Communication in Computer Science

The Scientific Process in Popular Culture

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Our goal this afternoon

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1: I briefly present “the scientific process”

2: I identify its rendition in The Imitation Game

3: You search for other renditions in a movie,
a book, a graphic novel, etc.

4: You prepare and give a quick talk
about a rendition you find interesting

Why it’s going to work

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We will talk about "the scientific process"

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but not in your own PhD activities,

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somewhere else safe, in popular medias

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to have an interesting conversation about it.

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to have an interesting conversation about it.

Bring your own context.
– Joss Whedon
(well, almost)

An extra reason why it's going to work

This seminar is for you and about you,

not for me and about me.

An extra reason why it's going to work

This seminar is for you and about you,

not for me and about me.

Example: a secretary's first course about html.

An extra reason why it's going to work

This seminar is for you and about you,

not for me and about me.

So: 30mn for me, 45mn for you, and 45mn for you.

The pitfall

action vs. actor

ball vs. player

object vs. subject

The pitfall

action vs. actor

ball vs. player

object vs. subject

A short story is about a murder.

A novel is about the murderer.

– Philip K. Dick

Here: scientific process vs. scientist

Here: scientific process vs. scientist

- the mad scientist
- the evil scientist

Here: scientific process vs. scientist

- the mad scientist
- the evil scientist
- the daughter of the old scientist
- the young scientist

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- the young scientist
  (he is after the daughter of the old scientist)

Here: scientific process vs. scientist

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- etc.

Typical examples of scientists

In movies:

- James Bond (they want to destroy the world)

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- Independence Day (they are locked up*)

* in Area 51...

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- Eureka

Marshall Jack Carter: Area 51 is real?

Henry Deacon [nodding vigorously]: No.

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- Eureka

etc.

The Imitation Game

Two aspects are nicely rendered:

- T.T.T. (Piet Hein)
- supersaturation

Put up in a place

Where it's easy to see

The cryptic admonishment

T.T.T.

When you feel how depressingly

slowly you climb,

it's well to remember that

Things Take Time!

T.T.T. in The Imitation Game

- Setting up the experiment takes time.

T.T.T. in The Imitation Game

- Setting up the experiment takes time.
- The experiment takes time.

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- Setting up the experiment takes time.
- The experiment takes time.
- Management vs. Turing. (“Prof. Turing, we demand you solve this halting problem.”)

T.T.T. in The Imitation Game

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- Management vs. Turing. (“Prof. Turing, we demand you solve this halting problem.”)

I never worry about action, only about inaction.

– Winston Churchill

Supersaturation in The Imitation Game

- Turing immerses himself in the problem.
- He is receptive to the smallest input
  (name of German girlfriend, “Heil Hitler”).
- He runs back to his lab.

Inspiration exists, but it must find you working.

– Pablo Picasso

About immersing oneself in a problem

heap of knowledge + change of perspective

$\Downarrow$

the mind clicks

About immersing oneself in a problem

heap of knowledge + change of perspective

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the mind clicks

Genius is 99% perspiration
and 1% inspiration.
– Thomas Edison

Your exercise

Find a movie / book / etc.

that illustrates

an aspect (any aspect) of the scientific process.

In natural science

The scientific process:

- observation,
- hypothesis, and
- experiment.

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(by, guess whom, yes, peer reviewers)

The art of the possible

The engineering process:

“Design a computer network

that is resilient

to single-point failure.”

Out of scope here.

A broad distinction

- Deductive: The corpse is on the table.

  How did the person die?

- Inductive: Find something that makes sense

  out of finitely many observations.

The first inkling

- “Hey, that’s funny...” (Asimov)
- “Hum, something doesn’t fit.” (Tycho Brahe)

The moment

- Eureka! (Archimedes)
- The apple (Newton)
- An oddity (H. C. Ørsted)

A huge pitfall: prejudices

- “If you look for something,

  you are likely to find it.”

  – Niels Steno
- “You must not fool yourself.

  However, you are the easiest person to fool.”

  – Richard Feynman

Concrete example

A long time ago, in a country far, far away,
a university changed its logo.

It commissioned a survey
as a student assignment
that it gave to a visiting student.

Subsequently, the student was interviewed
in the University weekly newspaper.

The interview

“I am not surprised by the figures.

The interview

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Before starting my assignment,

I asked my friends and fellow students

what they thought of the new logo,

The interview

“I am not surprised by the figures.
Before starting my assignment,
I asked my friends and fellow students
what they thought of the new logo,
and the answers I received in my survey
were more or less the same – great [...].

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“I am not surprised by the figures.
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were more or less the same – great [...].
So no – I’m not surprised at all.”

Neutrality?

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Bias

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Ego

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Mission accomplished: prejudices confirmed

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You are the easiest person to fool...

The symmetric pitfall: ignorance

The Enigma machine:

- Who developed it in the first place?
- To which end?
- How did it end up being used by the Nazis?
- Did it have other weaknesses
  than the ones exploited by Turing?

References (essays)

- Cargo Cult Science (Richard Feynman)
- The Relativity of Wrong (Isaac Asimov)

References (books)

- Bellwether (Connie Willis)
- Uncle Petros and Goldbach's conjecture, a novel of mathematical obsession (Apostolos Doxiadis)
- Math Girls (Hiroshi Yuki)
- Birth of a Theorem (Cedric Villani)
- Harry Potter and the Methods of Rationality

So, your exercise

Find a movie / book / etc.

that illustrates

an aspect of the scientific process.

Prepare a short talk about this aspect.

In 45mn you will give your talk.

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(And remember to repeat each question.)