especially , for multi-document summarization -RRB-

Effect: a representation p can be formalized as a structure of representations :

**CASE: 133 m**

Stag: 650 651

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: From this point of view , summarization can be regarded as a transformation of reducing the dimensions of a representation so that the dimensions of representation can be linked to and merge with the dimensions in the mental space . Therefore , we have the following definition .

Cause: From this point of view , summarization can be regarded as a transformation of reducing the dimensions of a representation so that the dimensions of representation can be linked to and merge with the dimensions in the mental space

Effect: we have the following definition .

### PTID:100, Because – 1: n\_2-1

**CASE: 36 n\_2**

Stag: 221 222

Pattern: 8 [['because']]---- [['&R', '(,/./;/--)', '(&AND)', '&THIS', '&BE', '(&ADV)'], ['&C']]

sentTXT: More types of links render more common knowledge and experience -LSB- Zhuge , 2009 -RSB- . This is because the establishment of rich social relations indicates common individual characteristics and social characteristics .

Cause: the establishment of rich social relations indicates common individual characteristics and social characteristics .

Effect: More types of links render more common knowledge and experience -LSB- Zhuge , 2009 -RSB-

### PTID:90, Concern/require/request – 1: n\_2-1

**CASE: 37 n\_2**

Stag: 225 226

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: A good summarizer should know its potential readers . This requests a summarizer to collect and analyze readers ' interests according to their reading behaviors and attitudes to summaries .

Cause: a summarizer to collect and analyze readers ' interests according to their reading behaviors and attitudes to summaries

Effect: A good summarizer should know its potential readers

### PTID:14, If – 1: f-1

**CASE: 69 f**

Stag: 384

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: The advantage is that the content is the same as the original text and readers can read the concise top-level content first and then read the details by clicking the link if they are interested in .

Cause: they are interested in .

Effect: The advantage is that the content is the same as the original text and readers can read the concise top-level content first and then read the details by clicking the link

### PTID:72, due to – 1: m-1

**CASE: 85** **m**

Stag: 458

Pattern: 0 [['due', 'to']]---- [['&R'], ['&NP@C@']]

sentTXT: A picture can convey meaning in about 1-10 seconds due to its familiarity and complexity to the viewer .

Cause: its familiarity and complexity to the viewer

Effect: A picture can convey meaning in about 1-10 seconds

### PTID:2, Thus – 1: m-1

**CASE: 104 m**

Stag: 525

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: Different classes of people play different roles in society and thus are likely involved in different events .

Cause: Different classes of people play different roles in society

Effect: are likely involved in different events .

## F0002

### PTID:94, Imply/mean/indicate – 6: m-6

**CASE: 15 m**

Stag: 76 77

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 1 -RRB- A rising spiral has an increasing rate of citations over time . This implies a rising research group or community .

Cause: -LRB- 1 -RRB- A rising spiral has an increasing rate of citations over time

Effect: a rising research group or community

**CASE: 16 m**

Stag: 78 79

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: In contrast , a descending spiral has a decreasing rate of citations . This implies a declining research group or community .

Cause: In contrast , a descending spiral has a decreasing rate of citations

Effect: a declining research group or community

**CASE: 17 m**

Stag: 80 81

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 2 -RRB- A rising and expanding spiral is a rising spiral that includes an increasing number of authors over time . This implies a rising and expanding research group or community .

Cause: -LRB- 2 -RRB- A rising and expanding spiral is a rising spiral that includes an increasing number of authors over time

Effect: a rising and expanding research group or community

**CASE: 18 m**

Stag: 82 83

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 3 -RRB- A falling and shrinking spiral is a descending spiral that is losing authors . This implies a declining and shrinking group or community .

Cause: -LRB- 3 -RRB- A falling and shrinking spiral is a descending spiral that is losing authors

Effect: a declining and shrinking group or community

**CASE: 19 m**

Stag: 84 85

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 4 -RRB- An authoritative spiral requires that all its nodes remain authoritative . This implies an authoritative research group .

Cause: -LRB- 4 -RRB- An authoritative spiral requires that all its nodes remain authoritative

Effect: an authoritative research group

**CASE: 20 m**

Stag: 86 87

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: -LRB- 5 -RRB- An original spiral has at least one source node . This implies the presence of an initiator .

Cause: -LRB- 5 -RRB- An original spiral has at least one source node

Effect: the presence of an initiator

### PTID:44, For – 4: m-2, a-2

**CASE: 1 m**

Stag: 4

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Coordinating and fusing knowledge flows , data flows , and control flows , and integrating knowledge flows and workflows , are powerful means for making teamwork effective .

Cause: making teamwork effective

Effect: Coordinating and fusing knowledge flows , data flows , and control flows , and integrating knowledge flows and workflows , are powerful means

**CASE: 7 m**

Stag: 54

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Invisible knowledge flow networks self-organize and evolve continuously and interact with each other through flows to form an autonomous knowledge space for providing advanced knowledge services .

Cause: providing advanced knowledge services

Effect: Invisible knowledge flow networks self-organize and evolve continuously and interact with each other through flows to form an autonomous knowledge space

**CASE: 35 a**

Stag: 139

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Figure 3 shows a tool for visualizing the semantic map where the center nodes can trace the user 's interest .

Cause: visualizing the semantic map where the center nodes can trace the user 's interest

Effect: Figure 3 shows a tool

**CASE: 39 a**

Stag: 152

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Coordinating and fusing knowledge flows , data flows , and control flows , and integrating knowledge flows and workflows , are powerful means for making teamwork effective .

Cause: making teamwork effective

Effect: Coordinating and fusing knowledge flows , data flows , and control flows , and integrating knowledge flows and workflows , are powerful means

### PTID:81, Ving – 3: m-3

**CASE: 32 m**

Stag: 127

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Extracting document fragments that contain authors , affiliations , and references , an escience knowledge grid environment can find useful semantic relationships between documents or document fragments .

Cause: Extracting document fragments that contain authors , affiliations , and references

Effect: an escience knowledge grid environment can find useful semantic relationships between documents or document fragments .

**CASE: 33 m**

Stag: 128

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Analyzing the relationship between authors , articles , and their citation network , the environment can automatically discover knowledge flow networks and can distinguish the type of knowledge nodes using ranking algorithms and trace their evolution .

Cause: Analyzing the relationship between authors , articles , and their citation network

Effect: the environment can automatically discover knowledge flow networks and can distinguish the type of knowledge nodes using ranking algorithms and trace their evolution .

**CASE: 40 m**

Stag: 160

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Interacting with scientists and their records , this environment will evolve in a novel way to help the development of science .

Cause: Interacting with scientists and their records

Effect: this environment will evolve in a novel way to help the development of science .

### PTID:80, As – 2: a-1, f-1

**CASE: 3 f**

Stag: 26 27

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The knowledge flow network implicit in the citation network consists of knowledge flows between nodes that process knowledge , including reasoning , fusing , generalizing , inventing , and problem solving , by authors and co-authors . As a scientific research area evolves , the knowledge flow network evolves with the citation network and behaves differently during different phases .

Cause: a scientific research area evolves , the knowledge flow network evolves with the citation network and behaves differently during different phases .

Effect: The knowledge flow network implicit in the citation network consists of knowledge flows between nodes that process knowledge , including reasoning , fusing , generalizing , inventing , and problem solving , by authors and co-authors .

**CASE: 10 a**

Stag: 62

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: For the same reason , highly cited articles attract more citations as the citation network evolves .

Cause: the citation network evolves .

Effect: the same reason , highly cited articles attract more citations

### PTID:56, According to – 2:n\_1-1,a-1

**CASE: 24 n\_1**

Stag: 100

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: This service can recommend references by retrieving documents from the Web and digital libraries , ranking them according to their citation rates and the roles of the authors , and tracing and analyzing their citation networks to show the references as a network rather than as a list .

Cause: their citation rates and the roles of the authors

Effect: and tracing and analyzing their citation networks to show the references as a network rather than as a list .

**CASE: 37 a**

Stag: 148

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Unlike data and control flows in workflows , which are predefined or adapted according to activities and changes , knowledge flows are behind the interaction among team members and come with activity-level cooperation .

Cause: activities and changes

Effect: knowledge flows are behind the interaction among team members and come with activity-level cooperation .

### PTID:67, By/Through – 1: a-1

**CASE: 21 a**

Stag: 90

Pattern: 0 [[['by', 'through']]]---- [[], ['&V-ing@C@', '&R']]

sentTXT: Scientists only need to start the environment by uploading their articles , or start with a directory or online database of articles .

Cause: uploading their articles

Effect: , or start with a directory or online database of articles .

### PTID:68, By/Through – 1: m-1

**CASE: 22 m**

Stag: 97

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: They can use this information to plan their research by looking at the distribution and evolution of their areas .

Cause: looking at the distribution and evolution of their areas

Effect: They can use this information to plan their research

### PTID:2, Thus – 2: m-2

**CASE: 4 m**

Stag: 29

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: Scientists can publish in several areas , and thus be involved in different knowledge flow networks .

Cause: Scientists can publish in several areas

Effect: be involved in different knowledge flow networks .

**CASE: 29 m**

Stag: 118

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: Based on the evolution of relevant knowledge flow networks , this service enables scientists to simulate and estimate the development of a discipline , and thus helps them plan research .

Cause: Based on the evolution of relevant knowledge flow networks , this service enables scientists to simulate and estimate the development of a discipline

Effect: helps them plan research .

### PTID:14, If – 1: m-1

**CASE: 11 m**

Stag: 69

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: Our experiment shows that knowledge routing in a peer-to-peer autonomous network can attain higher efficiency if higher energy nodes are more likely to be selected at each hop .

Cause: higher energy nodes are more likely to be selected at each hop .

Effect: Our experiment shows that knowledge routing in a peer-to-peer autonomous network can attain higher efficiency

### PTID:47, Based on – 1: n\_1-1

**CASE: 30 n\_1**

Stag: 118

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: Based on the evolution of relevant knowledge flow networks , this service enables scientists to simulate and estimate the development of a discipline

Cause: the evolution of relevant knowledge flow networks

Effect: this service enables scientists to simulate and estimate the development of a discipline

## F0003

### PTID:55, According to – 33: m-12, a-15, f-4, s-2

**CASE: 2 a**

Stag: 5

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: They are limited in ability to go beyond the cyber space , to learn linking rules , to know the effect of linking , and to explain computing results according to physical , physiological , psychological and socio laws .

Cause: physical , physiological , psychological and socio laws

Effect: They are limited in ability to go beyond the cyber space , to learn linking rules , to know the effect of linking , and to explain computing results

**CASE: 45 a**

Stag: 176

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Words and basic speech acts are interpreted according to grounded schemas .

Cause: grounded schemas

Effect: Words and basic speech acts are interpreted

**CASE: 48 f**

Stag: 183

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Modern airplanes can sense and record flying data such as location , height , temperature , and fuel , have communication ability , and can even autopilot according to pre-designed program .

Cause: pre-designed program

Effect: Modern airplanes can sense and record flying data such as location , height , temperature , and fuel , have communication ability , and can even autopilot

**CASE: 53 m**

Stag: 213

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: to adapt services according to the feedback

Cause: the feedback

Effect: to adapt services

**CASE: 57 a**

Stag: 228

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Versatile individuals and socio roles coexist and harmoniously co-evolve , provide appropriate on-demand material , information , knowledge and services for each other , transform from one form into another , interact with each other directly or through links , and self-organize according to socio value chains .

Cause: socio value chains

Effect: Versatile individuals and socio roles coexist and harmoniously co-evolve , provide appropriate on-demand material , information , knowledge and services for each other , transform from one form into another , interact with each other directly or through links , and self-organize

**CASE: 58 m**

Stag: 232

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The environment will ensure healthy and meaningful life of individuals , and maintain a reasonable expansion of population of various individuals and the scopes of behaviors according to the overall capacity and the material , energy , information , knowledge and service flow cycles .

Cause: the overall capacity and the material , energy , information , knowledge and service flow cycles

Effect: The environment will ensure healthy and meaningful life of individuals , and maintain a reasonable expansion of population of various individuals and the scopes of behaviors

**CASE: 69 a**

Stag: 288

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Learning materials and processes can be self-organized and adapted according to students ' real-time interest and psychological statuses .

Cause: students ' real-time interest and psychological statuses

Effect: Learning materials and processes can be self-organized and adapted

**CASE: 77 s**

Stag: 319

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The dynamic human-centered micro-environment will be known by linking sensors to mobile phones and vehicles , collecting real-time information , and classifying information according to the location , distribution of population and pollution sources .

Cause: the location , distribution of population and pollution sources

Effect: The dynamic human-centered micro-environment will be known by linking sensors to mobile phones and vehicles , collecting real-time information , and classifying information

**CASE: 79 a**

Stag: 320

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The CP3SME will help people know pollution sources and take appropriate control measures according to dynamic real-time micro-environment and recommendations .

Cause: dynamic real-time micro-environment and recommendations

Effect: The CP3SME will help people know pollution sources and take appropriate control measures

**CASE: 81 m**

Stag: 328

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Vehicles can be guided to appropriate destination according to intentions and minimization of energy consumption .

Cause: intentions and minimization of energy consumption

Effect: Vehicles can be guided to appropriate destination

**CASE: 90 f**

Stag: 356

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Some artifacts like paintings are passive , but some like robots can act according to the pre-designed programs .

Cause: the pre-designed programs

Effect: Some artifacts like paintings are passive , but some like robots can act

**CASE: 96 a**

Stag: 363

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 6 -RRB- The generation of the symbol space to help indicate semantics according to rules of languages .

Cause: rules of languages

Effect: -LRB- 6 -RRB- The generation of the symbol space to help indicate semantics

**CASE: 104 m**

Stag: 383

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Individuals link one another according to the rules in different spaces .

Cause: the rules in different spaces

Effect: Individuals link one another

**CASE: 113 a**

Stag: 440

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The other nodes do not know the behaviors unless reasoning or information flow can pass through the nodes according to rules .

Cause: rules

Effect: The other nodes do not know the behaviors unless reasoning or information flow can pass through the nodes

**CASE: 122 m**

Stag: 487

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: A multi-dimensional classification space can organize semantic images according to classifications and support zooming on classification hierarchies .

Cause: classifications

Effect: A multi-dimensional classification space can organize semantic images

**CASE: 124 m**

Stag: 489

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Resources like texts and relevant senses will be mapped into a point in the space according to classifications .

Cause: classifications

Effect: Resources like texts and relevant senses will be mapped into a point in the space

**CASE: 126 a**

Stag: 502

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 1 -RRB- Selecting the situation for reflection according to the active points in the mental space reflecting the physical , physiological , psychological , and socio requirements .

Cause: the active points in the mental space reflecting the physical , physiological , psychological , and socio requirements

Effect: -LRB- 1 -RRB- Selecting the situation for reflection

**CASE: 128 m**

Stag: 507

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 3 -RRB- Moving the instances in one point to another point according to the change of the structure of the space .

Cause: the change of the structure of the space

Effect: -LRB- 3 -RRB- Moving the instances in one point to another point

**CASE: 129 m**

Stag: 513

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 9 -RRB- Emerging a semantic image according to a given network in the physical space or socio space .

Cause: a given network in the physical space or socio space

Effect: -LRB- 9 -RRB- Emerging a semantic image

**CASE: 134 a**

Stag: 546

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Asking a group of students to draw paintings independently according to the same story

Cause: the same story

Effect: Asking a group of students to draw paintings independently

**CASE: 140 a**

Stag: 585

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Its basic opinion is that domain is a collection of collaborating objects , and that software should be organized dynamically according to the structure of the domain .

Cause: the structure of the domain

Effect: Its basic opinion is that domain is a collection of collaborating objects , and that software should be organized dynamically

**CASE: 154 a**

Stag: 639

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Any semantic node can link to any other node according to the rules .

Cause: the rules

Effect: Any semantic node can link to any other node

**CASE: 166 a**

Stag: 680

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: -LRB- 2 -RRB- How to recommend the best link to a node to realize its maximum performance according to such criteria as the rise of rank .

Cause: such criteria as the rise of rank

Effect: -LRB- 2 -RRB- How to recommend the best link to a node to realize its maximum performance

**CASE: 170 m**

Stag: 692

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Humans organize artifacts according to some socio rules , e.g. , co-location of different types of restaurants .

Cause: some socio rules , e.g. , co-location of different types of restaurants

Effect: Humans organize artifacts

**CASE: 174 a**

Stag: 701

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: It can simulate the effect of operations -LRB- e.g. , linking a new semantic node to an existing semantic node -RRB- according to some principles of emerging as depicted in Fig. 10 -LRB- d -RRB- .

Cause: some principles of emerging as depicted in Fig. 10 -LRB- d -RRB-

Effect: It can simulate the effect of operations -LRB- e.g. , linking a new semantic node to an existing semantic node -RRB-

**CASE: 182 m**

Stag: 808

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Multiple candidate services would be available for selection or for composition to support effective interaction according to a service description language and the interaction interest .

Cause: a service description language and the interaction interest

Effect: Multiple candidate services would be available for selection or for composition to support effective interaction

**CASE: 184 a**

Stag: 818

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: This type of complex link can be regarded as a service that can model the mental space , recognize socio behaviors and events , and organize services according to the semantic image emerging in the mental space and socio rules .

Cause: the semantic image emerging in the mental space and socio rules

Effect: This type of complex link can be regarded as a service that can model the mental space , recognize socio behaviors and events , and organize services

**CASE: 187 m**

Stag: 834

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The complex link can not only play the role of a semantic link but also facilitate interaction and transmit resources -LRB- denoted as ci -RRB- according to the interests of nodes and the rules on both nodes and links in multiple spaces .

Cause: the interests of nodes and the rules on both nodes and links in multiple spaces

Effect: The complex link can not only play the role of a semantic link but also facilitate interaction and transmit resources -LRB- denoted as ci -RRB-

**CASE: 195 m**

Stag: 864

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Influence can be measured according to the extent of transforming the pattern of a complex link network .

Cause: the extent of transforming the pattern of a complex link network

Effect: Influence can be measured

**CASE: 214 f**

Stag: 947

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: A fundamental difference between machine and human is that humans can co-experience in multiple spaces and emerge semantic images and motivations according to psychological , physiological and socio requirements .

Cause: psychological , physiological and socio requirements

Effect: A fundamental difference between machine and human is that humans can co-experience in multiple spaces and emerge semantic images and motivations

**CASE: 225 a**

Stag: 982

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Services are provided on demand through logistics of materials , services , information and knowledge according to socio rules .

Cause: socio rules

Effect: Services are provided on demand through logistics of materials , services , information and knowledge

**CASE: 226 f**

Stag: 983

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: The logistic processes will leave semantic images in the environment and can be adapted according to the change of requirements .

Cause: the change of requirements

Effect: The logistic processes will leave semantic images in the environment and can be adapted

**CASE: 241 s**

Stag: 1074

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Semantic images emerge and evolve when forms are sensed , classified , linked , and reasoned according to the existing semantic images in the mental space .

Cause: the existing semantic images in the mental space

Effect: Semantic images emerge and evolve when forms are sensed , classified , linked , and reasoned

### PTID:56, According to – 4: a-3, m-1

**CASE: 26 a**

Stag: 100

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: The key is to establish and maintain the semantic links between peers according to their schemas , and to develop routing strategies that can make use of the links .

Cause: their schemas

Effect: and to develop routing strategies that can make use of the links .

**CASE: 151 a**

Stag: 628

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Potential semantic links may be derived out from SLN according to Rules when a semantic link l indicated by the concept hierarchy is added to SLN at time t , i.e. , SLN -LRB- t +1 -RRB- = Reason -LRB- SLN -LRB- t -RRB- U -LCB- l -LRB- t -RRB- -RCB- , Rules -RRB- .

Cause: Rules

Effect: i.e. , SLN -LRB- t +1 -RRB- = Reason -LRB- SLN -LRB- t -RRB- U -LCB- l -LRB- t -RRB- -RCB- , Rules -RRB- .

**CASE: 171 a**

Stag: 694

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: An artist in the socio space creates an artifact -LRB- e.g. , sculpture -RRB- in the artifact space according to the semantic image emerged in the mental space , and then puts the artifact close to a physical object -LRB- e.g. , hill -RRB- at latitude x and longitude y , and at time t.

Cause: the semantic image emerged in the mental space

Effect: and then puts the artifact close to a physical object -LRB- e.g. , hill -RRB- at latitude x and longitude y , and at time t.

**CASE: 237 m**

Stag: 1051

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: Humans can actively link experiences according to cause and effect , which are categories that are hard to be generated from experience .

Cause: cause and effect

Effect: which are categories that are hard to be generated from experience .

### PTID:80, As – 26: n\_1-7, m-2, a-16, f-1

**CASE: 5 a**

Stag: 14

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: He described computer intelligence as a machine that can learn from experience and can alter its own instructions in 1947 and then proposed Turing test -LSB- 68 -RSB- -LSB- 69 -RSB- .

Cause: a machine that can learn from experience and can alter its own instructions in 1947 and then proposed Turing test -LSB- 68 -RSB- -LSB- 69 -RSB- .

Effect: He described computer intelligence

**CASE: 10 a**

Stag: 20

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: He regarded information system as automated external symbol manipulation , and designed the system H-LAM/T -LRB- Human using Language , Artifacts , and Methodology , in which he Trained -RRB- .

Cause: automated external symbol manipulation , and designed the system H-LAM/T -LRB- Human using Language , Artifacts , and Methodology , in which he Trained -RRB- .

Effect: He regarded information system

**CASE: 11 a**

Stag: 21 22

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: In 1968 , he created NLS -LRB- oN Line System -RRB- as the early hypertext system with three features : a database of nonlinear text , view filters for selecting information from the database , and views that structure the display of information for the terminal .

Cause: the early hypertext system with three features : a database of nonlinear text , view filters for selecting information from the database , and views that structure the display of information for the terminal

Effect: In 1968 , he created NLS -LRB- oN Line System -RRB-

**CASE: 18 a**

Stag: 76

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The similar relation can be detected by analyzing the contents of nodes based on such approaches as the Latent Semantic Analysis -LRB- LSA -RRB- and the Vector Space Model -LRB- VSM -RRB- -LSB- 46 -RSB- -LSB- 62 -RSB- .

Cause: the Latent Semantic Analysis -LRB- LSA -RRB- and the Vector Space Model -LRB- VSM -RRB- -LSB- 46 -RSB- -LSB- 62 -RSB- .

Effect: The similar relation can be detected by analyzing the contents of nodes based on such approaches

**CASE: 34 a**

Stag: 127

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Mind is different from brain just as software is different from hardware .

Cause: software is different from hardware .

Effect: Mind is different from brain just

**CASE: 44 a**

Stag: 175

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Schemas serve as structured beliefs that are grounded in an agent 's physical environment through a causal-predictive cycle of action and perception .

Cause: structured beliefs that are grounded in an agent 's physical

Effect: Schemas serve

**CASE: 74 n\_1**

Stag: 311 312

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The CP3SME will help people with different cultural backgrounds collaborate effectively by transforming symbol forms , linking symbols to different spaces , and establishing peers ' semantic images in their mental spaces . As the consequence of collaboration , the collaborators ' mental spaces evolve toward more commonalities .

Cause: the consequence of collaboration , the collaborators ' mental spaces evolve toward more commonalities .

Effect: The CP3SME will help people with different cultural backgrounds collaborate effectively by transforming symbol forms , linking symbols to different spaces , and establishing peers ' semantic images in their mental spaces .

**CASE: 83 m**

Stag: 333 334

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The revolution of CP3SME will also bring new security issues . As human behaviors will influence the physical space , physiological space , psychological space , and socio space through the cyber space , previous security issues isolated in one space will pass through multiple spaces .

Cause: human behaviors will influence the physical space , physiological space , psychological space , and socio space through the cyber space , previous security issues isolated in one space will pass through multiple spaces .

Effect: The revolution of CP3SME will also bring new security issues .

**CASE: 84 a**

Stag: 340 341

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The following are some great events of decomposition : -LRB- 1 -RRB- The generation of the mental space to reflect various forms in the physical space and socio space as semantic images , to evolve the semantic images , to make abstraction and analogy by classification , linking and reasoning , to generate some flows through semantic images , and to emerge and re-emerge semantic images of different scales through the semantic lens -LSB- 89 -RSB- .

Cause: semantic images , to evolve the semantic images , to make abstraction and analogy by classification , linking and reasoning , to generate some flows through semantic images , and to emerge and re-emerge semantic images of different scales through the semantic lens -LSB- 89 -RSB- .

Effect: The following are some great events of decomposition : -LRB- 1 -RRB- The generation of the mental space to reflect various forms in the physical space and socio space

**CASE: 86 n\_1**

Stag: 348

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If the organs are abstracted as service nodes and the relations between organs are abstracted as semantic links , an individual physiological space can be abstracted as a complex semantic link network evolving with physiological rules and the flows of material , energy and information through the links .

Cause: service nodes and the relations between organs are abstracted as semantic links , an individual physiological space can be abstracted as a complex semantic link network evolving with physiological rules and the flows of material , energy and information through the links .

Effect: the organs are abstracted

**CASE: 87 a**

Stag: 348

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: service nodes and the relations between organs are abstracted as semantic links , an individual physiological space can be abstracted as a complex semantic link network evolving with physiological rules and the flows of material , energy and information through the links .

Cause: semantic links , an individual physiological space can be abstracted as a complex semantic link network evolving with physiological rules and the flows of material , energy and information through the links .

Effect: service nodes and the relations between organs are abstracted

**CASE: 91 n\_1**

Stag: 357

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If artifacts are abstracted as semantic nodes with function descriptions , and the relations between artifacts are abstracted as semantic links , the artifact space can be regarded as a semantic link network evolving with scientific , technological and socio rules .

Cause: semantic nodes with function descriptions , and the relations between artifacts are abstracted as semantic links , the artifact space can be regarded as a semantic link network evolving with scientific , technological and socio rules .

Effect: artifacts are abstracted

**CASE: 92 a**

Stag: 357

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: semantic nodes with function descriptions , and the relations between artifacts are abstracted as semantic links , the artifact space can be regarded as a semantic link network evolving with scientific , technological and socio rules .

Cause: semantic links , the artifact space can be regarded as a semantic link network evolving with scientific , technological and socio rules .

Effect: semantic nodes with function descriptions , and the relations between artifacts are abstracted

**CASE: 94 n\_1**

Stag: 362

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If socio individuals are abstracted as active semantic nodes and socio relations between individuals are abstracted as semantic links , the socio space can be regarded as a complex semantic link network evolving with socio rules and interactions .

Cause: active semantic nodes and socio relations between individuals are abstracted as semantic links , the socio space can be regarded as a complex semantic link network evolving with socio rules and interactions .

Effect: socio individuals are abstracted

**CASE: 95 a**

Stag: 362

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: active semantic nodes and socio relations between individuals are abstracted as semantic links , the socio space can be regarded as a complex semantic link network evolving with socio rules and interactions .

Cause: semantic links , the socio space can be regarded as a complex semantic link network evolving with socio rules and interactions .

Effect: active semantic nodes and socio relations between individuals are abstracted

**CASE: 100 n\_1**

Stag: 368

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If symbols or symbol units -LRB- e.g. , words , phrases , and sentences -RRB- are abstracted as semantic nodes , and the relations -LRB- e.g. , sequential relation and cause-effect relation -RRB- between symbols are abstracted as semantic links , the symbol space can be regarded as an evolving semantic link network with rules of languages .

Cause: semantic nodes , and the relations -LRB- e.g. , sequential relation and cause-effect relation -RRB- between symbols are abstracted as semantic links , the symbol space can be regarded as an evolving semantic link network with rules of languages .

Effect: symbols or symbol units -LRB- e.g. , words , phrases , and sentences -RRB- are abstracted

**CASE: 101 a**

Stag: 368

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: semantic nodes , and the relations -LRB- e.g. , sequential relation and cause-effect relation -RRB- between symbols are abstracted as semantic links , the symbol space can be regarded as an evolving semantic link network with rules of languages .

Cause: semantic links , the symbol space can be regarded as an evolving semantic link network with rules of languages .

Effect: semantic nodes , and the relations -LRB- e.g. , sequential relation and cause-effect relation -RRB- between symbols are abstracted

**CASE: 102 n\_1**

Stag: 371

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: If information clusters like web pages or function clusters like services are abstracted as semantic nodes and the relation between clusters as semantic links , the cyber space can be abstracted as a complex semantic link network evolving various interactions .

Cause: semantic nodes and the relation between clusters as semantic links , the cyber space can be abstracted as a complex semantic link network evolving various interactions .

Effect: information clusters like web pages or function clusters like services are abstracted

**CASE: 110 f**

Stag: 419 420

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Languages are rules of composing symbols for indicating and linking semantic images in the mental space during interaction -LSB- 24 -RSB- . As the effect of learning and using languages for interaction , languages develop with the evolution of the mental space and the symbol space .

Cause: the effect of learning and using languages for interaction , languages develop with the evolution of the mental space and the symbol space .

Effect: Languages are rules of composing symbols for indicating and linking semantic images in the mental space during interaction -LSB- 24 -RSB- .

**CASE: 117 a**

Stag: 452 453

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Human minds reflect one another and reflect the patterns in the physical space and socio space and evolve themselves patterns , make artifacts such as mirrors and lens to reflect more of themselves and the other spaces , and create the cyber space to reflect the society . As a kind of mirror , the cyber space reflects the other spaces by recording and linking various interactions in other spaces -LSB- 89 -RSB- .

Cause: a kind of mirror , the cyber space reflects the other spaces by recording and linking various interactions in other spaces -LSB- 89 -RSB- .

Effect: Human minds reflect one another and reflect the patterns in the physical space and socio space and evolve themselves patterns , make artifacts such as mirrors and lens to reflect more of themselves and the other spaces , and create the cyber space to reflect the society .

**CASE: 131 m**

Stag: 532

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Different people may have different semantic images when sensing the same artifact as people may have different experiences .

Cause: people may have different experiences .

Effect: Different people may have different semantic images when sensing the same artifact

**CASE: 172 a**

Stag: 697

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The mental space reflects the physical objects and the semantic links as abstract classes and conceptual relations -LRB- e.g. , the nearby link -RRB- , and links the classes when co-experiencing in multiple spaces -LRB- Fig. 10 -LRB- b -RRB- -RRB- .

Cause: abstract classes and conceptual relations -LRB- e.g. , the nearby link -RRB- , and links the classes when co-experiencing in multiple spaces -LRB- Fig. 10 -LRB- b -RRB- -RRB- .

Effect: The mental space reflects the physical objects and the semantic links

**CASE: 173 a**

Stag: 698 699

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Reasoning may include the unknown physical object -LRB- the black box -RRB- into a semantic image and derive relevant semantic links to other semantic images . As depicted in Fig. 10 -LRB- c -RRB- , the cyber space can visualize the semantic link networks for humans to operate according to the semantic images in mind .

Cause: depicted in Fig. 10 -LRB- c -RRB- , the cyber space can visualize the semantic link networks for humans to operate according to the semantic images in mind .

Effect: Reasoning may include the unknown physical object -LRB- the black box -RRB- into a semantic image and derive relevant semantic links to other semantic images .

**CASE: 207 n\_1**

Stag: 912

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: For example , linking the agricultural ecological system to the industrial ecological system enables some waste of industry to be used as the fertilizer of crops , and enables the agricultural products to be the raw materials of some industries .

Cause: the fertilizer of crops , and enables the agricultural products to be the raw materials of some industries .

Effect: example , linking the agricultural ecological system to the industrial ecological system enables some waste of industry to be used

**CASE: 210 a**

Stag: 932 933

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: CP3SME also provides a new innovation environment . As shown in Fig. 16 , thoughts are inspired by the requirements raised in the socio space and the co-experiences in the physical space , socio space , artifact space , physiological space , and psychological space .

Cause: shown in Fig. 16 , thoughts are inspired by the requirements raised in the socio space and the co-experiences in the physical space , socio space , artifact space , physiological space , and psychological space .

Effect: CP3SME also provides a new innovation environment .

**CASE: 231 a**

Stag: 1028

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: For example , Minsky regarded minds as the collections of vast number of semi-autonomous , intricately connected agents , and gave an explanation of how minds relate to such functions as motivation , language , memory , learning , intentions , and metaphors .

Cause: the collections of vast number of semi-autonomous , intricately connected agents , and gave an explanation of how minds relate to such functions as motivation , language , memory , learning , intentions , and metaphors .

Effect: For example , Minsky regarded minds

### PTID:44, For – 22: m-11, a-10, f-1

**CASE: 7 a**

Stag: 16

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: In 1945 , Vannevar Bush introduced the ideal of memex , which could browse and make notes in an extensive on-line text and graphical system , and contain a very large library , personal notes , photographs and sketches , and several screens and a facility for establishing a labeled link between any two points in the entire library -LSB- 8 -RSB- .

Cause: establishing a labeled link between any two points in the entire library -LSB- 8 -RSB-

Effect: In 1945 , Vannevar Bush introduced the ideal of memex , which could browse and make notes in an extensive on-line text and graphical system , and contain a very large library , personal notes , photographs and sketches , and several screens and a facility

**CASE: 9 m**

Stag: 18

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Hypertext pioneer Engelbart proposed a conceptual framework for augmenting man 's intellect in 1963 -LSB- 21 -RSB- .

Cause: augmenting man 's intellect in 1963 -LSB- 21 -RSB-

Effect: Hypertext pioneer Engelbart proposed a conceptual framework

**CASE: 12 a**

Stag: 22

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: a database of nonlinear text , view filters for selecting information from the database , and views that structure the display of information for the terminal .

Cause: selecting information from the database

Effect: a database of nonlinear text , view filters

**CASE: 20 m**

Stag: 87

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Hyperlinks and previous typed links are created for structuring the cyber space .

Cause: structuring the cyber space

Effect: Hyperlinks and previous typed links are created

**CASE: 22 a**

Stag: 92

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: A simple semantic space suggested for regulating the semantics of a Semantic Link Network -LRB- SLN -RRB- consists of a classification hierarchy of concepts and a set of linking rules -LSB- 81 -RSB- -LSB- 87 -RSB- .

Cause: regulating the semantics of a Semantic Link Network

Effect: A simple semantic space suggested

**CASE: 36 m**

Stag: 133

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The associate mechanism polynemes invoke partial states of agents for representing some different aspects of a thing 's meaning , e.g. , recognizing an apple arouses its properties and relevant experience .

Cause: representing some different aspects of a thing 's meaning

Effect: The associate mechanism polynemes invoke partial states of agents

**CASE: 37 m**

Stag: 137

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Pronomes are isonomes for controlling the use of short-term memory representations , especially in a larger situation .

Cause: controlling the use of short-term memory representations , especially in a larger situation

Effect: Pronomes are isonomes

**CASE: 50 m**

Stag: 207

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Both rely on humans to add information to the cyber space for sharing with others .

Cause: sharing with others

Effect: Both rely on humans to add information to the cyber space

**CASE: 51 m**

Stag: 212

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: user behaviors can be sensed and fed back to the cyber space for analyzing the patterns of behaviors , and humans can remotely control the actuators to behave in the physical space through the cyber space .

Cause: analyzing the patterns of behaviors

Effect: user behaviors can be sensed and fed back to the cyber space

**CASE: 59 a**

Stag: 234

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Research concerns origin and essence of material , energy , information , knowledge , service , life , mind and society in the environment , harmonious and sustainable development of the environment , and the methodology for studying , developing and maintaining the environment .

Cause: studying , developing and maintaining the environment

Effect: Research concerns origin and essence of material , energy , information , knowledge , service , life , mind and society in the environment , harmonious and sustainable development of the environment , and the methodology

**CASE: 63 a**

Stag: 270

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: A multi-dimensional classification space is suitable for organizing classes in different spaces -LSB- 77 -RSB- -LSB- 82 -RSB- .

Cause: organizing classes in different spaces -LSB- 77 -RSB- -LSB- 82 -RSB-

Effect: A multi-dimensional classification space is suitable

**CASE: 66 m**

Stag: 276

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Adding a time dimension to the multi-dimensional classification space can form the space for showing the change of resources when compressing and stretching the time dimension -LSB- 82 -RSB- .

Cause: showing the change of resources when compressing and stretching the time dimension -LSB- 82 -RSB-

Effect: Adding a time dimension to the multi-dimensional classification space can form the space

**CASE: 67 a**

Stag: 277

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Sciences and technologies specific to a single space will converge to a general theory and methodology for studying and developing the CP3SME .

Cause: studying and developing the CP3SME

Effect: Sciences and technologies specific to a single space will converge to a general theory and methodology

**CASE: 93 a**

Stag: 360

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Various languages are interaction tools for constructing the socio space .

Cause: constructing the socio space

Effect: Various languages are interaction tools

**CASE: 109 f**

Stag: 419

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Languages are rules of composing symbols for indicating and linking semantic images in the mental space during interaction -LSB- 24 -RSB- .

Cause: indicating and linking semantic images in the mental space during interaction -LSB- 24 -RSB-

Effect: Languages are rules of composing symbols

**CASE: 176 a**

Stag: 716

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Rebuilding a mutual benefit relation needs more satisfied interactions than that for creating a new one .

Cause: creating a new one

Effect: Rebuilding a mutual benefit relation needs more satisfied interactions than that

**CASE: 185 a**

Stag: 823

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Most previous computing techniques are for improving the cyber space , for example , the Semantic Web is to create machine-understandable semantics in the cyber space , the semantic net is to express knowledge in the cyber space , and the semantic link network is to reflect socio relations and the dynamicity in the cyber space .

Cause: improving the cyber space

Effect: Most previous computing techniques are

**CASE: 200 m**

Stag: 887

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The new link has higher probability to connect the same type of link for transmitting materials or contents .

Cause: transmitting materials or contents

Effect: The new link has higher probability to connect the same type of link

**CASE: 202 m**

Stag: 893

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Complex link can be chained and closed for improving the performance of behaviors in multiple spaces .

Cause: improving the performance of behaviors in multiple spaces

Effect: Complex link can be chained and closed

**CASE: 213 a**

Stag: 940

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The end-of-use artifact will be decomposed into materials that can be reused for composing new artifacts -LSB- 67 -RSB- .

Cause: composing new artifacts -LSB- 67 -RSB-

Effect: The end-of-use artifact will be decomposed into materials that can be reused

**CASE: 221 m**

Stag: 970

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The interactive environment operates for ensuring harmonious development of individuals and the environment .

Cause: ensuring harmonious development of individuals and the environment

Effect: The interactive environment operates

**CASE: 243 m**

Stag: 1078

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Forms in more spaces provide richer experience for indicating semantic images .

Cause: indicating semantic images

Effect: Forms in more spaces provide richer experience

### PTID:48, Based on – 7: n\_1-1, m-2, a-4

**CASE: 19 n\_1**

Stag: 76

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: The similar relation can be detected by analyzing the contents of nodes based on such approaches

Cause: such approaches

Effect: The similar relation can be detected by analyzing the contents of nodes

**CASE: 25 a**

Stag: 97

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: guided browsing , and explanation based on reasoning .

Cause: reasoning

Effect: guided browsing , and explanation

**CASE: 80 m**

Stag: 327

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: Traffic jam will be avoided based on certain socio priority and real-time situation .

Cause: certain socio priority and real-time situation

Effect: Traffic jam will be avoided

**CASE: 88 a**

Stag: 351

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: Communities construct their psychological spaces through social construction process based on individual psychological spaces -LSB- 71 -RSB- .

Cause: individual psychological spaces -LSB- 71 -RSB-

Effect: Communities construct their psychological spaces through social construction process

**CASE: 149 m**

Stag: 619

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: The massively collaborative online repositories such as Wikipedia -LRB- www.wikipedia.org / -RRB- and ODP -LRB- Open Directory Project , www.dmoz.org / -RRB- can be used to build the hierarchy based on the analysis of how people define and evolve the classes .

Cause: the analysis of how people define and evolve the classes

Effect: The massively collaborative online repositories such as Wikipedia -LRB- www.wikipedia.org / -RRB- and ODP -LRB- Open Directory Project , www.dmoz.org / -RRB- can be used to build the hierarchy

**CASE: 165 a**

Stag: 679

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: needs to discover the implicit semantic links between linked objects based on uncertain reasoning .

Cause: uncertain reasoning

Effect: needs to discover the implicit semantic links between linked objects

**CASE: 197 a**

Stag: 872

Pattern: 0 [['based', 'on']]---- [['&R', '(,)', '(&ADV)'], ['&V-ing/&NP@C@', '(&Clause@C@)']]

sentTXT: The following is a motion energy measure of operation based on the number of individuals who have changed their communities influenced by the operation and the total number of individuals as follows :

Cause: the number of individuals who have changed their communities influenced by the operation and the total number of individuals as follows

Effect: The following is a motion energy measure of operation

### PTID:115, Based on – 7: m-3, a-4

**CASE: 28 m**

Stag: 106

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: Reasoning on instances is based on reasoning rules defined in the schema .

Cause: reasoning rules defined in the schema

Effect: Reasoning on instances

**CASE: 98 a**

Stag: 364

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: while some are based on natural languages .

Cause: natural languages

Effect: some

**CASE: 107 a**

Stag: 405

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: Human behaviors and reasons are based on various processes of co-experiencing in multiple spaces .

Cause: various processes of co-experiencing in multiple spaces

Effect: Human behaviors and reasons

**CASE: 150 m**

Stag: 627

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: Reasoning on the semantic link networks in different spaces is based on the rules and conditions given by humans .

Cause: the rules and conditions given by humans

Effect: Reasoning on the semantic link networks in different spaces

**CASE: 194 m**

Stag: 861

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: harmony is based on healthy and satisfied interaction within a community .

Cause: healthy and satisfied interaction within a community

Effect: harmony

**CASE: 216 a**

Stag: 951

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: Traditional artificial intelligence research is based on representation .

Cause: representation

Effect: Traditional artificial intelligence research

**CASE: 223 a**

Stag: 973

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: e.g. , software and hardware are pre-designed , information retrieval is to get past data , and knowledge discovery is based on past data .

Cause: past data

Effect: e.g. , software and hardware are pre-designed , information retrieval is to get past data , and knowledge discovery

### PTID:47, Based on – 6: n\_1-1, a-5

**CASE: 24 a**

Stag: 97

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: A system based on SLN is expected to have some preliminary intelligence such as answering queries on relations , guided browsing , and explanation based on reasoning .

Cause: SLN is expected to have some preliminary intelligence such as answering queries on relations

Effect: guided browsing , and explanation based on reasoning .

**CASE: 97 a**

Stag: 364

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: Some symbol spaces are based on mathematical languages , while some are based on natural languages .

Cause: mathematical languages

Effect: while some are based on natural languages .

**CASE: 105 a**

Stag: 393

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: For example , the complex distance between individuals involved in a socio event can be defined according to the physical distances such as road length and straight-line distance , socio distances based on friendship or harmonious interaction , and symbol distances based on profiles .

Cause: friendship or harmonious interaction

Effect: and symbol distances based on

**CASE: 120 n\_1**

Stag: 483

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: Different from previous notions about the mental space -LSB- 23 -RSB- -LSB- 47 -RSB- -LSB- 51 -RSB- , the mental space model depicted in Fig. 7 is based on the multi-dimensional classification space , link and the Interactive Semantic Base ISB -LSB- 89 -RSB- , since classification , link and interaction are the basis of the development of the mental space .

Cause: the multi-dimensional classification space

Effect: link and the Interactive Semantic Base ISB -LSB- 89 -RSB- , since classification , link and interaction are the basis of the development of the mental

**CASE: 222 a**

Stag: 973

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: Many current technologies are based on or about past , e.g. , software and hardware are pre-designed , information retrieval is to get past data , and knowledge discovery is based on past data .

Cause: or about past

Effect: e.g. , software and hardware are pre-designed , information retrieval is to get past data , and knowledge discovery is based on past data .

**CASE: 232 a**

Stag: 1029

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: Different agents can be based on different processes with different purposes , ways to represent knowledge , and approaches to produce results .

Cause: different processes with different purposes

Effect: ways to represent knowledge , and approaches to produce results .

### PTID:81, Ving – 14: m-5, a-7, f-2

**CASE: 3 m**

Stag: 6

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Linking various spaces will create a complex space -- the Cyber-Physical-Physiological-Psychological-SocioMental Environment CP3SME .

Cause: Linking various spaces

Effect: will create a complex space --

**CASE: 32 a**

Stag: 113

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from the schemas of databases , the self-organized SLN needs an adaptable schema that meets the need of changes

Cause: Different from the schemas of databases

Effect: the self-organized SLN needs an adaptable schema that meets the need of changes

**CASE: 40** **m**

Stag: 145

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Extending Bush 's memex vision , Gray proposed the notion of personal memex and world memex .

Cause: Extending Bush 's memex vision

Effect: Gray proposed the notion of personal memex and world memex .

**CASE: 60 a**

Stag: 254

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from the processes of controlling and computing , CP3SME executes with pervasive interactions between individuals within and cross spaces .

Cause: Different from the processes of controlling and computing

Effect: CP3SME executes with pervasive interactions between individuals within and cross spaces .

**CASE: 61 a**

Stag: 258

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from digital archival , the CP3SME 's preserving will be real-time , lifetime , and at multiple semantic layers .

Cause: Different from digital archival

Effect: the CP3SME 's preserving will be real-time , lifetime , and at multiple semantic layers .

**CASE: 89 m**

Stag: 352

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Abstracting behaviors as active semantic nodes and abstracting the relations between behaviors and the relations between the external situation and internal condition as semantic links , the psychological space can be regarded as a complex semantic link network evolving with psychological rules .

Cause: Abstracting behaviors as active semantic nodes and abstracting the relations between behaviors and the relations between the external situation and internal condition as semantic links

Effect: the psychological space can be regarded as a complex semantic link network evolving with psychological rules .

**CASE: 103 a**

Stag: 378

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from other individuals , humans can actively link symbols to the physical space , and to the socio space through the physiological space , psychological space , and mental space .

Cause: Different from other individuals

Effect: humans can actively link symbols to the physical space , and to the socio space through the physiological space , psychological space , and mental space .

**CASE: 116 m**

Stag: 449

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Knowing symmetry and self-similarity can help raise the effectiveness of operations such as control and navigation .

Cause: Knowing symmetry and self-similarity

Effect: can help raise the effectiveness of operations such as control and navigation

**CASE: 125 a**

Stag: 500

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from previous understanding of knowledge , knowledge flow can generate and evolve knowledge during flow process -LSB- 80 -RSB- .

Cause: Different from previous understanding of knowledge

Effect: knowledge flow can generate and evolve knowledge during flow process -LSB- 80 -RSB- .

**CASE: 163 f**

Stag: 667

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Visualizing the evolution process and the effects of operations helps humans to link relevant semantic images .

Cause: Visualizing the evolution process

Effect: and the effects of operations helps humans to link relevant semantic images .

**CASE: 164 m**

Stag: 679

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Answering these questions needs to discover the implicit semantic links between linked objects based on uncertain reasoning .

Cause: Answering these questions

Effect: needs to discover the implicit semantic links between linked objects based on uncertain reasoning .

**CASE: 180 f**

Stag: 733

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Linking different spaces can answer and explain the same question in different spaces .

Cause: Linking different spaces

Effect: can answer and

**CASE: 193 a**

Stag: 861

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Different from the ranks , harmony is based on healthy and satisfied interaction within a community .

Cause: Different from the ranks

Effect: harmony is based on healthy and satisfied interaction within a community .

**CASE: 229 a**

Stag: 1014

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: integrating the multi-dimensional classification space and the semantic link network -LSB- 82 -RSB- -LSB- 87 -RSB- .

Cause: integrating the multi-dimensional classification space and the semantic link network

Effect: -LSB- 82 -RSB- -LSB- 87 -RSB- .

### PTID:68, By/through – 7: m-5, a-2

**CASE: 27 m**

Stag: 104

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: SLN can have schemas to regulate its semantics by specifying node types , link types , and reasoning rules -LSB- 88 -RSB- .

Cause: specifying node types , link types , and reasoning rules -LSB- 88 -RSB-

Effect: SLN can have schemas to regulate its semantics

**CASE: 43 m**

Stag: 174

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: It provides a computational path from sensing and motor action to words and speech acts by combing concepts from semiotics and schema theory to develop a holistic approach to linguistic meaning .

Cause: combing concepts from semiotics and schema theory to develop a holistic approach to linguistic meaning

Effect: It provides a computational path from sensing and motor action to words and speech acts

**CASE: 49 a**

Stag: 201

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: It is important to explore the semantics of different categories by using different approaches -LSB- 59 -RSB- .

Cause: using different approaches -LSB- 59 -RSB-

Effect: It is important to explore the semantics of different categories

**CASE: 121 m**

Stag: 486

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: The basic classification and linking mechanism in the mental space could be inherited and fused through learning , experiencing and influencing between individuals .

Cause: learning , experiencing and influencing between individuals

Effect: The basic classification and linking mechanism in the mental space could be inherited and fused

**CASE: 167 a**

Stag: 688

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: -LRB- 7 -RRB- What level of intelligence can be reached by integrating multi-dimensional classification ability , linking ability and complex reasoning ability ?

Cause: integrating multi-dimensional classification ability , linking ability and complex reasoning ability

Effect: level of intelligence can be reached

**CASE: 208 m**

Stag: 918

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: Humans can not only sense from multiple channels but also form close loops through sensing , behaving , emerging semantic images , and reasoning .

Cause: sensing , behaving , emerging semantic images , and reasoning

Effect: Humans can not only sense from multiple channels but also form close loops

**CASE: 230 m**

Stag: 1024

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: For example , Maxwell created the electromagnetic theory by unveiling the uniformity of electricity , magnetism and light .

Cause: unveiling the uniformity of electricity , magnetism and light

Effect: For example , Maxwell created the electromagnetic theory

### PTID:67, By/through – 2: m-1, a-1

**CASE: 217 m**

Stag: 953

Pattern: 0 [[['by', 'through']]]---- [[], ['&V-ing@C@', '&R']]

sentTXT: In the CP3SME , co-experiencing in multiple spaces , forming and improving the closed loops of various links and flows through sensing , classifying , emerging , computing , communicating , interacting , controlling , behaving , and reasoning are the basis of the cyber-physical-socio intelligence .

Cause: sensing

Effect: , classifying , emerging , computing , communicating , interacting , controlling , behaving , and reasoning are the basis of the cyber-physical-socio intelligence .

**CASE: 227 a**

Stag: 997

Pattern: 0 [[['by', 'through']]]---- [[], ['&V-ing@C@', '&R']]

sentTXT: How to raise the effectiveness of the closed loops by reducing redundant interactions is an important issue .

Cause: reducing redundant interactions

Effect: is an important issue .

### PTID:88, Indicate/realize/ensure – 4: m-4

**CASE: 130 m**

Stag: 530

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Different languages -LRB- e.g. , natural language , art language , and mathematic language -RRB- indicate semantic images at different abstraction levels and scales .

Cause: Different languages -LRB- e.g. , natural language , art language , and mathematic language -RRB-

Effect: semantic images at different abstraction levels and scales

**CASE: 137 m**

Stag: 560

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: A semantic link indicates a relation between two semantic nodes .

Cause: A semantic link

Effect: a relation between two semantic nodes

**CASE: 161 m**

Stag: 652

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Different from previous graph-based models , different processes of forming an SLN may indicate different semantics .

Cause: different processes of forming an SLN may

Effect: different semantics

**CASE: 169 m**

Stag: 691

Pattern: 0 [[['indicate', 'indicates', 'indicated', 'realize', 'realizes', 'realized', 'ensure', 'ensures', 'ensured', 'imply', 'implies', 'implied']]]---- [['&NP@C@', '(&Clause@C@)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Semantic link indicates classification , reference , or rendering relations between artifacts .

Cause: Semantic link

Effect: classification , reference , or rendering relations between artifacts

### PTID:79, Since – 3: a-3

**CASE: 6 a**

Stag: 14 15

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: He described computer intelligence as a machine that can learn from experience and can alter its own instructions in 1947 and then proposed Turing test -LSB- 68 -RSB- -LSB- 69 -RSB- . Since then , scientists have been pursuing artificial intelligence .

Cause: then , scientists have been pursuing artificial intelligence .

Effect: He described computer intelligence as a machine that can learn from experience and can alter its own instructions in 1947 and then proposed Turing test -LSB- 68 -RSB- -LSB- 69 -RSB- .

**CASE: 8 a**

Stag: 16 17

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: In 1945 , Vannevar Bush introduced the ideal of memex , which could browse and make notes in an extensive on-line text and graphical system , and contain a very large library , personal notes , photographs and sketches , and several screens and a facility for establishing a labeled link between any two points in the entire library -LSB- 8 -RSB- . Since then , scientists have been pursuing an ideal cyber space .

Cause: then , scientists have been pursuing an ideal cyber

Effect: In 1945 , Vannevar Bush introduced the ideal of memex , which could browse and make notes in an extensive on-line text and graphical system , and contain a very large library , personal notes , photographs and sketches , and several screens and a facility for establishing a labeled link between any two points in the entire library -LSB- 8 -RSB- .

**CASE: 16 a**

Stag: 68

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: Much effort has been made on the Semantic Web since Berners-Lee initiated the vision -LSB- 2 -RSB- .

Cause: Berners-Lee initiated the vision -LSB- 2 -RSB- .

Effect: Much effort has been made on the Semantic Web

### PTID:86,Lead to – 3:m-1, f-1, s-1

**CASE: 186 m**

Stag: 833

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&V-ing/&NP@C@', '(&CAN/have/has/had)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: Different orders of operations may lead to different effects .

Cause: Different orders of operations

Effect: different effects

**CASE: 191 f**

Stag: 859

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&V-ing/&NP@C@', '(&CAN/have/has/had)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: For example , the spouse relation can be either harmony or discord , over discord may lead to divorce .

Cause: discord

Effect: divorce

**CASE: 211 s**

Stag: 936

Pattern: 0 [[['lead', 'leads', 'led'], 'to']]---- [['&V-ing/&NP@C@', '(&CAN/have/has/had)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: The final design can lead to the artifacts in the artifact space through a manufacture process .

Cause: The final design

Effect: the artifacts in the artifact space through a manufacture process

### PTID:93, Imply/mean/indicate – 2: n\_2-1, m-1

**CASE: 235 n\_2**

Stag: 1044 1045

Pattern: 0 [[['imply', 'implies', 'implied', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(that)', '&R@Complete@']]

sentTXT: The epistemology has been emphasized in the effort to solve the semantics problem -LSB- 77 -RSB- . This implies that the current approaches to the semantic web , machine translation , and text understanding through processing symbols in the cyber space is questionable in essence .

Cause: The epistemology has been emphasized in the effort to solve the semantics problem -LSB- 77 -RSB-

Effect: the current approaches to the semantic web , machine translation , and text understanding through processing symbols in the cyber space is questionable in essence .

**CASE: 240 m**

Stag: 1070 1071

Pattern: 0 [[['imply', 'implies', 'implied', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(that)', '&R@Complete@']]

sentTXT: -LRB- 1 -RRB- Operations on forms get forms . This indicates that semantics can not be got by operating forms , and that machines are limited in ability to generate social semantics by processing symbols without the participation of mental space , physiological space and psychological space .

Cause: -LRB- 1 -RRB- Operations on forms get forms

Effect: semantics can not be got by operating forms , and that machines are limited in ability to generate social semantics by processing symbols without the participation of mental space ,

### PTID:94, Imply/mean/indicate – 1: n\_2-1

**CASE: 212 n\_2**

Stag: 936 937

Pattern: 0 [[['imply', 'implies', 'implied', 'mean', 'means', 'indicate', 'indicates', 'indicated']]]---- [['&C', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['&NP@R@']]

sentTXT: The final design can lead to the artifacts in the artifact space through a manufacture process . This indicates a new design paradigm that enables designers and users to co-experience during the whole design process .

Cause: The final design can lead to the artifacts in the artifact space through a manufacture process

Effect: a new design paradigm that enables designers and users to co-experience during the whole design process

### PTID:0, So – 2: m-2

**CASE: 178 m**

Stag: 722 723

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Some socio rules also support indirect interaction , for example , the friend of enemy may be enemy . So , the creation of a semantic link depends not only on the neighbor links and rules but also on interactions .

Cause: Some socio rules also support indirect interaction , for example , the friend of enemy may be enemy

Effect: the creation of a semantic link depends not only on the neighbor links and rules but also on interactions .

**CASE: 201 m**

Stag: 889

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: For example , a person with only one type of link like family link will be more probably isolated in society , so a node who wants to raise socio status should not link to an isolated node .

Cause: , a person with only one type of link like family link will be more probably isolated in society

Effect: a node who wants to raise socio status should not link to an isolated node .

### PTID:90, Concern/require/request – 2: n\_2-1, m-1

**CASE: 65 n\_2**

Stag: 274 275

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: Evolution simulation can be slowed down by stretching time , which enables the details of evolution to be clearly observed . This requires CP3SME to have an elastic time dimension and the models for the evolution of communities and individuals .

Cause: CP3SME

Effect: Evolution simulation can be slowed down by stretching time , which enables the details of evolution to be clearly observed

**CASE: 246 m**

Stag: 1095 1096

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&this', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: -LRB- 4 -RRB- Exploring the general linking methodology . This concerns new philosophical thinking , interactive computing model , nature of the complex linking such as dynamicity , symmetry and rules of various flows , the methods for improving various closed loops , and the methods for coordinating spaces , controlling and predicting evolution .

Cause: new philosophical thinking , interactive computing model , nature of the complex linking such as dynamicity , symmetry and rules of various flows , the methods for improving various closed loops , and the methods for coordinating spaces , controlling and predicting evolution

Effect: -LRB- 4 -RRB- Exploring the general linking methodology

### PTID:15, If/once – 1: a-1

**CASE: 183 a**

Stag: 814

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: For example , a photo of cup does not tell us if the cup contains coffee or tea , and it is even harder to tell us the taste .

Cause: the cup contains coffee or tea

Effect: and it is even harder to tell us the taste .

### PTID:1, Therefore – 1: n\_2-1

**CASE: 188 n\_2**

Stag: 835 836

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: They will influence the evolution of the network . Therefore , communities of different types will emerge and evolve according to different rules .

Cause: They will influence the evolution of the network

Effect: communities of different types will emerge and evolve according to different rules .

### PTID:114, Because – 1: n\_1-1

**CASE: 199 n\_1**

Stag: 886

Pattern: 1 [['because']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&C']]

sentTXT: This is because the node with richer types of links offers higher probability to the new link to derive out more links

Cause: the node with richer types of links offers higher probability to the new link to derive out more links

Effect: This

### PTID:98, Why – 1: n\_2-1

**CASE: 209 n\_2**

Stag: 920 921

Pattern: 10 [['why']]---- [['&C', '(,/./;/--)', '(&AND)', '&THIS', '&BE'], ['&R']]

sentTXT: Practice -LRB- e.g. , dictation -RRB- helps establish the links between the behaviors through different channels and between behaviors and semantic images . This is why blind people can not write in the normal natural languages .

Cause: Practice -LRB- e.g. , dictation -RRB- helps establish the links between the behaviors through different channels and between behaviors and semantic images

Effect: blind people can not write in the normal natural languages .

### PTID:17, For reason – 1: a-1

**CASE: 236 a**

Stag: 1049 1050

Pattern: 7 [['for'], [['reason', 'reasons']]]---- [['&C', '(,/;/./--)', '(&AND)'], ['(&this)'], ['(,/that)', '&R']]

sentTXT: Rationalists argue that the ultimate starting point for knowledge is not the senses but reason . Human beings rely on innate fundamental concepts or categories in minds such as space and time to organize and interpret sense experience .

Cause: Rationalists argue that the ultimate starting point

Effect: . Human beings rely on innate fundamental concepts or categories in minds such as space and time to organize and interpret sense experience

## F0014

### PTID:15, If/once – 3: m-2, f-1

**CASE: 2 m**

Stag: 3

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: If the proposed solution is not correct , we may either require that the test indicate this in a finite number of steps or else allow it to go on indefinitely .

Cause: the proposed solution is not correct

Effect: we may either require that the test indicate this in a finite number of steps or else allow it to go on indefinitely .

**CASE: 12 m**

Stag: 19

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: The most obvious idea is to say that if T1 and T2 are two Turing machines each computing a g -LRB- m , r -RRB- , then for a particular m and r the more efficient one is the one which carries out the computation in the fewest steps .

Cause: T1 and T2 are two Turing machines each computing a g -LRB- m

Effect: r -RRB- , then for a particular m and r the more efficient one is the one which carries out the computation in the fewest steps .

**CASE: 34 f**

Stag: 77

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: An action scheme is a computation rule which computes from a status function -LRB- its Godel number -RRB- a new status function , perhaps gives an estimate of g -LRB- m , r -RRB- if it has determined this , and computes a new action scheme .

Cause: it has determined this

Effect: and computes a new action scheme .

### PTID:14, If/once – 3: n\_1-1, f-2

**CASE: 5 n\_1**

Stag: 9

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: In fact , it has been shown that the existence of g -LRB- m , r -RRB- is an undecidable question in that there does not exist a Turing machine which will eventually come to a stop and print a 1 if g -LRB- m , r -RRB- does not exist .

Cause: g -LRB- m , r -RRB- does not exist .

Effect: In fact , it has been shown that the existence of g -LRB- m , r -RRB- is an undecidable question in that there does not exist a Turing machine which will eventually come to a stop and print a 1

**CASE: 6 f**

Stag: 10

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: In spite of this , it is easy to show that a Turing machine exists which will compute a g -LRB- m , r -RRB- if such exists .

Cause: such exists .

Effect: In spite of this , it is easy to show that a Turing machine exists which will compute a g -LRB- m , r -RRB-

**CASE: 27 f**

Stag: 40

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: It would simply carry out some k -LRB- m , n -RRB- steps and conclude that if the computation had not terminated by this time it was not going to .

Cause: the computation had not terminated by this time it was not going to .

Effect: It would simply carry out some k -LRB- m , n -RRB- steps and conclude that

### PTID:44, For – 3: n\_1-2, m-1

**CASE: 23 n\_1**

Stag: 36

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Any machine can be modified into such a machine by adding to it facilities for testing a conclusion and having it spend a small fraction of its time trying the integers in order -RRB- .

Cause: testing a conclusion and having it spend a small fraction of its time trying the integers

Effect: Any machine can be modified into such a machine by adding to it facilities

**CASE: 26 m**

Stag: 39

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: -LRB- Otherwise , a machine could be described for determining whether the computation of fm -LRB- n -RRB- terminates .

Cause: determining whether the computation of fm -LRB- n -RRB- terminates

Effect: -LRB- Otherwise , a machine could be described

**CASE: 33 n\_1**

Stag: 68

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: In order to get around the fact that all formal systems which are anywhere near adequate for describing recursive function theory are incomplete , we avoid restriction to any one of them by introducing the notion of a formal theory -LRB- not for the first time , of course .

Cause: describing recursive function theory

Effect: In order to get around the fact that all formal systems which are anywhere near adequate

### PTID:0, So – 3: n\_2-1, a-1, s-1

**CASE: 14 s**

Stag: 22

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: It is probably also possible to increase the speed by increasing the number of internal states , though this is not so easy to show .

Cause: It is probably also possible to increase the speed by increasing the number of internal states , though this is not

Effect: easy to show .

**CASE: 24 a**

Stag: 37

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: However , it is not so easy to give a function which gives an over-all estimate of the efficiency of a machine at computing g -LRB- m , r -RRB- .

Cause: However , it is not

Effect: easy to give a function which gives an over-all estimate of the efficiency of a machine at computing g -LRB- m , r -RRB- .

**CASE: 29 n\_2**

Stag: 45 46

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Systems much simpler than Turing machine theory have been shown to have unsolvable decision procedures . So , we look for a way of evading these difficulties .

Cause: Systems much simpler than Turing machine theory have been shown to have unsolvable decision procedures

Effect: we look for a way of evading these difficulties .

### PTID:80, As – 2: n\_1-1, a-1

**CASE: 20 n\_1**

Stag: 32

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: It will be made at least plausible that a machine with Q internal states and S symbols should be considered as making about -LRB- 1/2 -RRB- log -LRB- QS -RRB- elementary steps per step of computation and hence the number of steps in a computation should be multiplied by this factor to get the length of the computation .

Cause: making about -LRB- 1/2 -RRB- log -LRB- QS -RRB- elementary steps per step of computation and hence the number of steps in a computation should be multiplied by this factor to get the length of the computation .

Effect: It will be made at least plausible that a machine with Q internal states and S symbols should be considered

**CASE: 39 a**

Stag: 97

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The relation of certain action schemes to certain theories might warrant our regarding certain statements in them as being normative , i.e. , of the form `` the next axiom scheme should be no .

Cause: being normative , i.e. , of the form `` the next axiom scheme should be no .

Effect: The relation of certain action schemes to certain theories might warrant our regarding certain statements in them

### PTID:81, Ving – 2: m-1, a-1

**CASE: 21 a**

Stag: 32

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: making about -LRB- 1/2 -RRB- log -LRB- QS -RRB- elementary steps per step of computation and hence the number of steps in a computation should be multiplied by this factor to get the length of the computation .

Cause: making about -LRB- 1/2 -RRB- log -LRB- QS -RRB- elementary steps per step of computation

Effect: and hence the number of steps in a computation should be multiplied by this factor to get the length of the computation .

**CASE: 22 m**

Stag: 33

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Having now an idea of what should be meant by the length L -LRB- m , r , T -RRB- of a particular computation of g -LRB- m , r -RRB- by the machine T , we can return to the question of comparing two Turing machines .

Cause: Having now an idea of what should be meant by the length L -LRB- m , r , T -RRB- of a particular computation of g -LRB- m , r -RRB- by the machine T

Effect: we can return to the question of comparing two Turing machines .

### PTID:47, Based on – 2: n\_1-2

**CASE: 30 n\_1**

Stag: 50

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: This is based on the plausible idea that , in searching for the solution to a problem , the given data should be taken into account .

Cause: the plausible idea that

Effect: in searching for the solution to a problem , the given data should be taken into

**CASE: 31 n\_1**

Stag: 53

Pattern: 0 [['based', 'on'], [',']]---- [[], ['&V-ing/&NP@C@', '(&Clause@C@)'], ['&R']]

sentTXT: This is based on the idea that the best procedure is more likely to be recursively simple , rather than merely to have a low number in the ordering .

Cause: the idea that the best procedure is more likely to be recursively simple

Effect: rather than merely to have a low number in the ordering .

### PTID:4, Hence – 1: n\_2-1

**CASE: 16 n\_2**

Stag: 23 24

Pattern: 7 [['hence']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: -LRB- Shannon shows elsewhere in these studies that it is possible to reduce the number of internal states to two at the cost of increasing the number of symbols and reducing the speed . Hence we offer the following revised definition of the length of a computation performed by a Turing machine .

Cause: -LRB- Shannon shows elsewhere in these studies that it is possible to reduce the number of internal states to two at the cost of increasing the number of symbols and reducing the speed

Effect: we offer the following revised definition of the length of a computation performed by a Turing machine .

### PTID:49, Hence – 1: m-1

**CASE: 17 m**

Stag: 27

Pattern: 0 [['hence'], ['.']]---- [['&C', '(,)', '(&AND)'], ['&NP@R@', '(&Clause@R@)']]

sentTXT: There are certain difficulties here connected with the fact that the rate of computation is limited if the tape of the universal machine is finite dimensional , and hence the rate should probably be defined with respect to a machine whose tape is infinite dimensional but each square of which has at most two states and which has only two internal states .

Cause: There are certain difficulties here connected with the fact that the rate of computation is limited if the tape of the universal machine is finite dimensional

Effect: the rate should probably be defined with respect to a machine whose tape is infinite dimensional but each square of which has at most two states and which has only two internal states

### PTID:68, By/through – 1: a-1

**CASE: 11 a**

Stag: 16

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: It corresponds to looking for a proof of a conjecture by checking in some order all possible English essays .

Cause: checking in some order all possible English essays

Effect: It corresponds to looking for a proof of a conjecture

### PTID:90, Concern/require/request – 1: m-1

**CASE: 19 m**

Stag: 27 28

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&THIS', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: There are certain difficulties here connected with the fact that the rate of computation is limited if the tape of the universal machine is finite dimensional , and hence the rate should probably be defined with respect to a machine whose tape is infinite dimensional but each square of which has at most two states and which has only two internal states . This requires a mild generalization of the concept of Turing machines .

Cause: a mild generalization of the concept of Turing machines

Effect: There are certain difficulties here connected with the fact that the rate of computation is limited if the tape of the universal machine is finite dimensional , and hence the rate should probably be defined with respect to a machine whose tape is infinite dimensional but each square of which has at most two states and which has only two internal states

### PTID:77, So that – 1: n\_1-1

**CASE: 37 n\_1**

Stag: 91

Pattern: 45 [['so', 'that']]---- [['&C'], ['&R']]

sentTXT: The point is to do this so that the procedures we offer are general -LRB- will eventually solve every solvable problem -RRB- and also are improvable by the methods built into the machine .

Cause: The point is to do this

Effect: the procedures we offer are general -LRB- will eventually solve every solvable problem -RRB- and also are improvable by the methods built into the machine .

## F0015

### PTID:15, If/once – 1: m-1

**CASE: 16 m**

Stag: 57

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: But it was designed to act as if it has that belief , and if I want to figure out how to make it give me cash in the future , I should treat it as if it knows that sort of thing .

Cause: I want to figure out how to make it give me cash in the future

Effect: I should treat it as if it knows that sort of thing .

### PTID:14, If/once – 4: m-1, a-3

**CASE: 17 a**

Stag: 57

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: I should treat it as if it knows that sort of thing .

Cause: it knows that sort of thing .

Effect: I should treat it as

**CASE: 22 a**

Stag: 68

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: Namely , the language must be able to express the information our program can actually get about a person 's or machine 's ` state of mind ' -- not just what might be obtainable if the neurophysiology of the human or the design of the machine were more accessible .

Cause: the neurophysiology of the human or the design of the machine were more accessible .

Effect: Namely , the language must be able to express the information our program can actually get about a person 's or machine 's ` state of mind ' -- not just what might be obtainable

**CASE: 43 a**

Stag: 153

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: I would argue that the set of rules understands Chinese , and , analogously , a computer program may be said to understand things , even if the computer does not .

Cause: the computer does not .

Effect: understands Chinese , and , analogously , a computer program may be said to understand things , even

**CASE: 49 m**

Stag: 190

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: Computers will end up with the psychology that is convenient to their designers -- -LRB- and they 'll be fascist bastards if those designers do n't think twice -RRB- .

Cause: those designers do n't think twice

Effect: their designers -- -LRB- and they 'll be fascist bastards

### PTID:44, For – 4: m-1, a-2, f-1

**CASE: 1 a**

Stag: 0

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: When we interact with computers and other machines , we often use language ordinarily used for talking about people .

Cause: talking about people

Effect: When we interact with computers and other machines , we often use language ordinarily used

**CASE: 19 m**

Stag: 62

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Certain formulas of this logic are then axioms giving relations between the concepts and conditions for ascribing them .

Cause: ascribing them

Effect: Certain formulas of this logic are then axioms giving relations between the concepts and conditions

**CASE: 39 a**

Stag: 145

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: A person who does n't know Chinese memorizes a book of rules for manipulating Chinese characters .

Cause: manipulating Chinese characters

Effect: does n't know Chinese memorizes a book of rules

**CASE: 45 f**

Stag: 174

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The third is called the intentional stance , and this is what we 'll often need for understanding computer programs .

Cause: understanding computer programs

Effect: The third is called the intentional stance , and this is what we 'll often need

### PTID:67, By/through – 1: a-1

**CASE: 21 a**

Stag: 66

Pattern: 0 [[['by', 'through']]]---- [[], ['&V-ing@C@', '&R']]

sentTXT: much behavior as possible by saying the machine or person or animal does what it thinks will achieve its

Cause: saying the machine or person or animal does what it thinks

Effect: will achieve its

### PTID:68, By/through – 2: f-2

**CASE: 46 f**

Stag: 175

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: In this we try to understand the behavior of a system by ascribing to it beliefs , goals , intentions , likes and dislikes , and other mental qualities .

Cause: ascribing to it beliefs , goals , intentions , likes and dislikes , and other mental qualities

Effect: In this we try to understand the behavior of a system

**CASE: 48 f**

Stag: 177

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: it intends to frighten me by sending me threatening letters

Cause: sending me threatening letters

Effect: it intends to frighten me

### PTID:0, So – 3: a-2, s-1

**CASE: 8 s**

Stag: 24

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Thinking about when they should do so led to the considerations of this article .

Cause: Thinking about when they should do

Effect: led to the considerations of this article .

**CASE: 13 a**

Stag: 52

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: First we want to provide machines with theories of knowledge and belief so they can reason about what their users know , do n't know , and want .

Cause: First we want to provide machines with theories of knowledge and belief

Effect: they can reason about what their users know , do n't know , and want .

**CASE: 38 a**

Stag: 143

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: A more elaborate automatic teller that handles loans , loan payments , traveler 's checks , and so forth , may have beliefs like , ` The payment was n't made on time , ' or , ` This person is a good credit risk .

Cause: that handles loans , loan payments , traveler 's checks

Effect: forth , may have beliefs like , ` The payment was n't made on time , ' or , ` This person is a good credit risk .

### PTID:80, As – 3: s-3

**CASE: 3 s**

Stag: 10 11

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: It wo n't be necessary for most people to know very much about how they work internally , but what we will have to know about them in order to use them is more complex than what we need to know about electric lights and telephones . As our daily lives involve ever more sophisticated computers , we will find that ascribing little thoughts to machines will be increasingly useful in understanding how to get the most good out of them .

Cause: our daily lives involve ever more sophisticated computers , we will find that ascribing little thoughts to machines will be increasingly useful in understanding how to get the most good out of them .

Effect: It wo n't be necessary for most people to know very much about how they work internally , but what we will have to know about them in order to use them is more complex than what we need to know about electric lights and telephones .

**CASE: 6 s**

Stag: 15 16

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Ever since Descartes , philosophically minded people have wrestled with the question of whether it is possible for machines to think . As we interact more and more with computers -- both personal computers and others -- the questions of whether machines can think and what kind of thoughts they can have become ever more pertinent .

Cause: we interact more and more with computers -- both personal computers and others -- the questions of whether machines can think and what kind of thoughts they can have become ever more pertinent .

Effect: Ever since Descartes , philosophically minded people have wrestled with the question of whether it is possible for machines to think .

**CASE: 20 s**

Stag: 66

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Our object is to account for as much behavior as possible by saying the machine or person or animal does what it thinks will achieve its goals .

Cause: much behavior as possible by saying the machine or person or animal does what it thinks will achieve its

Effect: Our object is to account for

### PTID:29, Because of – 2: f-1, s-1

**CASE: 28 f**

Stag: 104 105

Pattern: 1 [['because', 'of']]---- [['&C', '(,/;/./--)', '(&ADV)'], ['(&THIS)', '&NP', '&R']]

sentTXT: It is useful because of its connection with all of these things and because what it says about the dog corresponds in an informative way with similar statements about people . It does n't commit the person who said it to an elaborate view of the mind of a dog .

Cause: It is useful

Effect: . It does n't commit the person who said it to an elaborate view of the mind of a dog

**CASE: 40 s**

Stag: 148

Pattern: 1 [['because', 'of']]---- [['&C', '(,/;/./--)', '(&ADV)'], ['(&THIS)', '&NP', '&R']]

sentTXT: He is repeatedly given Chinese sentences , to which he applies the rules , and gives back what turn out , because of the clever rules , to be Chinese sentences that are appropriate replies .

Cause: He is repeatedly given Chinese sentences , to which he applies the rules , and gives back what turn out

Effect: , to be Chinese sentences that are appropriate replies .

### PTID:56, According to – 1: a-1

**CASE: 5 a**

Stag: 13

Pattern: 0 [['according', 'to'], [',']]---- [[], ['&NP@C@'], ['&R']]

sentTXT: According to some authorities , to use these words , the language of the mind , to talk about machines is to commit the error of anthropomorphism .

Cause: some authorities

Effect: to use these words , the language of the mind , to talk about machines is to commit the error of anthropomorphism .

### PTID:55, According to – 1: a-1

**CASE: 36 a**

Stag: 129

Pattern: 0 [['according', 'to']]---- [['&R', '(,)'], ['&NP@C@']]

sentTXT: Perhaps Honeywell discovers that these compromises should be modified according to a social rank formula devised by its psychologists and determined by patterns of speech loudness .

Cause: a social rank formula devised by its psychologists and determined by patterns of speech loudness

Effect: Perhaps Honeywell discovers that these compromises should be modified

### PTID:89, Reason – 1: f-1

**CASE: 11 f**

Stag: 49

Pattern: 0 [['the'], [['reason', 'reasons'], 'for']]---- [['(&OF)'], ['(&ADJ)'], ['&V-ing/&NP@R@', '&BE', '&NP/&TODO@C@']]

sentTXT: The reason for ascribing mental qualities and mental processes to machines is the same as for ascribing them to other people .

Cause: the same as for ascribing them to other people

Effect: ascribing mental qualities and mental processes to machines

### PTID:17, Reason – 1: n\_2-1

**CASE: 12 n\_2**

Stag: 51 52

Pattern: 7 [['for'], [['reason', 'reasons']]]---- [['&C', '(,/;/./--)', '(&AND)'], ['(&this)'], ['(,/that)', '&R']]

sentTXT: Researchers in artificial intelligence -LRB- AI -RRB- are interested in the use of mental terms to describe machines for two reasons . First we want to provide machines with theories of knowledge and belief so they can reason about what their users know , do n't know , and want .

Cause: Researchers in artificial intelligence -LRB- AI -RRB- are interested in the use of mental terms to describe machines

Effect: . First we want to provide machines with theories of knowledge and belief so they can reason about what their users know , do n't know , and want

### PTID:115, Based on – 1: f-1

**CASE: 7 f**

Stag: 19

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: My answer is based on work in the field of artificial intelligence -LRB- usually abbreviated AI -RRB- which is the science and engineering of making computers solve problems and behave in ways generally considered to be intelligent .

Cause: work in the field of artificial intelligence -LRB- usually abbreviated AI -RRB- which is the science and engineering of making computers solve problems and behave in ways generally considered to be intelligent

Effect: My answer

### PTID:1, Therefore – 1: n\_2-1

**CASE: 26 n\_2**

Stag: 97 98

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: Also animals can not be shown to have more than a few . Therefore , many present and future programs can best be described as partially self-conscious .

Cause: Also animals can not be shown to have more than a few

Effect: many present and future programs can best be described as partially self-conscious .

### PTID:2, Thus – 1: a-1

**CASE: 32 a**

Stag: 112

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: I suppose some philosophers , psychologists , and English teachers would maintain that the blanket manufacturer is guilty of anthropomorphism and some will claim that great harm can come from thus ascribing to machines qualities which only humans can have .

Cause: I suppose some philosophers , psychologists , and English teachers would maintain that the blanket manufacturer is guilty of anthropomorphism and some will claim that great harm can come from

Effect: ascribing to machines qualities which only humans can have .

### PTID:82, So that – 1: m-1

**CASE: 41 m**

Stag: 149

Pattern: 47 [['so'], ['that']]---- [['&C'], ['&adj/&adv@C@'], ['&R']]

sentTXT: We suppose that the rules result in a Chinese conversation so intelligent that the person giving and receiving the sentences ca n't tell him from an intelligent Chinese .

Cause: We suppose that the rules result in a Chinese conversation so intelligent

Effect: the person giving and receiving the sentences ca n't tell him from an intelligent Chinese .

### PTID:79, Since – 1: n\_2-1

**CASE: 42 n\_2**

Stag: 151

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: Searle says that since the person in the example does n't understand Chinese -- even though he can produce intelligent Chinese conversation by following rules -- a computer can not be said to ` understand ' things .

Cause: the person in the example does n't understand Chinese -- even though he can produce intelligent Chinese conversation by following rules -- a computer can not be said to ` understand ' things .

Effect: Searle says that

### PTID:81, Ving – 1: m-1

**CASE: 44 m**

Stag: 160

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Looking at a thermostat from this point of view , we 'd want to understand the working of the bimetal strip that most thermostats use .

Cause: Looking at a thermostat from this point of view

Effect: we 'd want to understand the working of the bimetal strip that most thermostats use .

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### PTID:44, For – 5: m-1, a-4

**CASE: 10 a**

Stag: 40

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The production formalism turned out to be suitable for representing a large amount of information about the diagnosis and treatment of bacterial infections .

Cause: representing a large amount of information about the diagnosis and treatment of bacterial infections

Effect: The production formalism turned out to be suitable

**CASE: 21 m**

Stag: 72

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Then MYCIN might have to make a plan for getting rid of the patient 's fever and verifying that it was gone as a part of the plan for using the antibiotic .

Cause: getting rid of the patient 's fever and verifying that it was gone as a part of the plan for using the antibiotic

Effect: Then MYCIN might have to make a plan

**CASE: 22 a**

Stag: 72

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: getting rid of the patient 's fever and verifying that it was gone as a part of the plan for using the antibiotic

Cause: using the antibiotic

Effect: getting rid of the patient 's fever and verifying that it was gone as a part of the plan

**CASE: 33 a**

Stag: 119

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: There is often no clear separation in the program between determining what inferences are correct and the strategy for finding the inferences required to solve the problem at hand .

Cause: finding the inferences required to solve the problem at hand

Effect: There is often no clear separation in the program between determining what inferences are correct and the strategy

**CASE: 34 a**

Stag: 121

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Systems provide for inferring a fact about one or two particular objects from other facts about these objects and a general rule containing variables .

Cause: inferring a fact about one or two particular objects from other facts about these objects and a general rule containing variables

Effect: Systems provide

### PTID:80, As – 4: a-4

**CASE: 15 a**

Stag: 58

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Namely , what one man builds as a reasoning method into his program , another can express as a fact using a richer ontology .

Cause: a reasoning method into his program , another can express as a fact using a richer ontology .

Effect: one man builds

**CASE: 19 a**

Stag: 68

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Its rules give the recommended treatment as a function of the information elicited about the patient , but MYCIN makes no prognosis of the effects of the treatment .

Cause: a function of the information elicited about the

Effect: Its rules give the recommended treatment

**CASE: 39 a**

Stag: 144

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: This property or relation is constrained by some sentences taken as assumptions , but there is still some freedom left .

Cause: assumptions , but there is still some freedom

Effect: This property or relation is constrained by some sentences taken

**CASE: 41 a**

Stag: 145 146

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Circumscription further constrains the property or relation by requiring it to be true of a minimal set of objects . As an example , consider representing the facts about whether an object can fly in a database of common sense knowledge .

Cause: an example , consider representing the facts about whether an object can fly in a database of common sense knowledge .

Effect: Circumscription further constrains the property or relation by requiring it to be true of a minimal set of objects .

### PTID:14, If/Once – 2: a-1, s-1

**CASE: 24 a**

Stag: 80

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: or even `` What bad things might happen if I give this patient penicillin ?

Cause: I give this patient penicillin ?

Effect: bad things might happen

**CASE: 44 s**

Stag: 150

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: we could provide for flying camels , if there were any , by adding statements without removing existing statements .

Cause: there were any , by adding statements without removing existing statements .

Effect: we could provide for flying camels ,

### PTID:15, If/Once – 2: m-2

**CASE: 27 m**

Stag: 85

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: For example , if a patient has cholera , while the antibiotic is killing the cholera bacteria , the damage to his intestines is causing loss of fluids that are likely to be fatal .

Cause: a patient has cholera

Effect: while the antibiotic is killing the cholera bacteria , the damage to his intestines is causing loss of fluids that are likely to be fatal .

**CASE: 30 m**

Stag: 101

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: For example , if I spill the glass of water on the podium , everyone knows that the glass will break and the water will spill .

Cause: I spill the glass of water on the podium

Effect: everyone knows that the glass will break and the water will spill

### PTID:68, By/through – 3: a-2, f-1

**CASE: 4 f**

Stag: 22

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: While the dialog is in English , MYCIN avoids having to understand freely written English by controlling the dialog .

Cause: controlling the dialog

Effect: While the dialog is in English , MYCIN avoids having to understand freely written English

**CASE: 31 a**

Stag: 103

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: However , this information is not obtained by using the formula for a falling body or the Navier-Stokes equations governing fluid flow .

Cause: using the formula for a falling body or the Navier-Stokes equations governing fluid flow

Effect: However , this information is not obtained

**CASE: 45 a**

Stag: 150

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: there were any , by adding statements without removing existing statements .

Cause: adding statements without removing existing statements

Effect: there were any ,

### PTID:67, By/through – 1: a-1

**CASE: 14 a**

Stag: 50

Pattern: 0 [[['by', 'through']]]---- [[], ['&V-ing@C@', '&R']]

sentTXT: An example of MYCIN not knowing its limitations can be excited by telling MYCIN that the patient has Cholerae Vibrio in his intestines .

Cause: telling MYCIN

Effect: that the patient has Cholerae Vibrio in his intestines .

### PTID:1, Therefore – 3: n\_2-2, f-1

**CASE: 7 n\_2**

Stag: 31 32

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: This is because patients are n't values of variables , and MYCIN never compares the infections of two different patients . It would therefore be difficult to modify MYCIN to learn from its experience .

Cause: is because patients are n't values of variables , and MYCIN never compares the infections of two different patients . It would

Effect: be difficult to modify MYCIN to learn from its experience .

**CASE: 38 f**

Stag: 137

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: Some concluded that therefore logic is not an appropriate formalism .

Cause: Some concluded that

Effect: logic is not an appropriate formalism .

**CASE: 48 n\_2**

Stag: 160 161

Pattern: 62 [['therefore']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(,)', '&R']]

sentTXT: Unless I told you that my bird could n't fly , the judge will side with you . We can therefore regard it as a communication convention that if a bird can fly the fact need not be mentioned , but if the bird ca n't fly and it is relevant , then the fact must be mentioned .

Cause: I told you that my bird could n't fly , the judge will side with you . We can

Effect: regard it as a communication convention that if a bird can fly the fact need not be mentioned , but if the bird ca n't fly and it is relevant , then the fact must be mentioned .

### PTID:2, Thus – 2: m-2

**CASE: 28 m**

Stag: 90 91

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: I can see part of the front of a person in the audience , and my idea of his shape uses this information to approximate his total shape . Thus I do n't expect him to stick out two feet in back even though I ca n't see that he does n't .

Cause: I can see part of the front of a person in the audience , and my idea of his shape uses this information to approximate his total shape

Effect: I do n't expect him to stick out two feet in back even though I ca n't see that he does n't .

**CASE: 42 m**

Stag: 148 149

Pattern: 35 [['thus']]---- [['&C', '(,/;/./--)', '(&AND)'], ['&R']]

sentTXT: Circumscription allows us to express the assumption that only those objects can fly for which there is a positive statement about it . Thus there will be positive statements that birds and airplanes can fly and no statement that camels can fly .

Cause: Circumscription allows us to express the assumption that only those objects can fly for which there is a positive statement about it

Effect: there will be positive statements that birds and airplanes can fly and no statement that camels can fly .

### PTID:79, Since – 2: a-2

**CASE: 2 a**

Stag: 10

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: I have been advocating `` Computer Programs with Common Sense `` since I wrote a paper with that title in 1958 .

Cause: I wrote a paper with that title in 1958 .

Effect: I have been advocating `` Computer Programs with Common Sense ``

**CASE: 35 a**

Stag: 126 127

Pattern: 23 [['since']]---- [['&R@NCTime@', '(,)'], ['&C@NCTime@']]

sentTXT: MYCIN 's does n't require this , but our hypothetical robot physician would have to draw conclusions from a patient 's appearance , and computer vision is not ready for it . An important new development in AI -LRB- since the middle 1970s -RRB- is the formalization of nonmonotonic reasoning .

Cause: the middle 1970s -RRB- is the formalization of nonmonotonic reasoning .

Effect: 's does n't require this , but our hypothetical robot physician would have to draw conclusions from a patient 's appearance , and computer vision is not ready for it . An important new development in AI -LRB-

### PTID:0, So – 2: n\_1-1, m-1

**CASE: 5 m**

Stag: 24

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Its major innovations over many previous expert systems were that it uses measures of uncertainty -LRB- not probabilities -RRB- for its diagnoses and the fact that it is prepared to explain its reasoning to the physician , so he can decide whether to accept it .

Cause: Its major innovations over many previous expert systems were that it uses measures of uncertainty -LRB- not probabilities -RRB- for its diagnoses and the fact that it is prepared to explain its reasoning to the physician

Effect: he can decide whether to accept it .

**CASE: 8 n\_1**

Stag: 35 36

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: When a rule is activated , MYCIN tests whether the pattern part matches the database . If so this results in the variables in the pattern being matched to whatever entities are required for the match of the database .

Cause: a rule is activated , MYCIN tests whether the pattern part matches the database . If

Effect: this results in the variables in the pattern being matched to whatever entities are required for the match of the database .

### PTID:90, Concern/require/request – 1: a-1

**CASE: 1 a**

Stag: 7

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&THIS', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: The object of this lecture is to describe common sense abilities and the problems that require them .

Cause: them

Effect: The object of this lecture is to describe common sense abilities and the problems

### PTID:75, Because – 1: n\_1-1

**CASE: 6 n\_1**

Stag: 31

Pattern: 18 [['because'], [',']]---- [[], ['&C'], ['&R']]

sentTXT: This is because patients are n't values of variables , and MYCIN never compares the infections of two different patients .

Cause: patients are n't values of variables

Effect: and MYCIN never compares the infections of two different patients .

### PTID:29, Because of – 1: n\_1-1

**CASE: 20 n\_1**

Stag: 70 71

Pattern: 1 [['because', 'of']]---- [['&C', '(,/;/./--)', '(&ADV)'], ['(&THIS)', '&NP', '&R']]

sentTXT: Ignoring prognosis is possible because of the specific narrow domain in which MYCIN operates . Suppose , for example , a certain antibiotic had the precondition for its usefulness that the patient not have a fever .

Cause: Ignoring prognosis is possible

Effect: . Suppose , for example , a certain antibiotic had the precondition for its usefulness that the patient not have a fever

### PTID:59, As a result/consequence of – 1: f-1

**CASE: 16 f**

Stag: 61

Pattern: 0 [['as', 'a', ['result', 'consequence'], 'of'], ['.']]---- [['&R'], ['&NP@C@']]

sentTXT: 1 -RRB- The most salient common sense knowledge concerns situations that change in time as a result of events .

Cause: events

Effect: 1 -RRB- The most salient common sense knowledge concerns situations that change in time

## F0027

### PTID:44, For – 3: m-1, a-1, s-1

**CASE: 11 m**

Stag: 47

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: We are helping to build a system for measuring long-term environmental trends that affect soil biodiversity -LRB- www.lifeunderyourfeet.org ;

Cause: measuring long-term environmental trends that affect soil biodiversity -LRB- www.lifeunderyourfeet.org ;

Effect: We are helping to build a system

**CASE: 12 s**

Stag: 52

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: Multidisciplinary databases also provide a rich environment for performing science ;

Cause: performing science

Effect: Multidisciplinary databases also provide a rich environment

**CASE: 15 a**

Stag: 68

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: But there is , as yet , no standard for publishing large volumes of data .

Cause: publishing large volumes of data

Effect: But there is , as yet , no standard

### PTID:80, As – 2: n\_1-2

**CASE: 3 n\_1**

Stag: 12 13

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: But none of these programs scale up to handle millions of data records -- and they are primitive by most standards . As data volumes grow , it is increasingly arduous to extract knowledge .

Cause: data volumes grow , it is increasingly arduous to extract knowledge .

Effect: -- and they are primitive by most standards .

**CASE: 5 n\_1**

Stag: 31 32

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: both Matlab and GenBankwill change enormously in that time . As experiments yield more data , and analysis becomes more complex , data become increasingly difficult to document and reproduce .

Cause: experiments yield more data , and analysis becomes more complex , data become increasingly difficult to document and reproduce .

Effect: both Matlab and GenBankwill change enormously in that time .

### PTID:0, So – 2: n\_1-1, m-1

**CASE: 6 n\_1**

Stag: 33 34

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: One might argue that complex biological experiments have always been difficult to reproduce , as there are so many variables . But we believe that with current trends it is nearly impossible to reproduce experiments .

Cause: One might argue that complex biological experiments have always been difficult to reproduce , as there are

Effect: many variables . But we believe that with current trends it is nearly impossible to reproduce experiments

**CASE: 18 m**

Stag: 93 94

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: it is universal . And so although some subdisciplines may reach a plateau in data generation , other technological innovations will take their place .

Cause: it is universal

Effect: although some subdisciplines may reach a plateau in data generation , other technological innovations will take their place .

### PTID:77, So that – 1: a-1

**CASE: 2 a**

Stag: 2

Pattern: 45 [['so', 'that']]---- [['&C'], ['&R']]

sentTXT: are trained early to keep careful records in their laboratory notebooks -- recording both experimental procedures and observations , so that they can analyse their results and

Cause: are trained early to keep careful records in their laboratory notebooks -- recording both experimental procedures and observations ,

Effect: they can analyse their results and

### PTID:90, Concern/require/request – 1: a-1

**CASE: 7 a**

Stag: 36

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&THIS', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: Increasingly , scientists are analysing complex systems that require data to be combined from several groups and even several disciplines .

Cause: data

Effect: Increasingly , scientists are analysing complex systems

## F0028

### PTID:80, As – 8: n\_1-2, a-5, s-1

**CASE: 12 a**

Stag: 54

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Failed data can be automatically recovered from the redundant copies with no interruption to database access , much as RAID5 disk arrays do today .

Cause: RAID5 disk arrays do today .

Effect: Failed data can be automatically recovered from the redundant copies with no interruption to database access , much

**CASE: 17 n\_1**

Stag: 75

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Ideally much of this metadata would be automatically generated and managed as part of the workflow , reducing the scientist 's intellectual burden .

Cause: part of the workflow , reducing the scientist 's intellectual burden .

Effect: much of this metadata would be automatically generated and managed

**CASE: 24 a**

Stag: 118

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: But views are primarily used to allow old programs to operate correctly even as the underlying database is reorganized and redesigned .

Cause: the underlying database is reorganized and redesigned .

Effect: But views are primarily used to allow old programs to operate correctly even

**CASE: 28 a**

Stag: 133 134

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: But the key point of this section is that an explicit and standard data access layer with precise metadata and explicit data access is essential for data independence . As mentioned earlier , scientists often start with numeric data arrays from their instruments or simulations .

Cause: mentioned earlier , scientists often start with numeric data arrays from their instruments or simulations .

Effect: But the key point of this section is that an explicit and standard data access layer with precise metadata and explicit data access is essential for data independence .

**CASE: 30 s**

Stag: 146 147

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The directories relate all data from some instrument or some month or some region or some laboratory . As things evolve , the directories become hierarchical .

Cause: things evolve , the directories become hierarchical .

Effect: The directories relate all data from some instrument or some month or some region or some laboratory .

**CASE: 33 n\_1**

Stag: 157 158

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: MPI itself lacks any notion of metadata beyond file names . As file systems grow to petabyte-scale archives with billions of files , the science community must create a synthesis of database systems and file systems .

Cause: file systems grow to petabyte-scale archives with billions of files , the science community must create a synthesis of database systems and file systems .

Effect: MPI itself lacks any notion of metadata beyond file names .

**CASE: 37 a**

Stag: 203 204

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Lastly , most file systems can manage millions of files , but by the time a file system can deal with billions of files , it has become a database system . As you can see , we take an ecumenical view of what a database is .

Cause: you can see , we take an ecumenical view of what a database is .

Effect: Lastly , most file systems can manage millions of files , but by the time a file system can deal with billions of files , it has become a database system .

**CASE: 40 a**

Stag: 214

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: Some scientists use databases for some of their work , but as a general rule , most scientists do not .

Cause: a general rule , most scientists do not .

Effect: Some scientists use databases for some of their work , but

### PTID:0, So – 5: n\_1-1, n\_2-1, a-2, s-1

**CASE: 8 a**

Stag: 30

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Increasingly , the datasets are so large , and the application programs are so complex

Cause: Increasingly , the datasets are

Effect: large , and the application programs are so complex

**CASE: 38 n\_2**

Stag: 209 210

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: And , they have a collection of tools to create , access , search , and visualize the data . So , in our view they are simple database systems .

Cause: And , they have a collection of tools to create , access , search , and visualize the data

Effect: in our view they are simple database systems .

**CASE: 41 s**

Stag: 216 217

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Why are tabular databases so successful in commercial applications and such a flop in most scientific applications ? Scientific colleagues give one or more of the following answers when asked why they do not use databases to manage their data :

Cause: Why are tabular databases

Effect: successful in commercial applications and such a flop in most scientific applications ? Scientific colleagues give one or more of the following answers when asked why they do not use databases to manage their data

**CASE: 46 a**

Stag: 264

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Because data collection is now separated from data analysis , extensive metadata describing the data in standard terms is needed so people and programs can understand the data .

Cause: Because data collection is now separated from data analysis , extensive metadata describing the data in standard terms is needed

Effect: people and programs can understand the data .

**CASE: 49 n\_1**

Stag: 276

Pattern: 265 [['so']]---- [['&C', '(,/;/./--)', '(&AND)'], ['(-far)', '(,)', '&R']]

sentTXT: Because data is so large , and IO bandwidth is not keeping pace , moving code to data will be essential to performance .

Cause: Because data is

Effect: large , and IO bandwidth is not keeping pace , moving code to data will be essential to performance .

### PTID:68, By/through – 3: m-2, f-1

**CASE: 18 m**

Stag: 78

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: These data models can also represent data lineage and other metadata by including narrative text , data definitions , and data tables within the file .

Cause: including narrative text , data definitions , and data tables within the file

Effect: These data models can also represent data lineage and other metadata

**CASE: 22 m**

Stag: 112

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: , physical data independence allows performance improvements by reorganizing data for parallelism -- at little or no extra effort on the part of scientists .

Cause: reorganizing data for parallelism -- at little or no extra effort on the part of scientists

Effect: physical data independence allows performance improvements

**CASE: 25 f**

Stag: 119

Pattern: 0 [[['by', 'through']]]---- [['&R@Complete@'], ['&V-ing@C@']]

sentTXT: For example , consider a program whose correct operation depends on some table T that a database administrator wants to reorganize by dividing vertically into two pieces stored in tables T ' and T '' .

Cause: dividing vertically into two pieces stored in tables T ' and T

Effect: example , consider a program whose correct operation depends on some table T that a database administrator wants to reorganize

### PTID:81, Ving – 2: m-1, a-1

**CASE: 16 a**

Stag: 73

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Preserving and augmenting this metadata as part of the processing -LRB- data lineage -RRB- will be a key benefit of the next-generation tools .

Cause: Preserving and augmenting this metadata as part of the processing

Effect: -LRB- data lineage -RRB- will be a key benefit of the next-generation tools .

**CASE: 44 m**

Stag: 249

Pattern: 30 []---- [['&V-ing@C@', '(,)', '&R@Complete@']]

sentTXT: Using a database allows queries to define more sophisticated mesh partitions and allows concurrent indexed access to the simulation data for visualization and computational steering .

Cause: Using a database

Effect: allows queries to define more sophisticated mesh partitions and allows concurrent indexed access to the simulation data for visualization and computational steering .

### PTID:90, Concern/require/request – 2: a-1, f-1

**CASE: 1 f**

Stag: 0

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&THIS', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: Scientific instruments and computer simulations are creating vast data stores that require new scientific methods to analyze and organize the data .

Cause: new scientific methods

Effect: Scientific instruments and computer simulations are creating vast data stores

**CASE: 6 a**

Stag: 27 28

Pattern: 0 [[['concern', 'concerns', 'concerned', 'require', 'requires', 'required', 'request', 'requests', 'requested']]]---- [['&R', '(,/./;/--)', '&THIS', '(&adj)', '(&N)', '(&CAN/have/has/had)', '(&ADV)'], ['(about)', '&V-ing/&NP@C@']]

sentTXT: To ameliorate these problems , scientists will need better analysis algorithms that can handle extremely large datasets with approximate algorithms -LRB- ones with near-linear execution time -RRB- and they will need parallel algorithms that can apply many processors and many disks to the problem to meet cpu-density and bandwidth-density demands . These peta-scale datasets required a new work style .

Cause: a new work style

Effect: To ameliorate these problems , scientists will need better analysis algorithms that can handle extremely large datasets with approximate algorithms -LRB- ones with near-linear execution time -RRB- and they will need parallel algorithms that can apply many processors and many disks to the problem to meet cpu-density and bandwidth-density demands

### PTID:85, A consequence of – 1: n\_2-1

**CASE: 5 n\_2**

Stag: 20

Pattern: 1 [['a', 'consequence', 'of']]---- [['&NP@R@', '(&CAN/have/has/had)', '(&ADV)', '&BE/&V', '(as/for)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: This is a consequence of three phenomena :

Cause: three phenomena

Effect: This

### PTID:15, If/once – 1: m-1

**CASE: 14 m**

Stag: 65

Pattern: 0 [[['if', 'once']], [',']]---- [[], ['&C@Complete@'], ['&R@Complete@']]

sentTXT: If I tell you it is a JPEG , you know it is a bitmap in http://www.jpeg.org/ format .

Cause: I tell you it is a JPEG

Effect: you know it is a bitmap in http://www.jpeg.org/ format .

### PTID:44, For – 1: a-1

**CASE: 29 a**

Stag: 141

Pattern: 25 [['for']]---- [['&R'], ['&V-ing@C@']]

sentTXT: The scientific file-formats of HDF , NetCDF , and FITS can represent tabular data but they provide minimal tools for searching and analyzing tabular data .

Cause: searching and analyzing tabular data

Effect: The scientific file-formats of HDF , NetCDF , and FITS can represent tabular data but they provide minimal tools

### PTID:115, Based on – 1: m-1

**CASE: 42 m**

Stag: 229

Pattern: 0 [['based', 'on']]---- [['&V-ing/&NP@R@', '(&Clause@R@)', '&BE', '(&ADV)'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: All these answers are based on experience and considerable investment .

Cause: experience and considerable investment

Effect: All these answers

### PTID:112, Due to – 1: m-1

**CASE: 43 m**

Stag: 241

Pattern: 7 [['due', 'to']]---- [['&V-ing/&NP@R@', '&BE'], ['&NP@C@', '(&Clause@C@)']]

sentTXT: The speedup is due to better indexing and parallelism .

Cause: better indexing and parallelism

Effect: The speedup

### PTID:3, Consequently – 1: m-1

**CASE: 50 m**

Stag: 276 277

Pattern: 9 [['consequently']]---- [['&C', '(,/;/./--)'], ['(,)', '&R']]

sentTXT: Because data is so large , and IO bandwidth is not keeping pace , moving code to data will be essential to performance . Consequently , science centers will remain the core vehicle and federations will likely be secondary .

Cause: Because data is so large , and IO bandwidth is not keeping pace , moving code to data will be essential to performance

Effect: science centers will remain the core vehicle and federations will likely be secondary .

## F0029

### PTID:80, As – 4: a-3, s-1

**CASE: 1 a**

Stag: 7

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: The first step is to classify misses as ephemeral -- when the object moved or simply disappeared , masked -- when noise hid or corrupted the object observation , or edge -- when the object was near the edge of the observational field .

Cause: ephemeral -- when the object moved or simply disappeared , masked -- when noise hid or corrupted the object observation , or edge -- when the object was near the edge of the observational

Effect: The first step is to classify misses

**CASE: 10 a**

Stag: 47

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: O1 is at the detection threshold and the seeing was good in run1 but not as good in run2 or O1 may be invisible if run2 is a different kind of instrument -LRB- e.g.

Cause: good in run2 or O1 may be invisible if run2 is a different kind of instrument -LRB-

Effect: O1 is at the detection threshold and the seeing was good in run1 but not

**CASE: 18 a**

Stag: 75 76

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: We adopted the International Virtual Observatory definition for footprints -LSB- 1 -RSB- and have implemented a footprint service both inside SQL -LSB- 2 -RSB- and on the web -LSB- 3 , 4 -RSB- . As explained in -LSB- 2 , 4 -RSB- , spherical regions are represented as the union of convex hulls that are each the intersection of a set of half-spaces .

Cause: explained in -LSB- 2 , 4 -RSB- , spherical regions are represented as the union of convex hulls that are each the intersection of a set of half-spaces .

Effect: We adopted the International Virtual Observatory definition for footprints -LSB- 1 -RSB- and have implemented a footprint service both inside SQL -LSB- 2 -RSB- and on the web -LSB- 3 , 4 -RSB- .

**CASE: 21 s**

Stag: 151 152

Pattern: 26 [['as']]---- [['&R@Complete@', '(,)', '(-such/-same/-seem/-regard/-regards/-regarded/-view/-views/-viewed/-denote/-denoted/-denotes)'], ['(-if/-follow/-follows/-&adv)', '&C@Complete@']]

sentTXT: When bundles overlap it may make sense to merge them into one bundle with one Bundle record . As new runs are acquired , new records are added to the catalog and new records are added to the Match table -LRB- which is easily computed incrementally .

Cause: new runs are acquired , new records are added to the catalog and new records

Effect: bundles overlap it may make sense to merge them into one bundle with one Bundle record .

### PTID:14, If – 3: a-2, f-1

**CASE: 3 a**

Stag: 17

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: they come from different runs and if their positions differ by less than their classification distance .

Cause: their positions differ by less than their classification distance .

Effect: they come from different runs and

**CASE: 11 f**

Stag: 47

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: good in run2 or O1 may be invisible if run2 is a different kind of instrument -LRB-

Cause: run2 is a different kind of instrument -LRB-

Effect: good in run2 or O1 may be invisible

**CASE: 17 a**

Stag: 72

Pattern: 0 [['if']]---- [['&R@Complete@'], ['&C@Complete@']]

sentTXT: Given such a run2 , we need to know if the missing object O1 is either near the run2 footprint edge or is inside a run2 mask .

Cause: the missing object O1 is either near the run2 footprint edge or is inside a run2 mask .

Effect: Given such a run2 , we need to know