
Class #2

Thought experiment

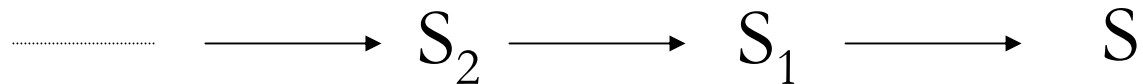
- Discuss your answers to the questions from the handout you got last time.
 - Learn to listen and criticize.
 - Do you all understand and approve of each other's arguments?
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Axiomatic method

Procedure by which we demonstrate or **prove** that statements are indeed correct (given hypotheses).

Proving

- To show that a statement, S , is true:



either:

- we arrive at a statement that is accepted as true –
 S has been proved
- we do not arrive at a true statement:
 - Flawed proof
 - Faulty system
 - The sequence of statements is incorrect.

Needed

- Agree on language
 - Agree on axioms (*statements to be accepted as true without justification*)
 - Agree on what constitutes a proof (*how do we deduce new statements from old ones?*)
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By Tweedledee:

- Contrariwise, if it was so, it might be; and if it were so, it would be; but as it isn't, it ain't!
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“Theorem”: A cat has nine tails

- No cat has eight tails. Since one cat has one more tail than no cat, it must have nine tails.
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Language: technical terms

Exercise:

- What is a point?
 - What is a line?
 - What is a number?
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Possible answers

- What is a point?
 - A sharp or tapered end
 - A decimal point
 - A dimensionless geometric object having no properties except location
 - Euclid: *that which has no part.*
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Possible answers

- What is a line?
 - a geometric figure formed by a point moving along a fixed direction and the reverse direction
 - Euclid:
 - *A breadthless length*
 - *That which lies evenly with the points on itself*
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Undefined terms

- Point
 - Line
 - Lie on (*a point P lies on line l , l passes through P*)
 - Between (*point A is between B and C*)
 - Congruent
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New terms

- Using undefined terms we can define new terms.

Definition: Two lines l and m are parallel, $l \parallel m$, if no point lies on both lines.

‘no point lies on both lines’ reads

‘there exists no point P such that P lies on l and P lies on m ’

Experiment:

- Define the following terms:
 - Segment AB
 - Midpoint M of a segments AB
 - Points A, B and C are collinear
 - The triangle ABC formed by three noncollinear points A, B and C
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