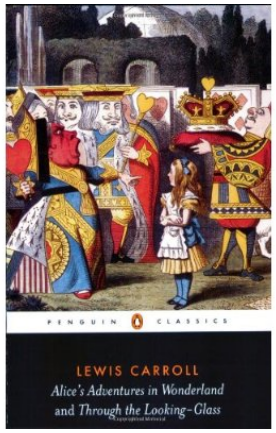

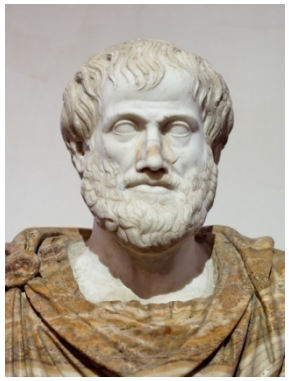

COMP 1002

Intro to Logic for Computer Scientists

Lecture 1

B 5 2 J

Do we think logically?

- You see the following cards. Each has a letter on one side and a number on the other.

- Which cards do you need to turn to check that if a card has a J on it then it has a 5 on the other side?

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Do we think logically?

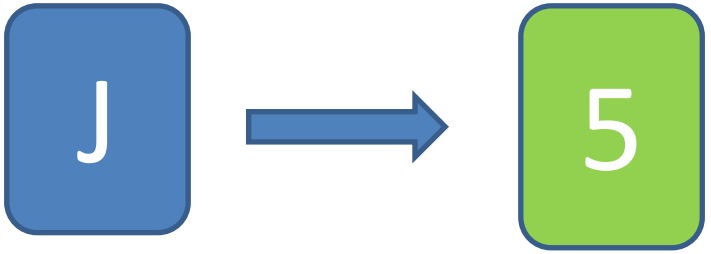
- You see the following cards. Each has a letter on one side and a number on the other.

- Which cards do you need to turn to check that if a card has a J on it then it has a 5 on the other side?
  - All cards where J is visible.
  - Plus all cards with a number other than 5 visible.

“if … then” in logic

- This puzzle has a logical structure:

“if A then B”



- What circumstances make this true?
  - A is true and B is true

  - A is true and B is false

  - A is false and B is true

  - A is false and B is false

If A then B

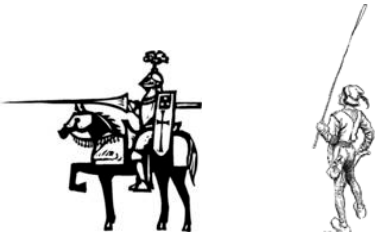
- We make logical conclusions all the time
- But do we always make them “logically”?
- Sometimes people think that “if ... then” goes both ways...
  - If you live in NL, you must pay HST. John lives in BC. Does he pay HST?
  - If today it Tuesday, then there is a COMP1002 lecture. Today is Thursday. Is there a COMP1002 lecture today?

Natural vs. Logic language

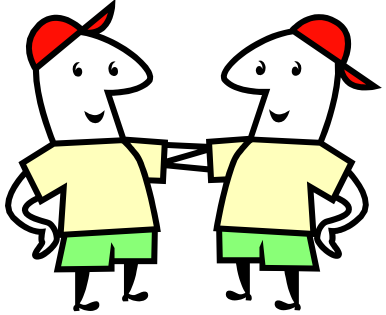
- Natural languages are ambiguous.
- For example, the word “any” can have different meanings depending on the context:

- Any = some
  - She will be happy if she can solve any question.
  - She will be happy if she can solve every question.

- Any = all
  - Any student knows this.
  - Every student knows this.



Twins puzzle



- There are two identical twin brothers, Dave and Jim.
- One of them always lies; another always tells the truth.
- Suppose you see one of them and you want to find out his name.
- How can you learn if you met Dave or Jim by asking just one short yes-no question? You don’t know which one of them is the liar.