WHAT IS CREATIVITY?

- The problem with creativity is that we know it when we see it, but it is hard to define.

H-CREATIVITY

- Dangers of considering only h-creativity when talking about being creative:
  - Significance of inventions is realized much later
  - Stories must be told in retrospect.
  - People tend to dramatize the story
  - Many myths grow up around great inventions.
  - Most creative acts are rather ordinary
  - Quote from Thomas Alva Edison: "Invention is 99% perspiration and 1% inspiration.

CREATIVITY & COGNITION

- Creativity involves generation of new ideas
- Classification by Magret Boden (Philosopher):
  - P-creativity:
    - A new idea for a person
  - H-creativity:
    - A new idea historically; novel inventions
- Most of what we think of as creative: h-creativity
- However, h-creativity can only be studied historically
- You do not know when a creative event will happen

INCREMENTAL VS. TRANSFORMATIONAL

- Incremental creativity:
  - Explore a domain based on an initial idea or a technique, a paradigm
  - Impressionism after Manet, development of new cars, new business model
- Transformational creativity:
  - Take a concept from one domain and transfer it to another domain
  - Apply physics knowledge to computer science research
Most Inventions are Incremental

- How can a creative idea come about?
- Typically a new idea is related to existing ideas
- Otherwise, how would people think it up?
- How could it be implemented?
- What does it mean for an idea to be ahead of its time?
- A creative idea must be comprehensible to others
- What good is an invention that nobody wants?
- It is also possible that existing ideas constrain creativity

Carriage to Car

Radio to iPod

Practically Speaking

- Ideally, we want to be h-creative
  - Propose novel ideas and techniques to advance human knowledge
- To be practical, we need to be p-creative
  - Practice how to come up with new ideas
  - Hopefully, the idea is also new historically

2 Ways of Thinking

- Discussed in The Use of Lateral Thinking (Edward de Bono, 1967)
  - Linear Thinking (a.k.a. Vertical Thinking)
  - Lateral Thinking (a.k.a. Horizontal Thinking)
- Neither Linear or Lateral Thinking is the right answer for every situation
- Simply different ways to think
- Each having advantages and drawbacks

Linear Thinking

- Based on logic, rules and rationality to solve a problem
  - A process of thought following known cycles or step-by-step progression where a response to a step must be elicited before another step is taken
  - The thought process is singular; there is one path toward completion which ignores possibilities and alternatives
  - It's methodical, sequential and focused
  - An example:
    - Civil engineers implement an architectural design that satisfies the construction code
**LATERAL THINKING**

- Think outside of the box
  - Solving problems through an indirect and creative approach
  - By using reasoning that is not immediately obvious and involving ideas that may not be obtainable
  - Also using only traditional step-by-step logic

- An example:
  - The Judgment of Solomon: King Solomon resolves a dispute over the parentage of a child by calling for the child to be cut in half, and making his judgment according to the reactions that this order receives

**ENHANCING LINEAR THINKING**

- Build “Associative Barriers”
  - Be focused
  - Seek depth
  - Learn advanced knowledge
  - Stay current
  - Follow state-of-the-art research
  - Understand better
  - Explain difficult concepts to people outside the domain

**ENHANCING LATERAL THINKING**

- Break down “Associative Barriers”
  - Reverse assumptions
  - Study outside your primary domain
  - Read widely and avidly
  - Look at multiple perspective
    - Slow down, look at the big picture
  - Practice making unusual and unexpected mental associations
  - Expose yourself to a range of cultures
    - Travel and learn art