Science in Classics
经典中的科学

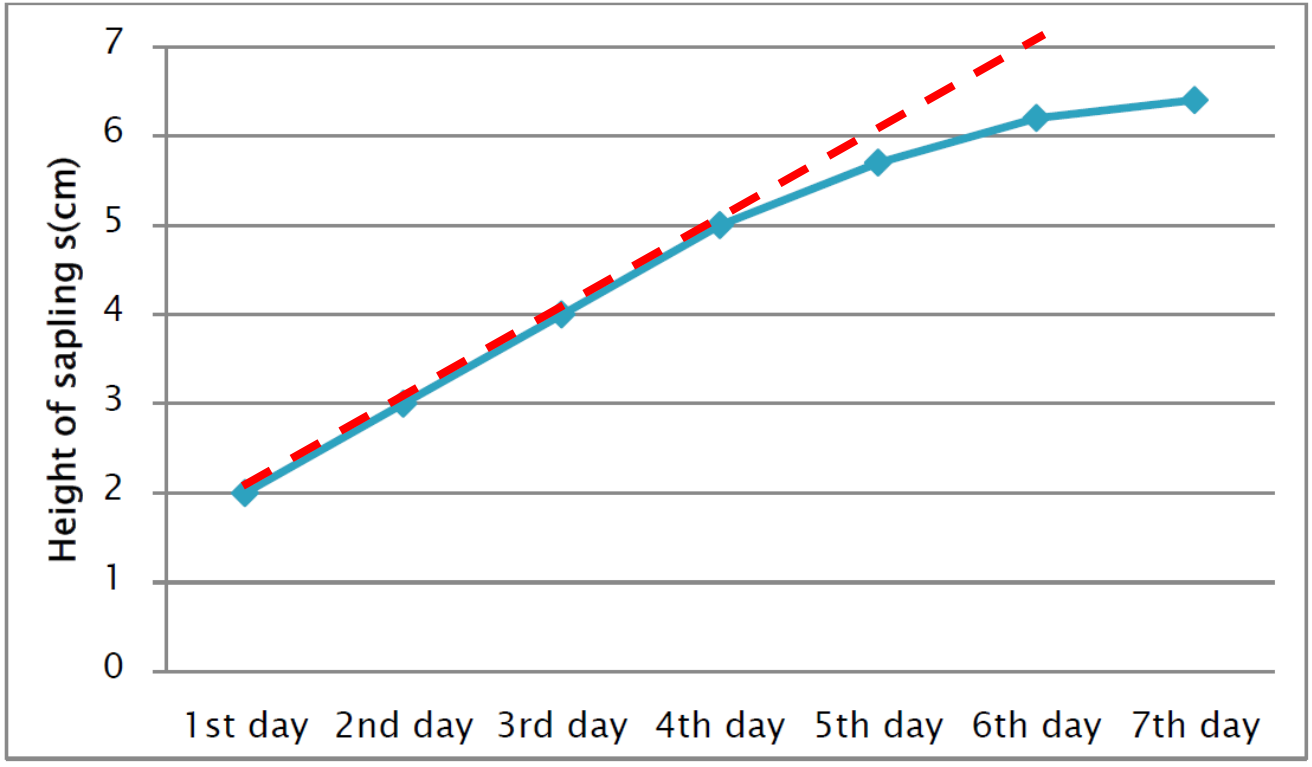
Tutorial 5: Poincaré

Today

1. Discussion (Part 1)
2. Discussion (Part 2)

So condensed ….

11 It is with regular facts, therefore, that we ought to begin; but as soon as the rule is well established, as soon as it is no longer in doubt, the facts which are in complete conformity with it lose their interest, since they can teach us nothing new. Then it is the exception which becomes important. We cease to look for resemblances, and apply ourselves before all else to differences, and of these differences we select first those that are most accentuated, not only because they are the most striking, but because they will be the most instructive. This will be best explained by a simple



Today

1. Discussion (Part 1)
2. Discussion (Part 2)

Q1. What are scientists doing? (Chapter 1)

- Start with simple facts.

General (useful) laws

Q2. Why are they doing this? (Chapter 1)

- What is the driving force?
  - Satisfaction of the sense of beauty.
  - Para. 15.

Q3. How does the mind work? (Chapter 3)

- Conscious ego.
- Subliminal ego.

Discussion Part I

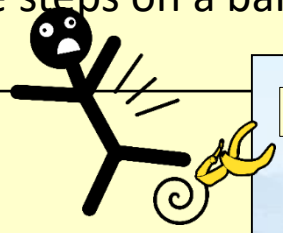
Groups 1 and 2: (Facts) (Chapter 1)

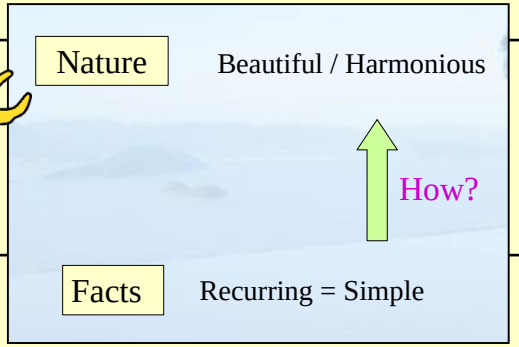
1a. (Group 1) Para. 8: Explain the two kinds of simplicity.

1b. (Group 2) Para.10: Poincaré comments that sociologists (of his time) cannot find general laws. As far as you know, how do sociologists nowadays find laws? Tell Poincaré.

Group 3: (Facts ⇔ laws) (Chapter 1)

2. Para.16-17: Poincaré took beauty and **harmony (of Nature)** as synonyms and our sense of harmony makes us select simple facts. However, he did not explain how **simplicity (of facts)** contributes to the harmony (of Nature). What is harmony? If Nature is not harmonious, what would happen with the facts? (Hint: If the Law of Gravitation is not harmonious, what would you observe when one steps on a banana peel at different places?)





Group 4: (Laws) (Chapter 1)

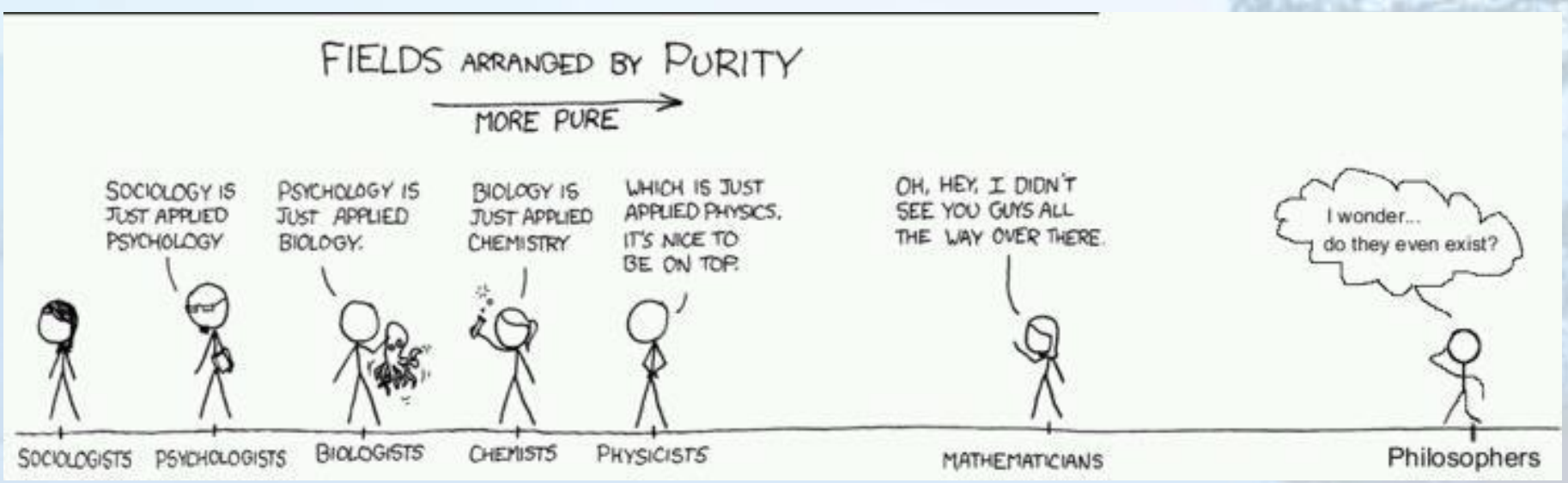
3. Para.19: Explain the two possible reasons why the beautiful is also practical.

Group 5: (On the human mind) (Chapter 3)

4. Para.26-28: Which two remarks does Poincare make?

Group 6: (On the human mind) (Chapter 3)

5. Para.30-34: Which two hypotheses does Poincare make?

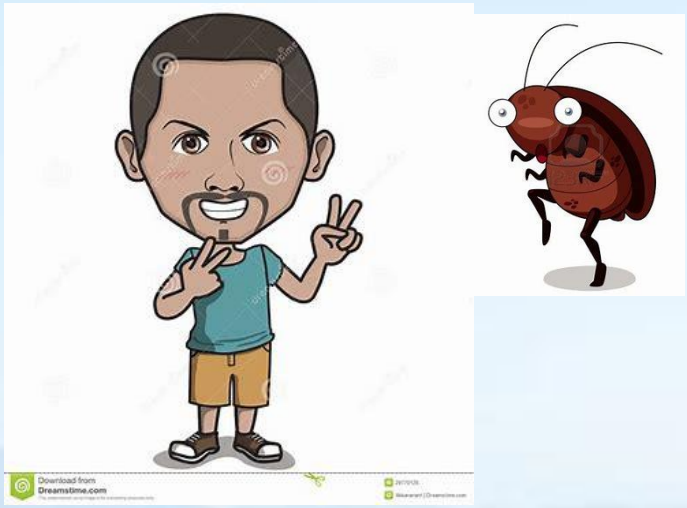

FIELDS ARRANGED BY PURITY
MORE PURE
SOCIOLOGY IS JUST APPLIED PSYCHOLOGY
PSYCHOLOGY IS JUST APPLIED BIOLOGY.
BIOLOGY IS JUST APPLIED CHEMISTRY
WHICH IS JUST APPLIED PHYSICS. IT'S NICE TO BE ON TOP.
OH, HEY, I DIDN'T SEE YOU GUYS ALL THE WAY OVER THERE.
I wonder... do they even exist?
SOCIOLOGISTS
PSYCHOLOGISTS
BIOLOGISTS
CHEMISTS
PHYSICISTS
MATHEMATICIANS
Philosophers

Intellectual beauty

Sensible beauty

Fighting (practical)

Intellectual beauty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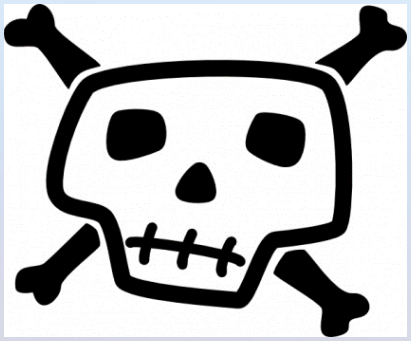


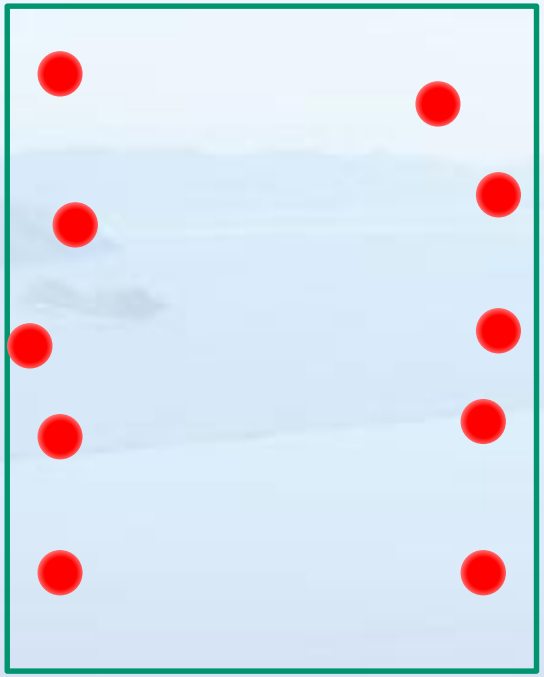
SURVIVE!

Conscious work

Unconscious work

Conscious work

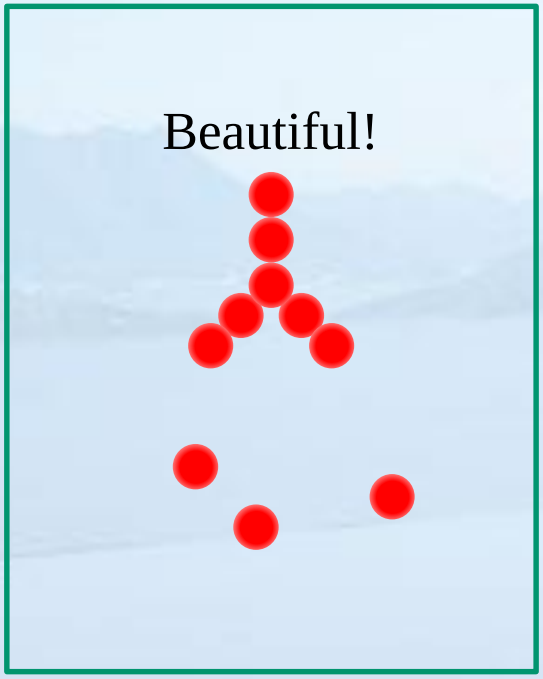
Mathematical discovery (Para. 39-45)



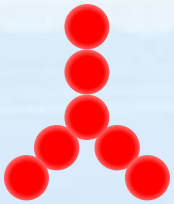
Stage I
Conscious Work

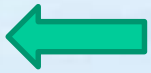
Stage II
Unconscious Work

Mathematical discovery



Stage II
Unconscious Work





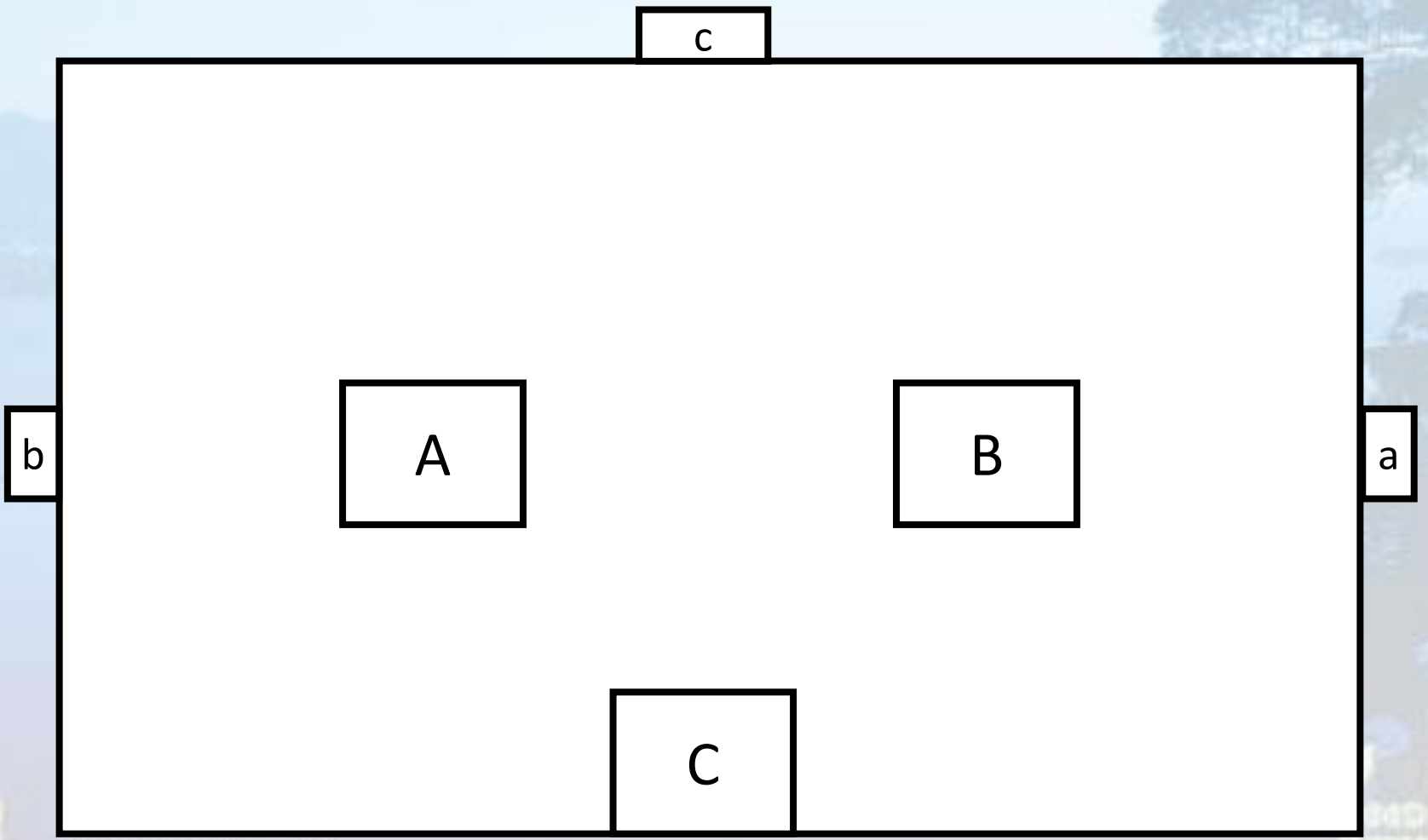
Mathematical discovery

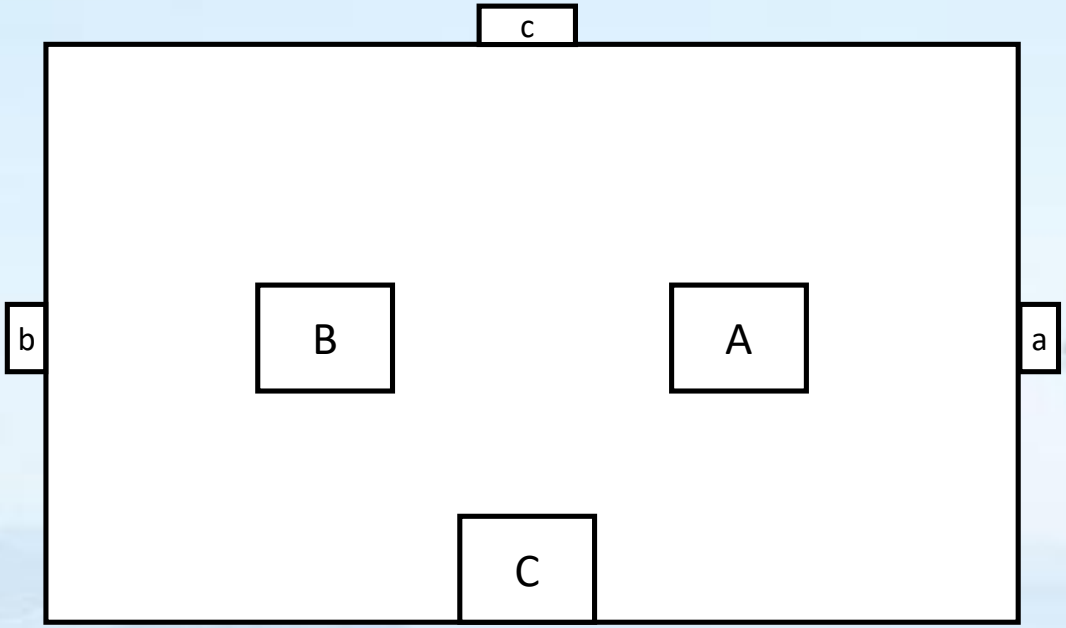
Stage III
Conscious ego is informed and verifies.

Today

1. Discussion (Part 1)
2. Discussion (Part 2)

Connect them!




c
b
B
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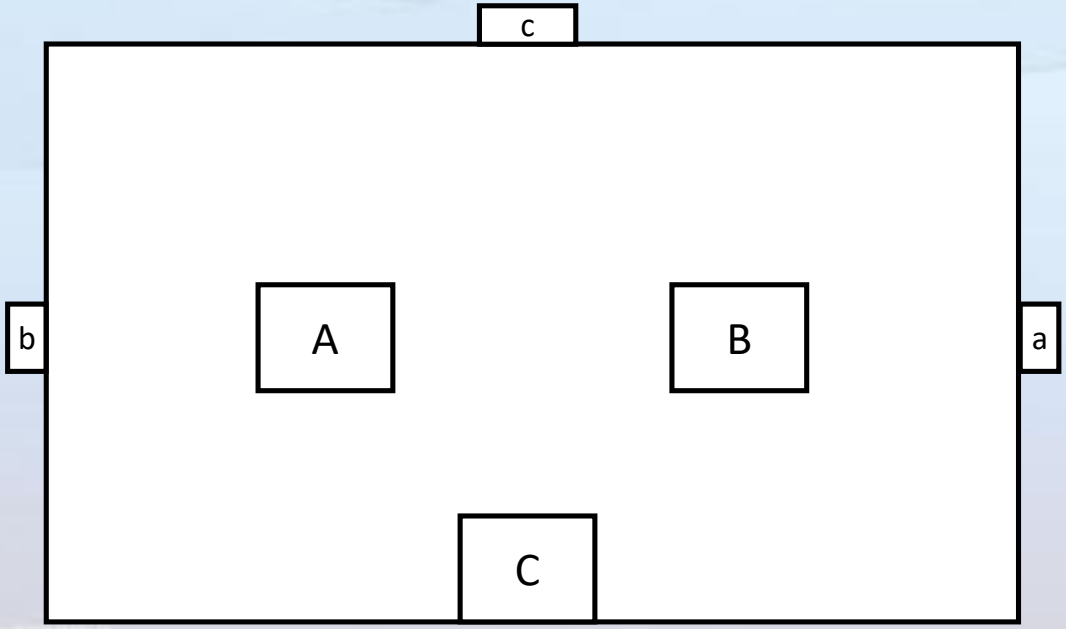
C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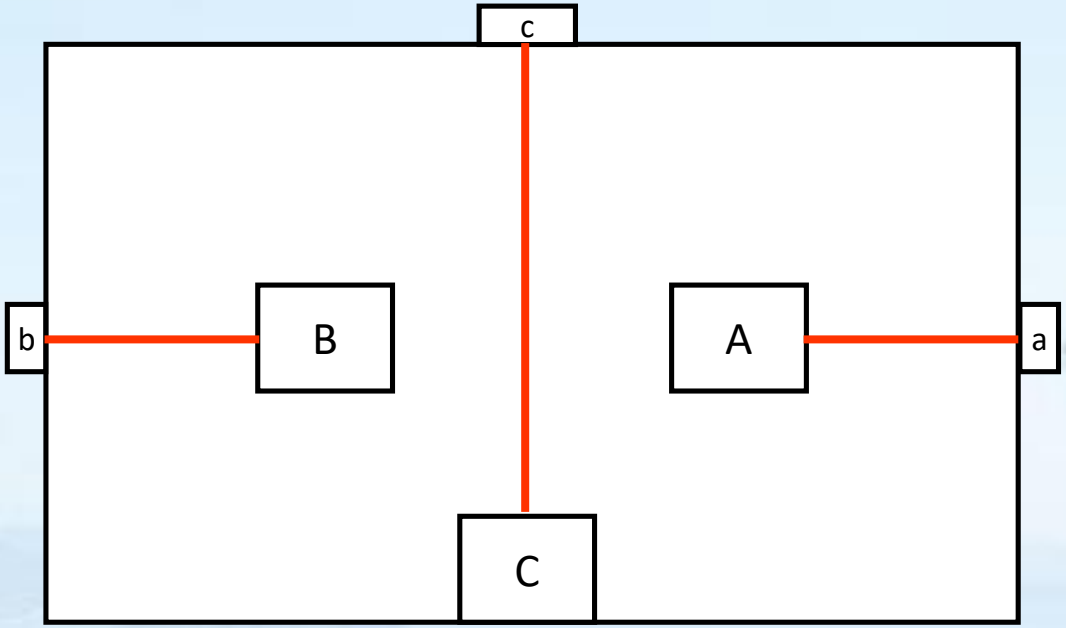
c
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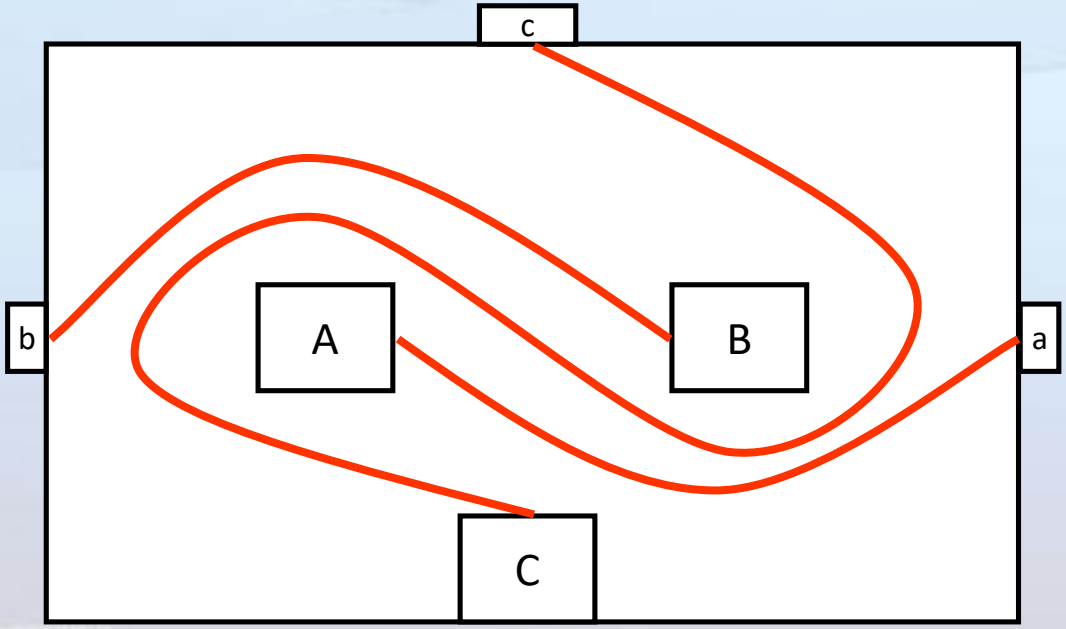
c
b
A
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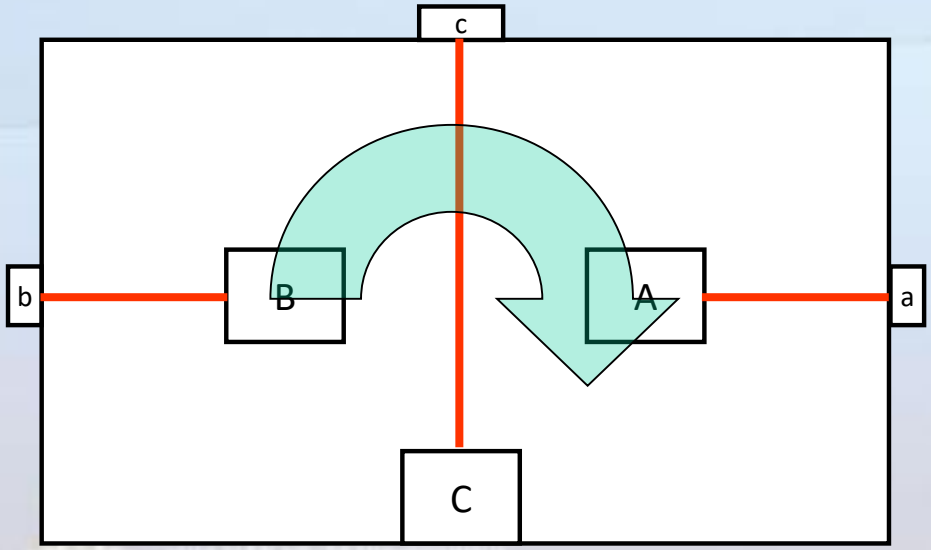
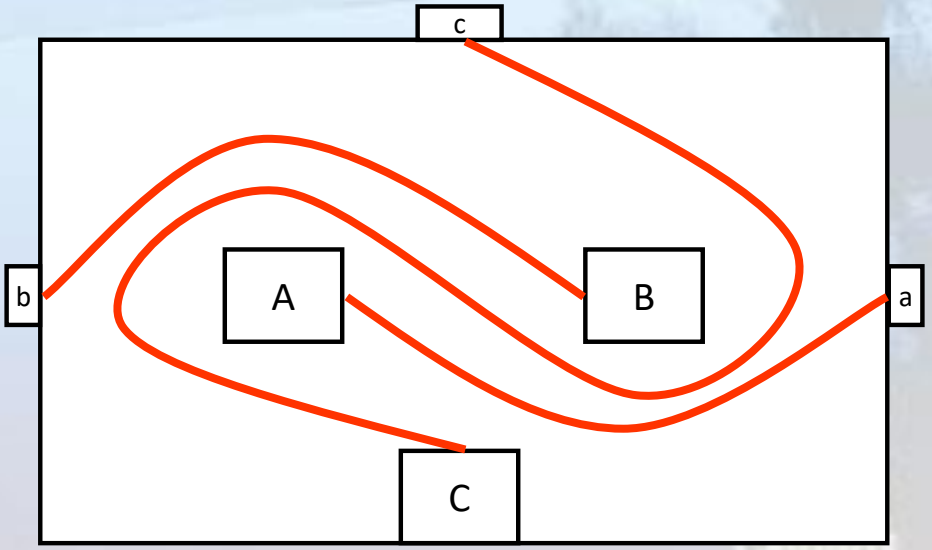
Topology

- Father: Poincaré
- Properties independent of actual coordinates.





Discussion (Part 2)

6. What is so beautiful in your major? Define this beauty.

Announcement

- Quiz 3 (Kandel): should be done before the next tutorial (2pm, 31 May, Tuesday)
- Reflective Journal 2 (9pm, 4 June, Saturday)