

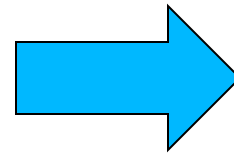
What's New

Patrick Henry Winston, '65

24 April 2014

CBMM Vision

It is time to collaborate to develop a computational account of human intelligence.

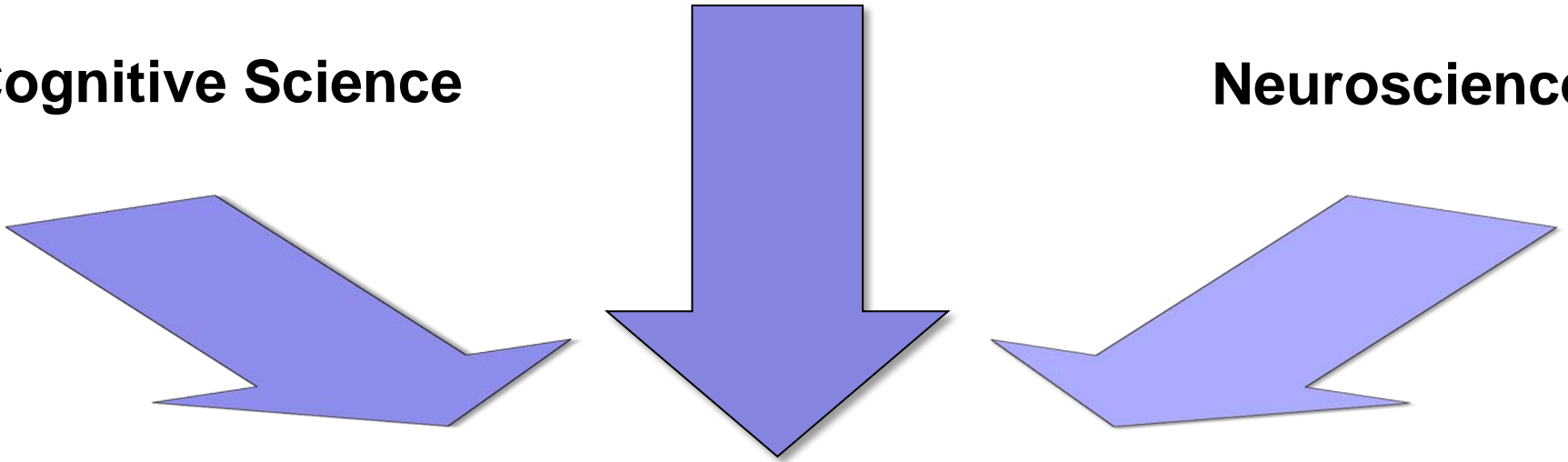


Let's
propose a
Science and
Technology
Center!

**Artificial Intelligence
Machine Learning
Computer Science**

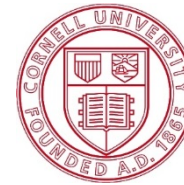
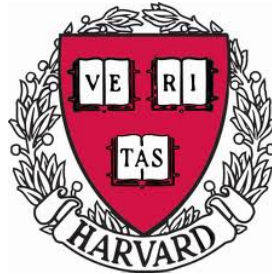
Cognitive Science

Neuroscience



Science and Technology of Intelligence

Step 1



Step 2

Thrust 1
How it works

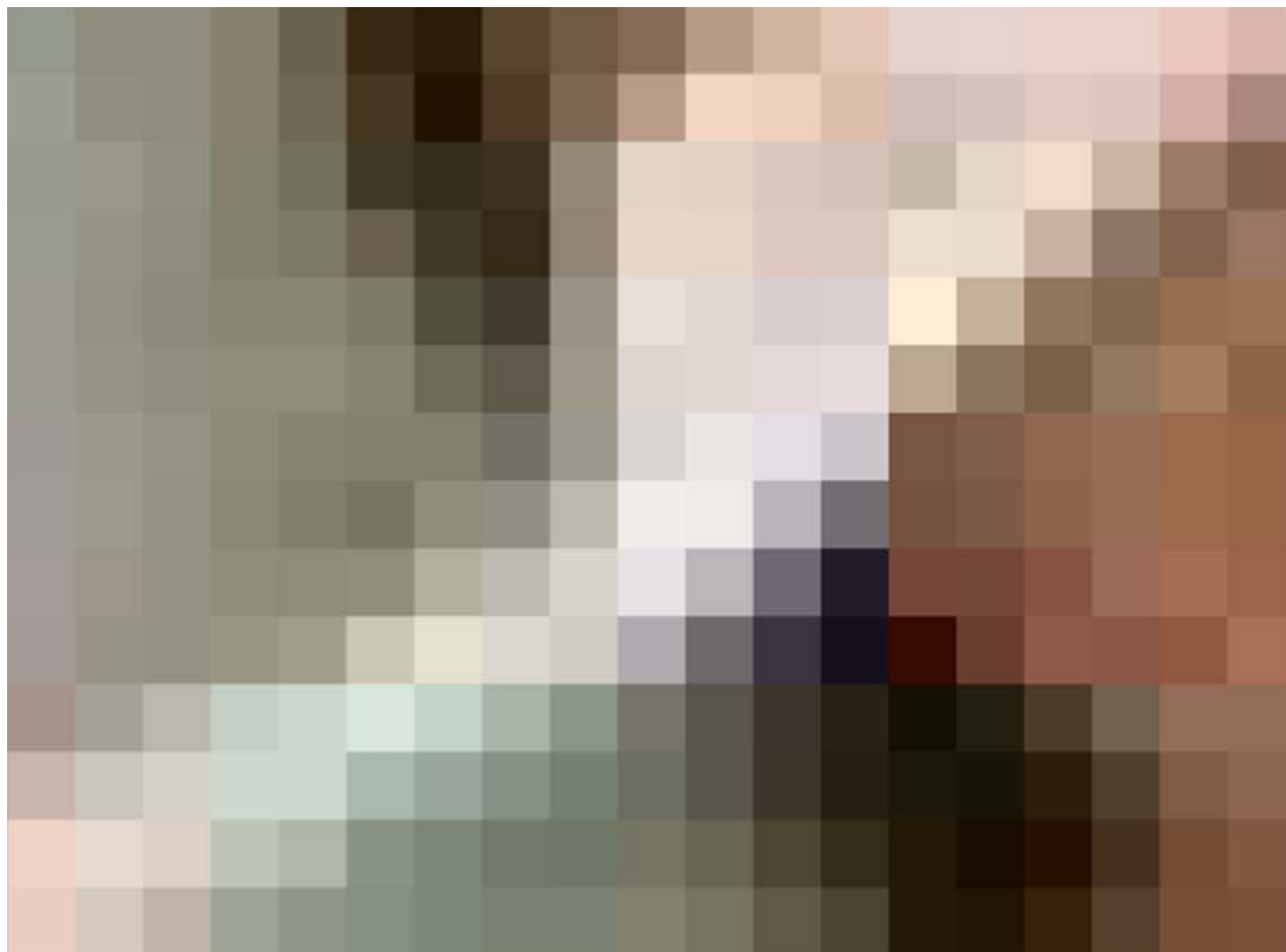
Thrust 2
How it develops

Enabling theory

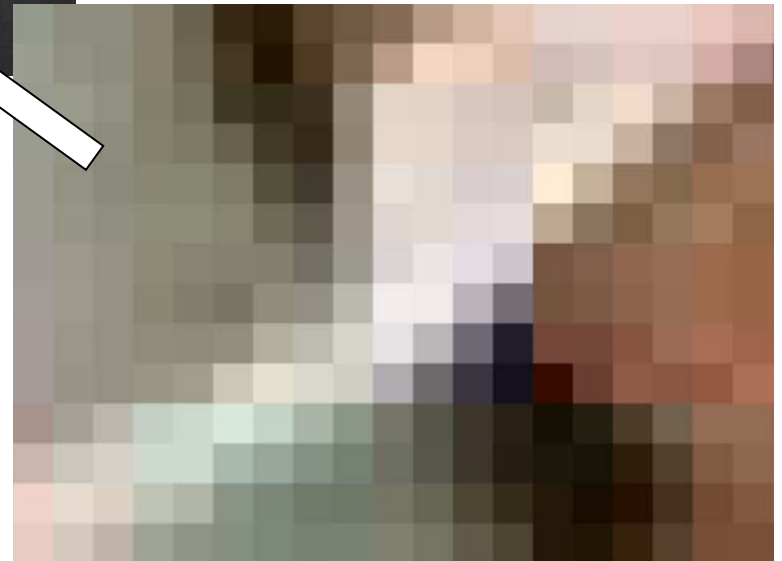
Thrust 3
How implemented

Thrust 4
How amplified

Step 3



Step 3



Step 3

Who is there?

What are they doing?

Where are they?

Why are they there?

When is the picture taken?

Is he toasting or drinking?

Are the people happy?

What will they do next?



Step 4

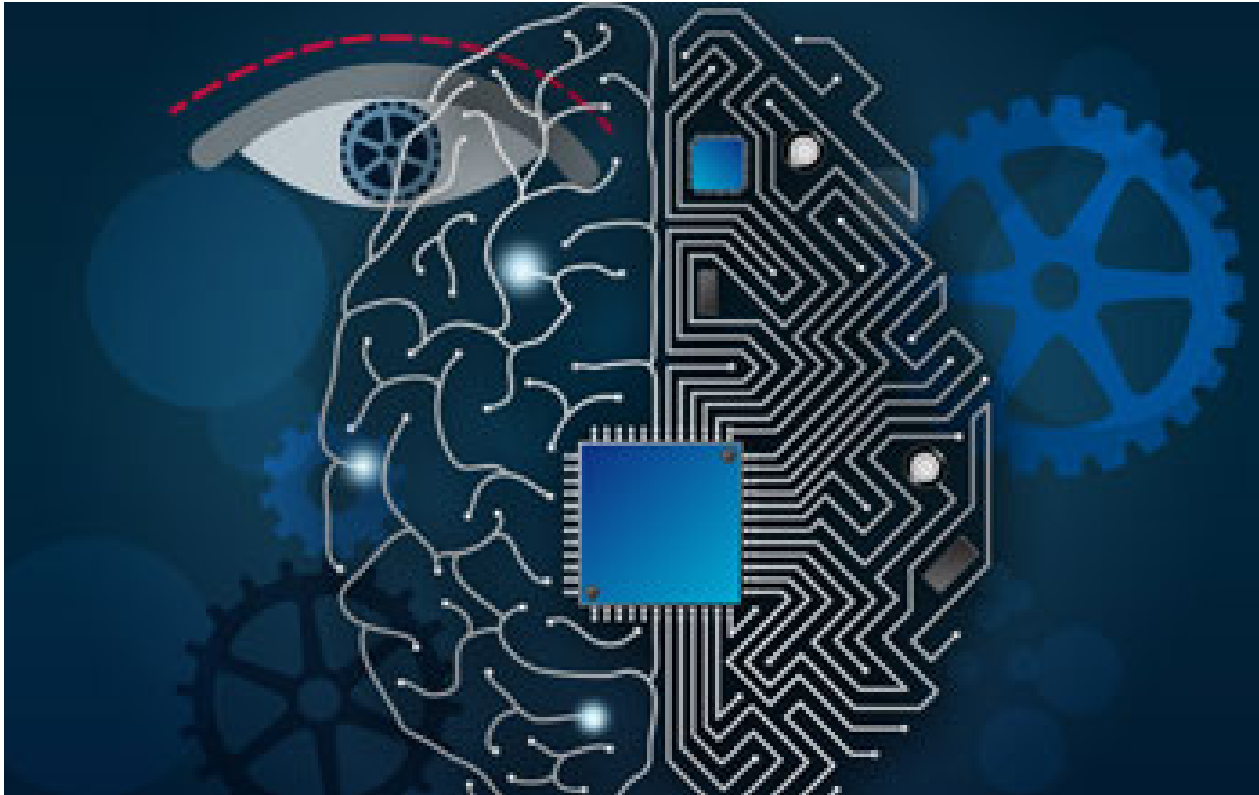
Learning with $N \rightarrow \infty$



Learning with $N \rightarrow 1$



We won!

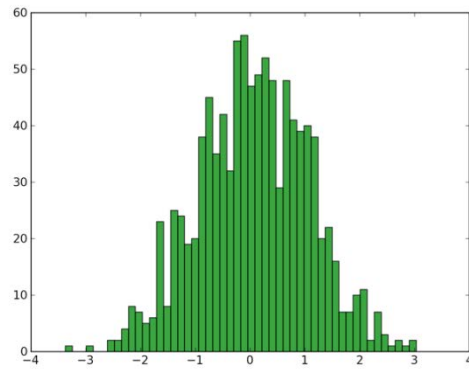
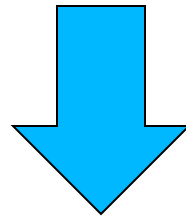
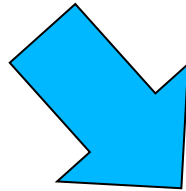


The Center for Brains, Minds and Machines



Thrust 1

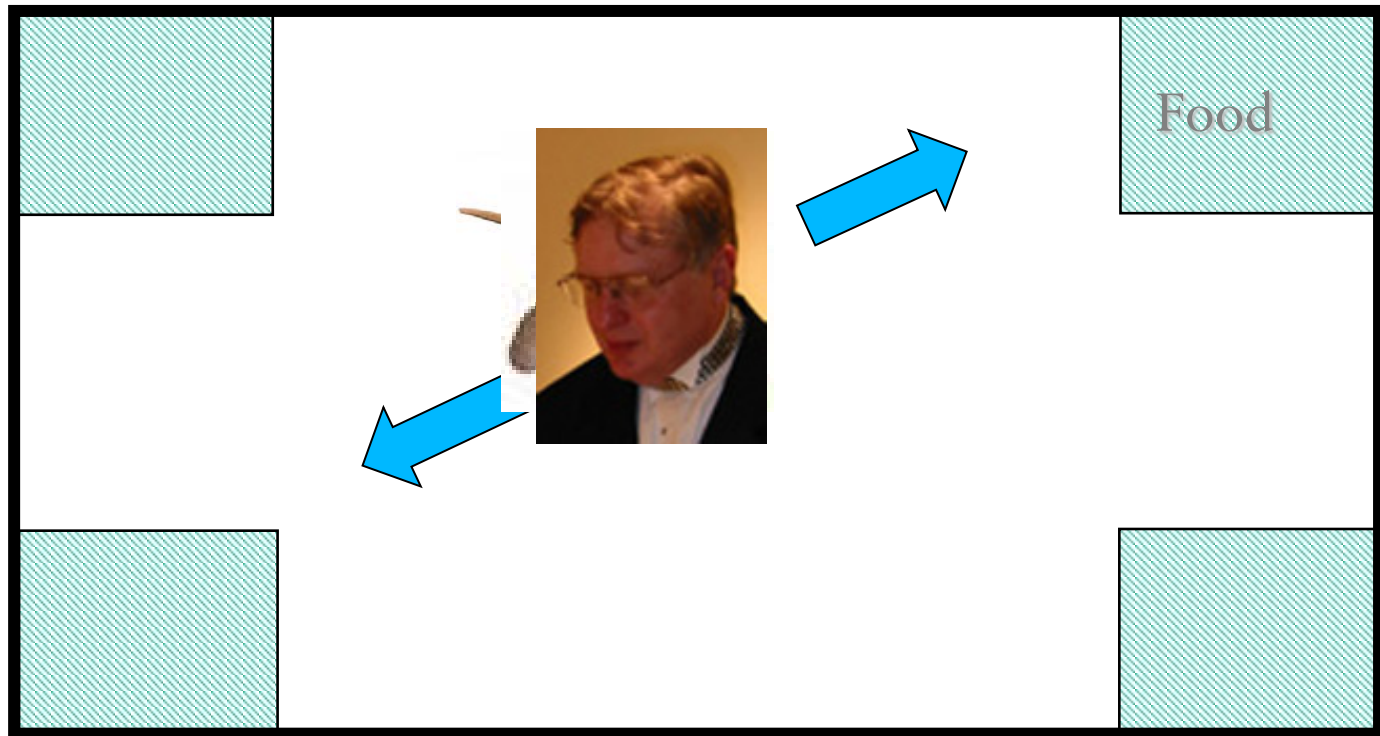
How it works

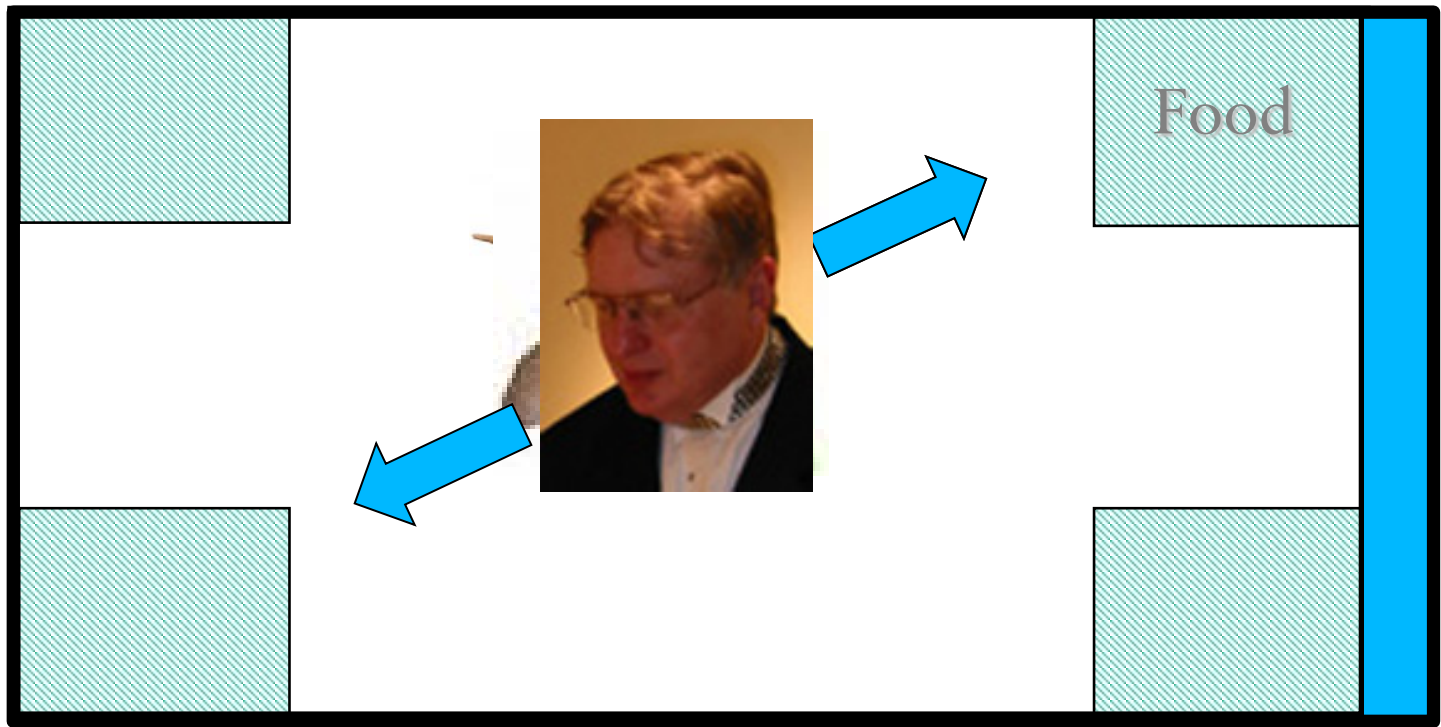




Thrust 2

How it develops





Django was started by
two 2 people who
worked in a newsroom

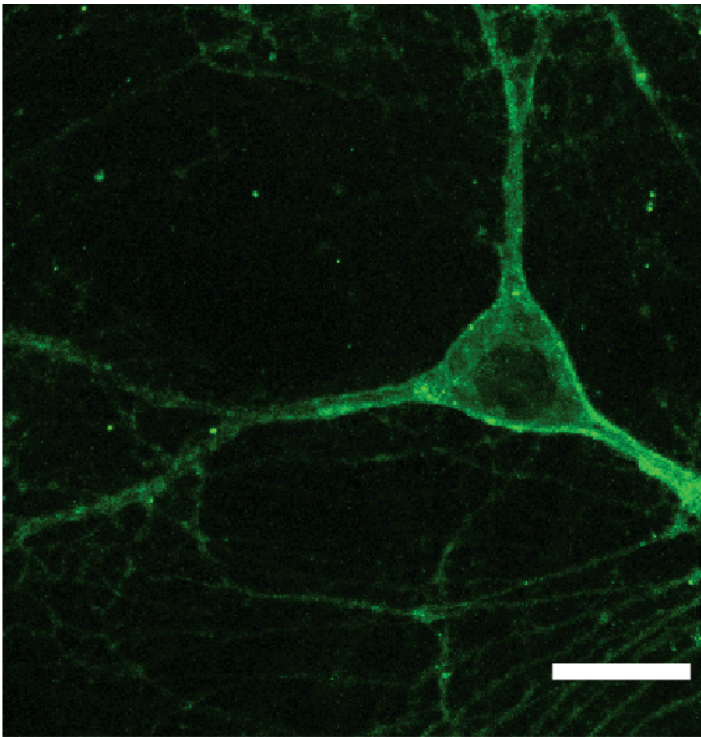
You can update
and retrieve
articles very
easily

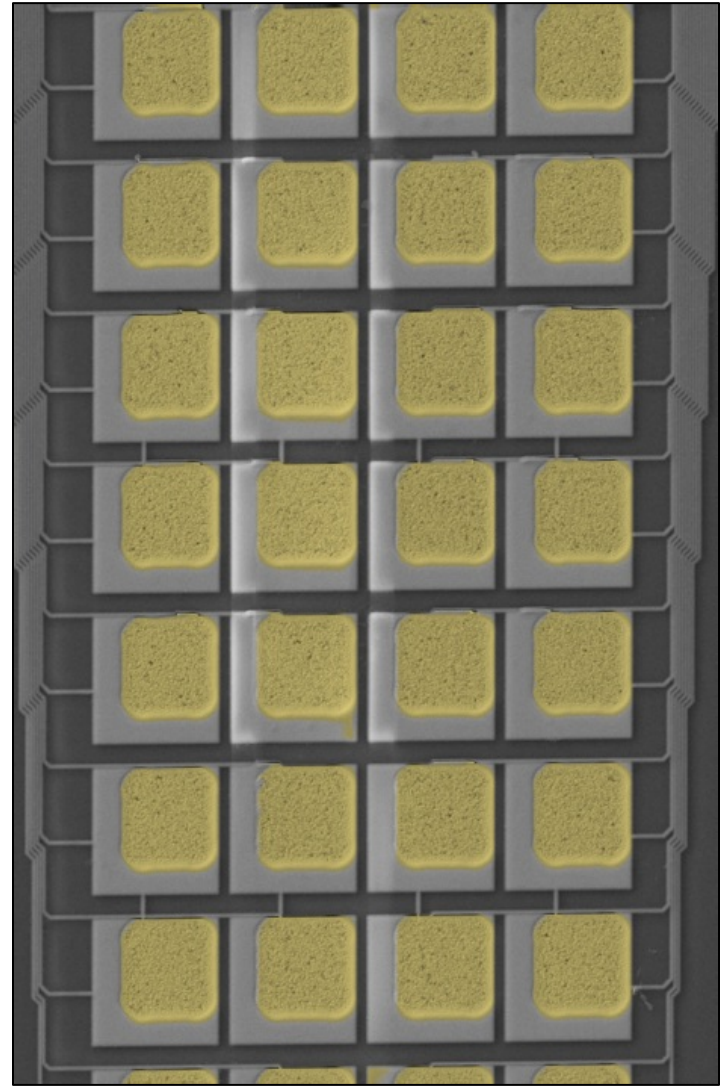
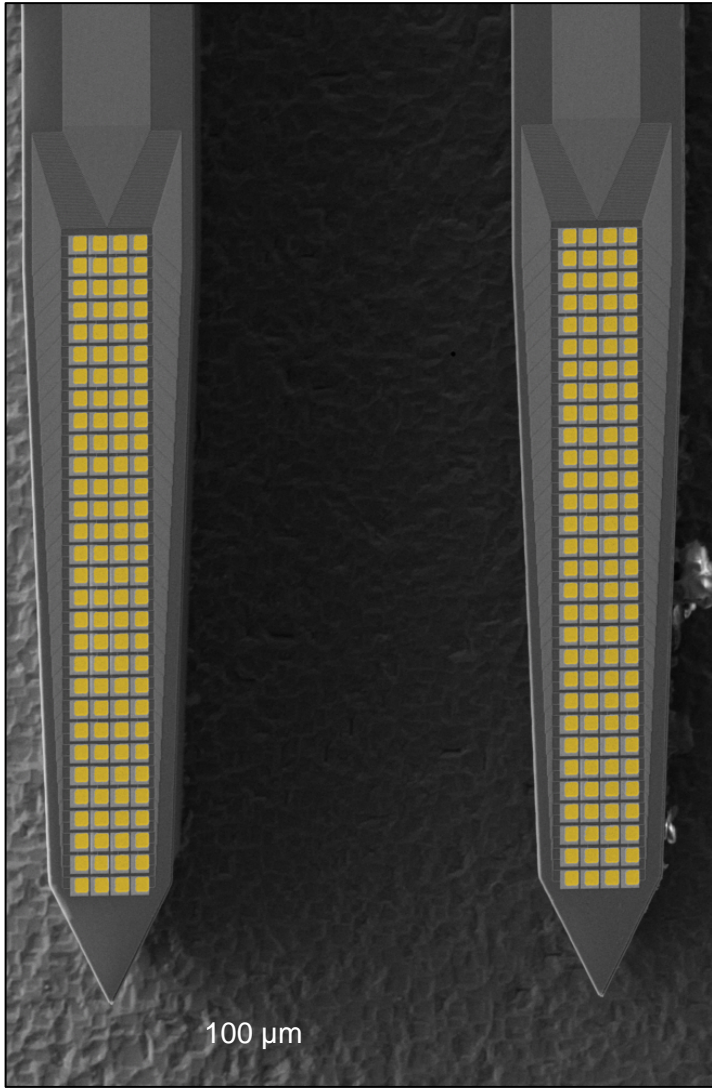
They need a good
way to store and
access articles

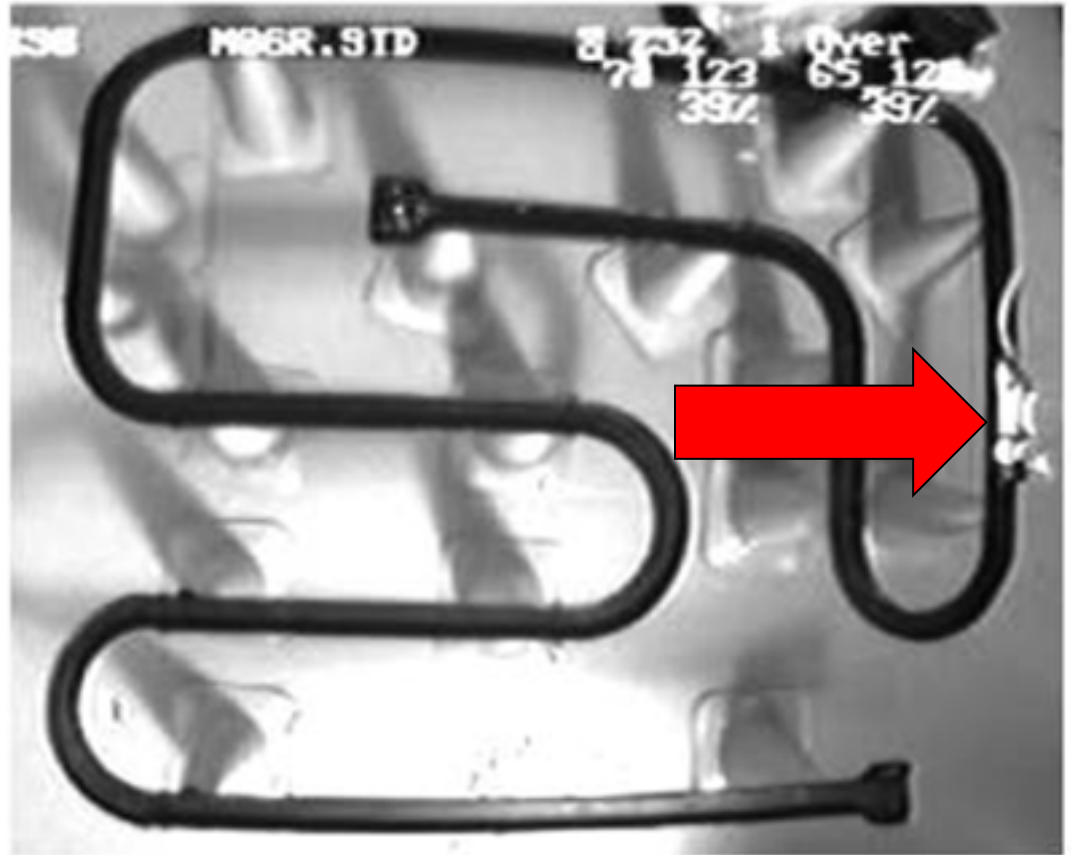
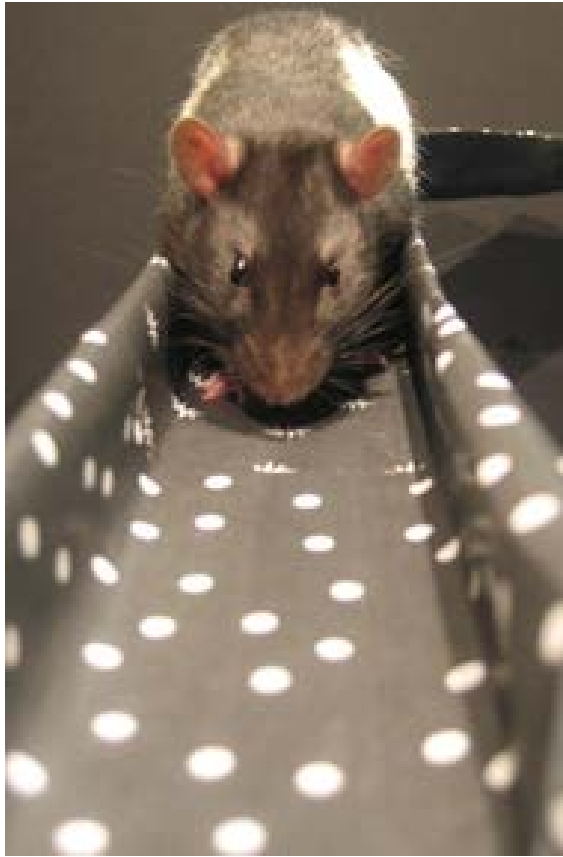


Thrust 3

How it is implemented







Thrust 4

Social interaction

John was hungry.

He wanted a new car.

He decided to play his violin.

His brother got a new job.

John was hungry.

He wanted a hamburger.

He decided to walk to McDonalds.

He ordered a Big Mac.

John, an MIT freshman, was hungry.

He wanted a hamburger.

He decided to go to the student center.

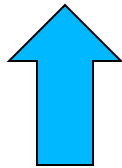
On the way, he was mauled by an escaped circus lion.

**Grace thinks the
powder is sugar.
It is sugar.
Her friend is fine**

**Grace thinks the
powder is sugar.
It is arsenic.
Her friend dies.**

**Grace thinks the
powder is arsenic.
It is sugar.
Her friend is fine.**

**Grace thinks the
powder is arsenic.
It is arsenic.
Her friend dies.**

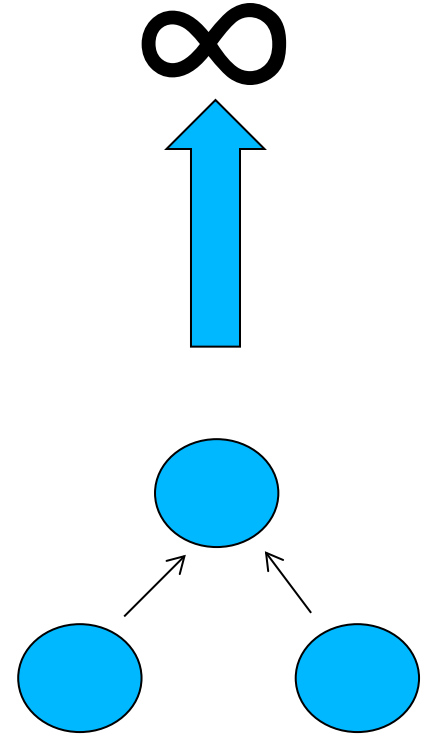


Back to Thrust 1

The story at the center of the story

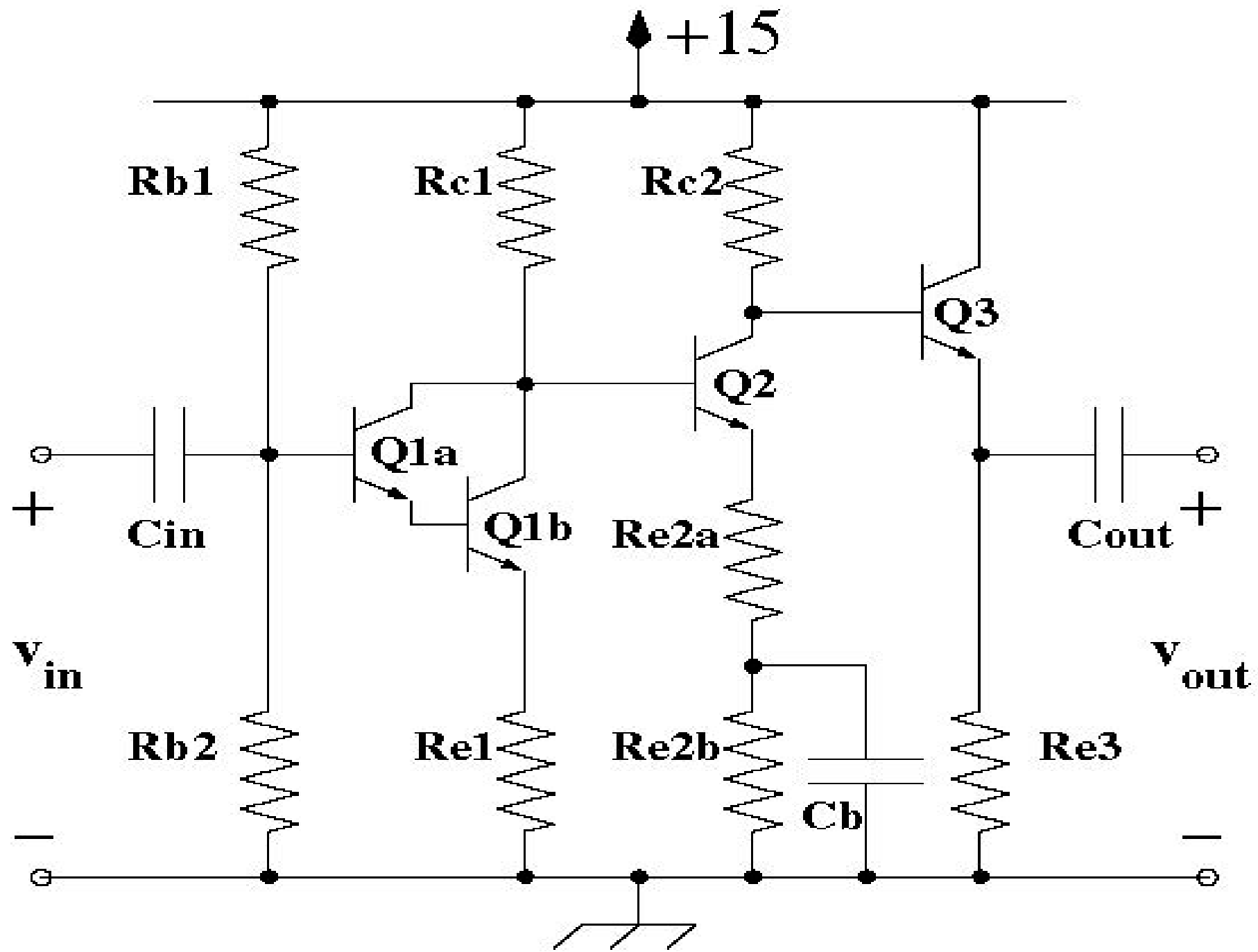






The Strong Story Hypothesis

The mechanisms that enable us humans to tell, understand, and recombine stories separate our intelligence from that of other primates.



Macbeth is a thane and Macduff is a thane. Lady Macbeth is evil and greedy. Duncan is the king, and Macbeth is Duncan's successor. Duncan is an enemy of Cawdor. Macduff is an enemy of Cawdor. Duncan is Macduff's friend. Macbeth defeated Cawdor. Duncan becomes happy because Macbeth defeated Cawdor. The witches danced and had visions. Macbeth talks with the witches. The witches predicted that Macbeth will become king. The witches astonish Macbeth. Duncan executes Cawdor. Macbeth becomes Thane of Cawdor. Duncan rewarded Macbeth because Duncan became happy. Macbeth wants to become king because Lady Macbeth persuaded Macbeth to want to become the king. Macbeth invites Duncan to dinner. Duncan complements Macbeth. Duncan goes to bed. Duncan's guards become drunk and sleep. In order to murder Duncan, Macbeth murders the guards and Macbeth stabs Duncan. Macbeth becomes king. Malcolm and Donalbain flee. Macbeth's murdering Duncan leads to Macduff's fleeing to England. In order to flee to England, Macduff rides to the coast and Macduff sails on a ship. Then, Macduff's fleeing to England leads to Macbeth's murdering Lady Macduff. Macbeth hallucinates at a dinner. Lady Macbeth says he hallucinates often. Everyone leaves because Lady Macbeth tells everyone to leave. Macbeth's murdering Duncan leads to Lady Macbeth's becoming distraught. Lady Macbeth has bad dreams. Lady Macbeth thinks she has blood on her hands. Lady Macbeth kills herself. Birnam Wood is a forest. Burnham Wood goes to Dunsinane. Macduff's army attacks Dunsinane. Macduff curses Macbeth. Macbeth refuses to surrender. Macduff kills Macbeth. The end.

...The witches predicted that Macbeth will become king. The witches astonish Macbeth. Duncan executes Cawdor. Macbeth becomes Thane of Cawdor. Duncan rewarded Macbeth because Duncan became happy. Macbeth wants to become king because Lady Macbeth persuaded Macbeth to want to become the king. Macbeth invites Duncan to dinner. ...

Inference rule:

If X harms Y, X harms Y's friend.

Explanation rule:

X may want to kill Y because X is angry at Y.

Concept pattern for revenge:

X's harming Y leads to Y's harming X.

Genesis

12:29:40 EDT 20-Apr-2014

Demonstrate Read Record About

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

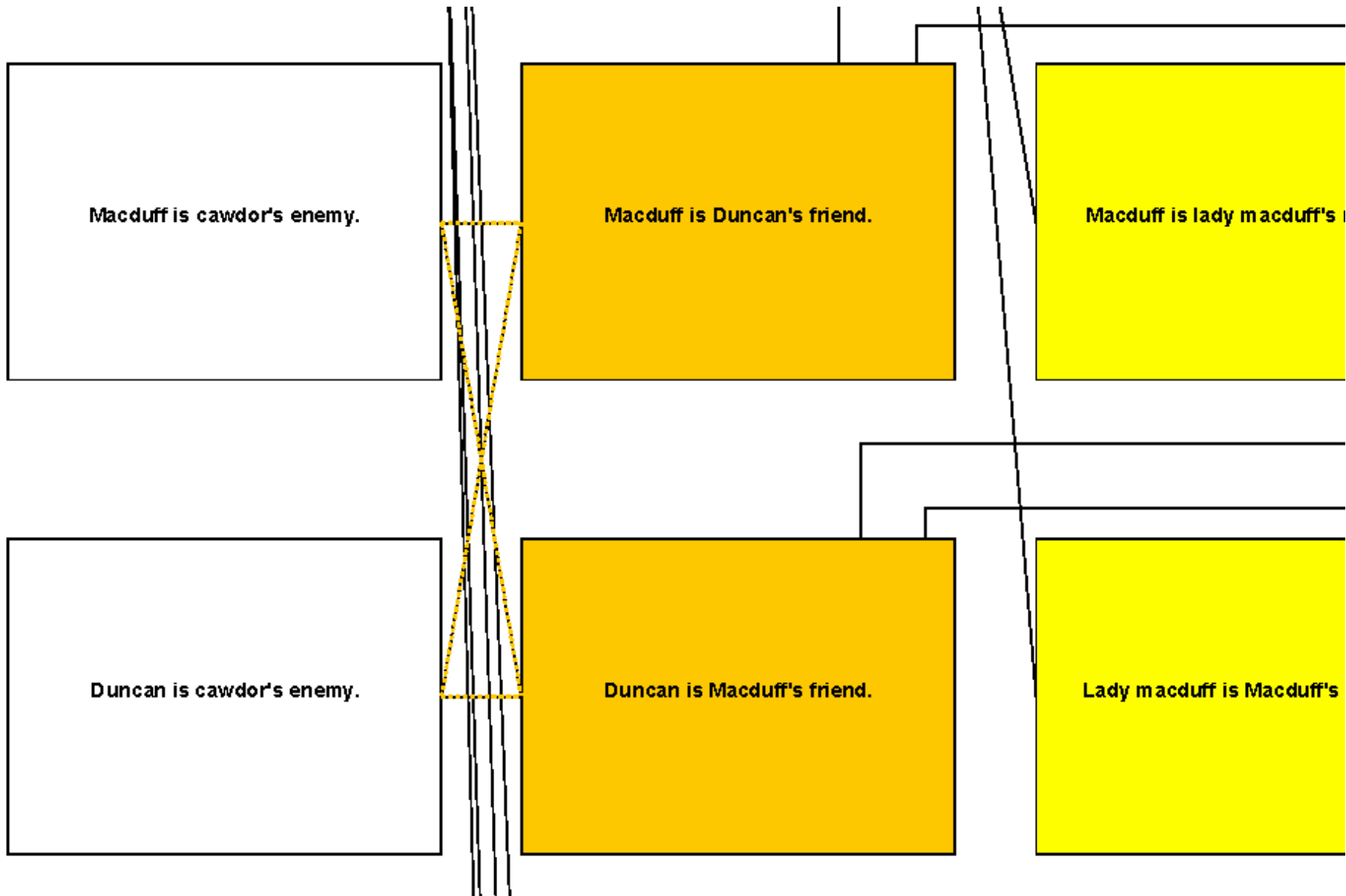
Rules: 2
Inferences: 0
Concepts: 0
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 0.0 sec

Analysis

21%

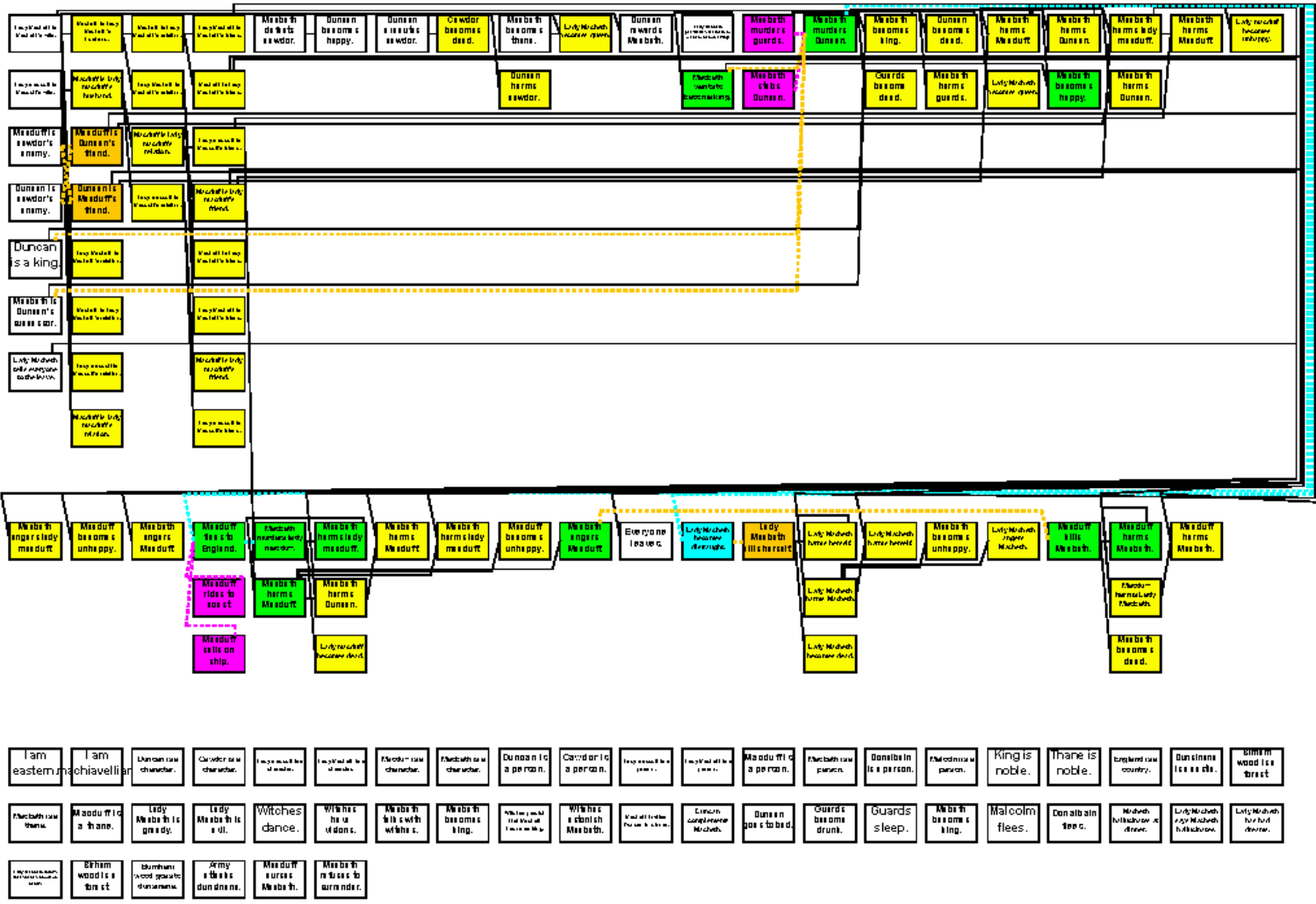
Elaboration graph

The image shows a screenshot of the Genesis software interface. At the top, there is a title bar with the text "Genesis" and a system clock showing "12:29:40 EDT 20-Apr-2014". Below the title bar is a menu bar with options: "Demonstrate", "Read", "Record", and "About". Underneath the menu bar is a secondary menu bar with options: "Views", "Controls", "Start viewer", "Experts", "Elaboration graph", "Inspector", "Sources", "Results", "Summary", and "Story". The main area of the window contains a list of statistics: "Rules: 2", "Inferences: 0", "Concepts: 0", "Discoveries: 0", "Explicit elements: 0", "Inferred elements: 0", "Total elements: 0", "Story reading time: 0.0 sec", and "Total time elapsed: 0.0 sec". At the bottom of the window, there is a section labeled "Analysis" which contains a progress bar. The progress bar is partially filled and shows "21%". Below the progress bar, the text "Elaboration graph" is visible.



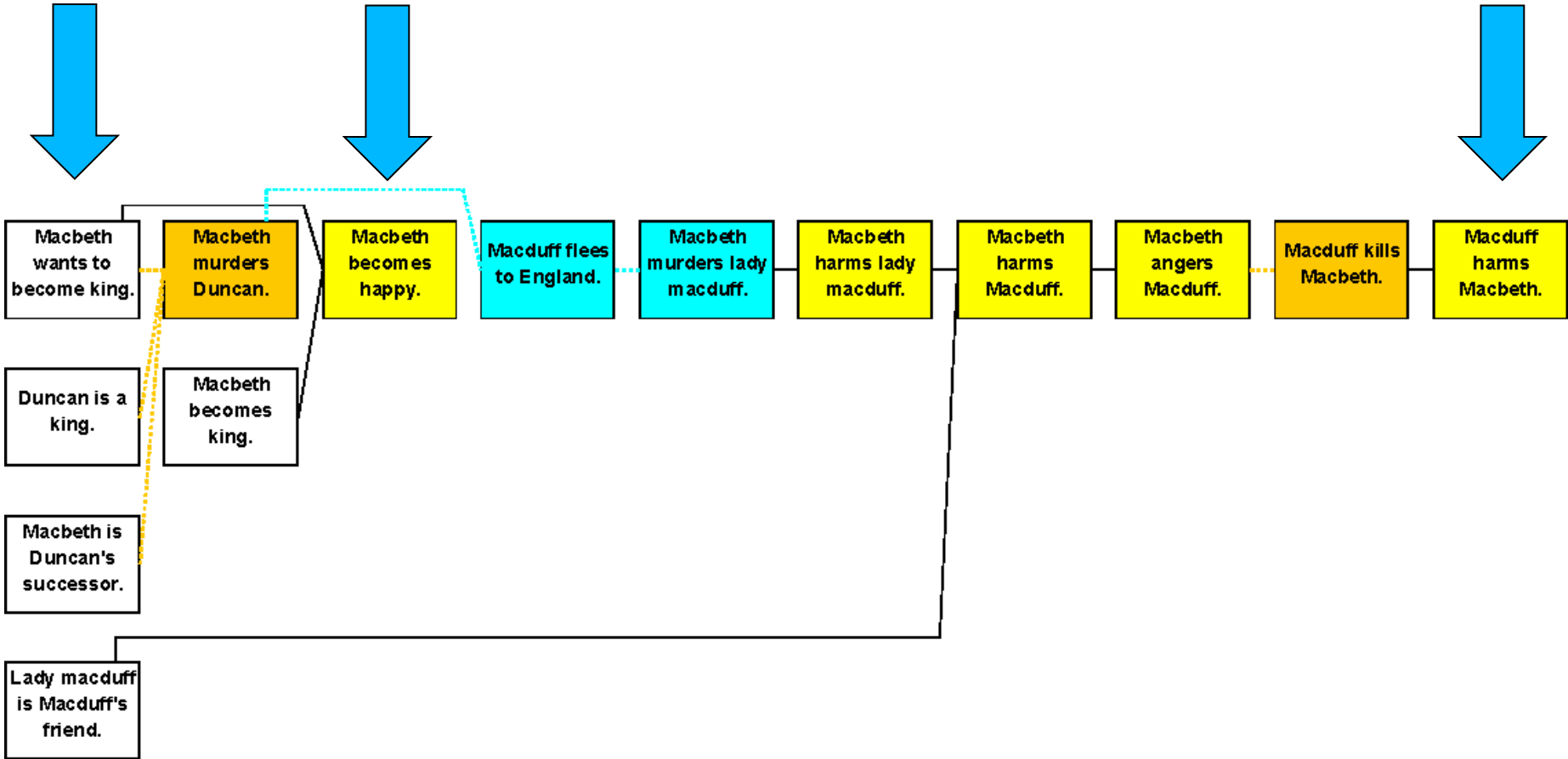
Macbeth/revenge

Rules: 39
 Inferences: 70
 Concepts: 14
 Discoveries: 9
 Explicit elements: 68
 Inferred elements: 46
 Total elements: 114
 Story reading time: 2.8 sec
 Total time elapsed: 5.1 sec



Analysis

Revenge	Success	Answered prayer	Mistake because unh...	Mistake because har...	Mistake because har...	Pyrrhic victory	Pyrrhic victory	Suicide
---------	---------	-----------------	------------------------	------------------------	------------------------	-----------------	------------------------	---------



Genesis 13:43:09 EDT 20-Apr-2014

Demonstrate Read Record About

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Rules: 38
Inferences: 0
Concepts: 14
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 0.7 sec

Rules: 38
Inferences: 0
Concepts: 14
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 0.7 sec

Analysis

91%

Elaboration graph

The screenshot shows the Genesis software interface with two side-by-side panels. Each panel displays the same statistics: Rules: 38, Inferences: 0, Concepts: 14, Discoveries: 0, Explicit elements: 0, Inferred elements: 0, Total elements: 0, Story reading time: 0.0 sec, and Total time elapsed: 0.7 sec. Below the statistics is an 'Analysis' section with a progress bar showing 91% completion. At the bottom of each panel is an 'Elaboration graph' section. The interface includes a menu bar with 'Demonstrate', 'Read', 'Record', and 'About', and a toolbar with 'Views', 'Controls', 'Start viewer', 'Experts', 'Elaboration graph', 'Inspector', 'Sources', 'Results', 'Summary', and 'Story'. The window title is 'Genesis' and the system clock shows '13:43:09 EDT 20-Apr-2014'.

Macbeth harms
Macduff.

Macbeth angers
Macduff.

Macduff kills
Macbeth.

Macduff harms
Macbeth.

Macduff isn't sane.

Macduff kills
Macbeth.

Demonstrate Read Record About

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Predictions Concept analysis Answers Speech

On a commonsense level

It looks like Dr. Jekyll thinks Macduff kills Macbeth, probably because Macbeth angers Macduff.

It looks like Mr. Hyde thinks Macduff kills Macbeth, probably because Macduff isn't sane.

On a concept level

It looks like Dr. Jekyll thinks Macduff kills Macbeth is part of acts of Revenge, Mistake because harmed, and Pyrrhic victory.

It looks like Mr. Hyde thinks Macduff kills Macbeth is part of act of Insane violence.

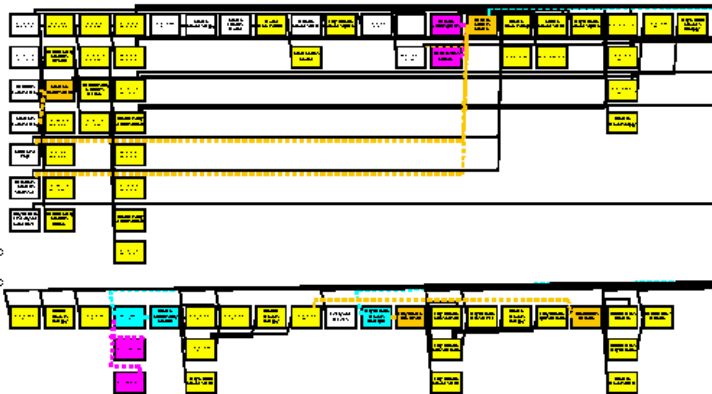
Results

Why did Macduff kill Macbeth?

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Macbeth/eastern

Rules: 38
Inferences: 63
Concepts: 14
Discoveries: 9
Explicit elements: 69
Inferred elements: 43
Total elements: 112
Storyreading time: 5.1 sec
Total time elapsed: 9.8 sec



Analysis

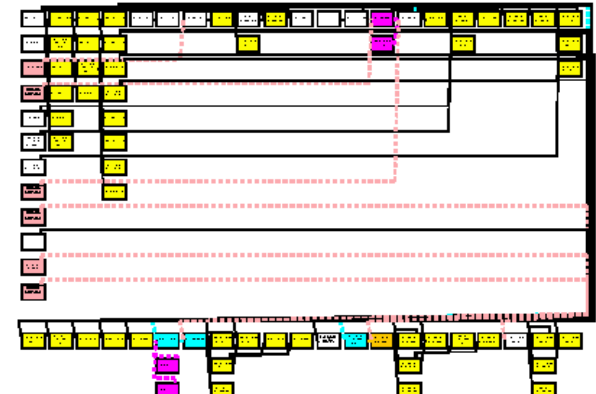
Revenge Success Answer... Mistak... Mistak... Mistak... Pyrrhic... Pyrrhic... Suicide

100%

Elaboration graph

Macbeth/western

Rules: 38
Inferences: 65
Concepts: 14
Discoveries: 5
Explicit elements: 68
Inferred elements: 47
Total elements: 115
Storyreading time: 5.1 sec
Total time elapsed: 9.9 sec



Analysis

Insane violence Insane violence Insane violence Insane violence Suicide

100%

Genesis

13:51:39 EDT 20-Apr-2014

Demonstrate Read Record About

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Rules: 7
Inferences: 0
Concepts: 0
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 0.1 sec

Rules: 7
Inferences: 0
Concepts: 0
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 0.1 sec

Analysis

25%

Elaboration graph

Analysis

25%

Elaboration graph



Genesis 13:55:39 EDT 20-Apr-2014

Demonstrate Read Record About

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Causal view

Did Lu kill Shan because America is individuali

Views Controls Start viewer Experts Elaboration graph Inspector Sources Results Summary Story

Lu murder story/eastern

Rules: 36
Inferences: 0
Concepts: 14
Discoveries: 0
Explicit elements: 2
Inferred elements: 0
Total elements: 2
Story reading time: 2.4 sec
Total time elapsed: 6.2 sec

Analysis

80%

Elaboration graph

Lu murder story/western

Rules: 31
Inferences: 0
Concepts: 17
Discoveries: 0
Explicit elements: 0
Inferred elements: 0
Total elements: 0
Story reading time: 0.0 sec
Total time elapsed: 3.7 sec

Analysis

80%

It looks like the Dr. Jekyll reader of *Lu murder story/eastern*, **on reflection,** **believes** America is individualistic which **enables him to believe** Lu kills shan because America is individualistic

It looks like the Mr. Hyde reader of *Lu murder story/western* **does not believe** America is individualistic and therefore **cannot believe** that Lu kills shan because America is individualistic

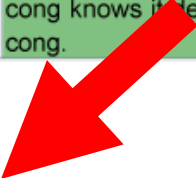
- The USA knew the Viet Cong were preparing to attack the USA.
- The USA knew the USA would defeat the Viet Cong.
- The USA knew the Viet Cong knew the USA would defeat the Viet Cong.
- The USA believed the Viet Cong would not attack the USA.
- The Viet Cong attacked the USA.
- The Israelis knew the Egyptians were preparing to attack the Israelis.
- The Israelis knew the Israelis would defeat the Egyptians.
- The Israelis knew the Egyptians knew the Israelis would defeat the Egyptians.
- The Israelis believed the Egyptians would not attack the Israelis.
- ?

The Israelis know the Egyptians prepare to attack them.	The Israelis know to defeat the Egyptians.	The Israelis know that the Egyptians know they defeat the Egyptians.	The Israelis believe the Egyptians not to attack them.	---
The USA knows that the viet cong prepares to attack it.	The USA knows to defeat the viet cong.	---	The USA believes the viet cong not to attack it.	The viet cong attacks the USA.

The Israelis know that the Egyptians prepare to attack them.	The Israelis know to defeat the Egyptians.	The Israelis know that the Egyptians know they defeat the Egyptians.	The Israelis believe the Egyptians not to attack them.	The Egyptians attack the Israelis.
The USA knows that the viet cong prepares to attack it.	The USA knows to defeat the viet cong.	The USA knows that the viet cong knows it defeats the viet cong.	The USA believes that the viet cong doesn't attack it.	The viet cong attacks the USA.

The Israelis know the Egyptians prepare to attack them.	The Israelis know to defeat the Egyptians.	The Israelis know that the Egyptians know they defeat the Egyptians.	The Israelis believe the Egyptians not to attack them.	---
The USA knows that the viet cong prepares to attack it.	The USA knows to defeat the viet cong.	---	The USA believes the viet cong not to attack it.	The viet cong attacks the USA.

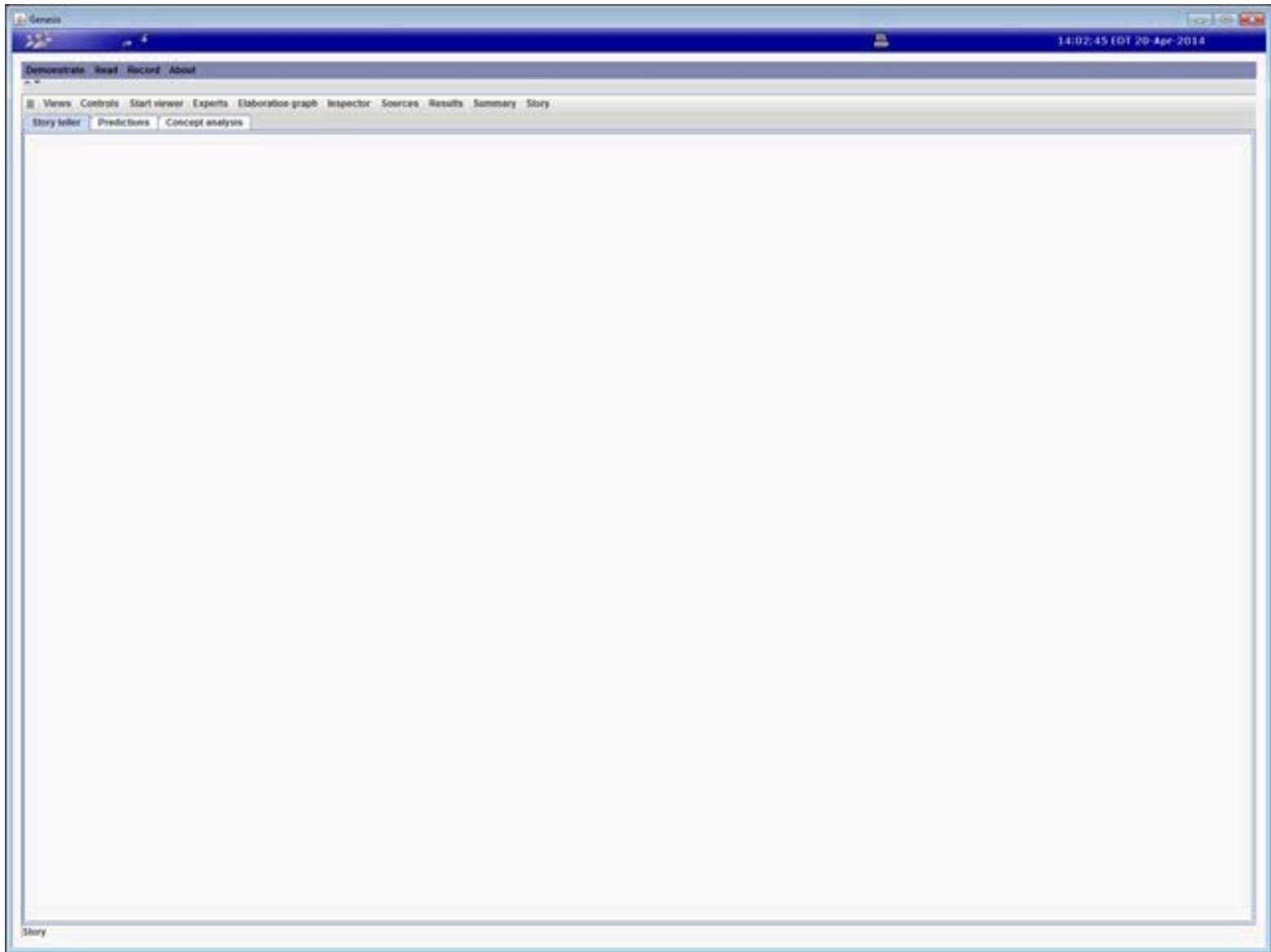
The Israelis know that the Egyptians prepare to attack them.	The Israelis know to defeat the Egyptians.	The Israelis know that the Egyptians know they defeat the Egyptians.	The Israelis believe the Egyptians not to attack them.	The Egyptians attack the Israelis.
The USA knows that the viet cong prepares to attack it.	The USA knows to defeat the viet cong.	The USA knows that the viet cong knows it defeats the viet cong.	The USA believes that the viet cong doesn't attack it.	The viet cong attacks the USA.



The USA knows that the viet cong knows it defeats the viet cong.

The Egyptians attack the Israelis





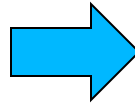
Duncan is a person. Lady Macbeth is a person. Macduff is a person. Macbeth is a person. A thane is a noble. Macbeth is a thane. Macduff is a thane. Lady Macbeth is greedy. Macbeth defeats a rebel. Appear is a success. Macbeth has a success. Witches talk with Macbeth. Witches have visions. Duncan rewards Macbeth because Duncan becomes happy. Macbeth wants to become king because Lady Macbeth persuades Macbeth to want to become king.

**Duncan becomes dead because
Macbeth murders Duncan.**

Duncan is a person. Lady Macbeth is a person. Macduff is a person. Macbeth is a person. A thane is a noble. Macbeth is a thane. Macduff is a thane. Lady Macbeth is greedy. Macbeth defeats a rebel. Appear is a success. Macbeth has a success. Witches talk with Macbeth. Witches have visions. Duncan rewards Macbeth because Duncan becomes happy. Macbeth wants to become king because Lady Macbeth persuades Macbeth to want to become king.

**Duncan becomes dead because
because Person x becomes dead
whenever Person y kills person x.**

Macbeth is a thane and Macduff is a thane. Lady Macbeth is evil and greedy. Duncan is the king, and Macbeth is Duncan's successor. Duncan is an enemy of Cawdor. Macduff is an enemy of Cawdor. Duncan is Macduff's friend. Macbeth defeated Cawdor. Duncan becomes happy because Macbeth defeated Cawdor. The witches danced and had visions. Macbeth talks with the witches. The witches predicted that Macbeth will become king. The witches astonish Macbeth. Duncan executes Cawdor. Macbeth becomes Thane of Cawdor. Duncan rewarded Macbeth because Duncan became happy. Macbeth wants to become king because Lady Macbeth persuaded Macbeth to want to become the king. Macbeth invites Duncan to dinner. Duncan complements Macbeth. Duncan goes to bed. Duncan's guards become drunk and sleep. In order to murder Duncan, Macbeth murders the guards and Macbeth stabs Duncan. Macbeth becomes king. Malcolm and Donalbain flee. Macbeth's murdering Duncan leads to Macduff's fleeing to England. In order to flee to England, Macduff rides to the coast and Macduff sails on a ship. Then, Macduff's fleeing to England leads to Macbeth's murdering Lady Macduff. Macbeth hallucinates at a dinner. Lady Macbeth says he hallucinates often. Everyone leaves because Lady Macbeth tells everyone to leave. Macbeth's murdering Duncan leads to Lady Macbeth's becoming distraught. Lady Macbeth has bad dreams. Lady Macbeth thinks she has blood on her hands. Lady Macbeth kills herself. Birnam Wood is a forest. Burnham Wood goes to Dunsinane. Macduff's army attacks Dunsinane. Macduff curses Macbeth. Macbeth refuses to surrender. Macduff kills Macbeth. The end.



The story is about Pyrrhic victory. Lady Macduff was Macduff's wife. Macbeth wanted to become king because Lady Macbeth persuaded Macbeth to want to become king. Macbeth murdered Duncan, probably because Duncan was a king and Macbeth was Duncan's successor. Macduff fled to England. Macbeth killed Lady Macduff. Macduff killed Macbeth, probably because Macbeth angered Macduff.







CBMM Contributions to come

- A better understanding of ourselves
- A better understanding of each other
- A substantial contribution to our societies future education, prosperity, health, and security



M.I.T.
Police Officer
Sean A.
Collier
Square

NO
TURN
RED



MIT
STRONG

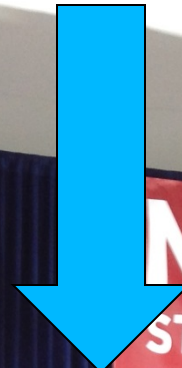
MENS·MANUS·FORTIS

MIT
STRONG

MENS·MANUS·FORTIS

MIT
STRONG

MENS·MANUS·FORTIS

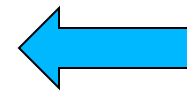


Fear Not, Be Strong
Crystal Campbell
Brent Collier
[Small photo of a person]

Dan Oliver (5:34:31)

Madeleine Pascolini-Campbell (4:27:13)

Thomas Petersen (2:40:17)



Julie Pryor (4:57:56)

Jeremy Rishel (5:27:50)

MIT
STRONG

MENS · MANUS · FORTIS