TOK Presentation Script

0.00 min: Distribute the falsified and correct Wikipedia articles about the financial crisis. Articles should be subtly different, but different enough that they lead to clearly different ideas about the financial crisis.

* This activity should be under the pretext of giving “background” on the content of the presentation
  + However we will use it later in the presentation as an example of trust in technology

3.00 min: Get in groups to discuss the articles and what they think happened at the financial crisis

8.00 min: Share with the class their version of the financial crisis. The differences in these versions should create an argument like a Wikipedia “edit war”.

             3 groups of 6

10.00 min:  Introduce **knowledge issues**

* **To what extent can we trust knowledge provided to us by computers? What role does faith play in this?**
* **How does technology influence our perception of the reliability of a knowledge claim?**

12.00 min: Present the “Was software responsible for the financial crisis?” 2008 financial crisis (The Guardian) -- summarize main points:

* Since the 1980s, a good percentage of **trading has been automated by computers** (“algotrading”). Statistics: “40% of all trades on the London Stock Exchange in 2006; on some American equity markets the figure can be as high as 80%.”
* Algorithms and systems are created and maintained by “quants” (physics/math graduates). These algorithms are extremely complex, and judging by the crash, **not even the quants understood them completely**
* Newer markets have been unregulated
  + "Somehow the genius quants - the best and brightest geeks Wall Street firms could buy - fed $1 trillion in subprime mortgage debt into their supercomputers, added some derivatives, massaged the arrangements with computer algorithms and - poof! - created $62 trillion in imaginary wealth."
* Algorithms were based on “risk to the market”, an **abstraction** -- not the empirical facts of how much people could spend and human behavior
  + ‘As George Dyson (son of the quantum physicist Freeman) wrote in Edge last week: "The problem starts, as the current crisis demonstrates, when unregulated replication is applied to money itself. Highly complex computer-generated financial instruments (known as derivatives) are being produced, not from natural factors of production or other goods, but purely from other financial instruments."’
  + ‘Dooling has a growing conviction that we are now at the mercy of a financial system based on "arrangements so complex only machines can make". **It seems we are at the mercy of the machine**.’ ← troubling that we ourselves don’t directly understand the financial system, but rely on machines to do the intellectual work for us

14.00 min: Metaphor for subprime mortgage crisis: the **black box**, volunteers put in paper with assigned value, take out paper of more value.

* Use Toblerones to symbolize houses
* People can buy the Toblerones with their automagically generated money

17.00 min: Analysis about the black box

* The black box symbolizes the complex algorithms and systems involved in “algotrading”. Just like we can’t see what is going on inside the box, most human beings are unable to comprehend the algorithms in automated trading. And no human being is able to fully process the computations like a computer can. We only see what goes in and what goes out.
* **Technology will only be as good as we can make it**; therefore it is unwise to blindly trust it to perfectly perform intellectual tasks. Ultimately information needs to be interpreted by humans for knowledge to be gained and understood.
  + Blind trust manifested in the Flash Crash of 2010. The employees of the investment firms allowed computers to make blazingly fast trades -- so fast that in the event that things went wrong, a lot of damage would be done before humans could manually stop the computers
  + Also manifested in the 2008 financial crisis. Trading had been automated, yet new markets were unregulated. Calculations of algorithms were abstracted from actual reality. (repetition of points from summary of The Guardian article earlier)
    - “Those algorithms were based on risk assessments that were seriously flawed, based only on the risk to the market at that moment, rather on cold, hard empirical data about a person's ability to pay and what would happen if a lot, rather than a few of them, stopped.” (The Guardian)
    - “The problem starts, as the current crisis demonstrates, when unregulated replication is applied to money itself. Highly complex computer-generated financial instruments (known as derivatives) are being produced, not from natural factors of production or other goods, but purely from other financial instruments." (Edge)
    - Algorithms and systems for trading were so complex and occurred at such high speeds that were incomprehensible to humans -- they were **unknowable**. Yet we trusted computers to make wise judgments.

22.00 min: Analysis about trusting technology (Wikipedia articles)

* **How should we approach trusting/using technology if we don’t understand it?**
* Why did you trust the Wikipedia articles -- have people raise their hands if they trusted it; ask a few people why they did or did not
* Analysis:
  + **The Oracle Effect**: “Knowledge of the human authorship of a text is suppressed in order to give the text superhuman validity “ (Lanier 32)
    - E.g: the bible
    - Anonymity and that it’s a technology, gives rise to it
  + Technology has pervaded society to the extent -- both in breadth and the type of tasks that we trust technology to perform -- that we’re just predisposed to trust it. This has given technology is a **mystical quality of infallibility**, so enchanted are we with the benefits it has given us. **However, ultimately humans are behind the workings of technology; if the human has made an error, then so will the technology.**
    - “The problematic nature of trust in technology becomes evident with the dissemination of information and communication technologies (ICTs) and the subsequent information revolution, with which artefacts cease to be used mainly to perform physical and fatiguing tasks, and begin to be deployed to execute also intellectual works” (Floridi 2008)
    - “As the outsourcing to (informational) artefacts becomes more pervasive, the trust and the dependence of the users on such artefacts also grows” (Taddeo)
    - “relation between two types of on-line trust - general trust, trust in most websites; and familiar trust, trust in websites that one frequently visits - as well as independent variables such as information technology competence, and adverse on-line events” (Taddeo)
  + **Concession:** However, we can’t renounce technology now that our society is so reliant on it. Moreover, more often than not, technology is extremely beneficial and convenient.
    - We *can* trust technology to make calculations and automated certain tasks, but **we can’t trust it to think for us. The mistake is not when we simply use technology, but when we use it on the assumption that a machine is intelligent in the same way that a human being is.**
    - **Example:**  The victory of Deep Blue, the chess computer, over a human chess champion Kasparov was hailed by technologists as machine intelligence surpassing human intelligence. However, Deep Blue had to be programmed by *somebody*. Deep Blue didn’t win against Kasparov -- a team of computer scientists who came up with algorithms to win at chess and implemented them in code, plus the raw computing power of Deep Blue, won against Kasparov.
    - An important distinction about intelligence: if we call Deep Blue “intelligent”, then we are changing/degrading our definition of intelligence.  Instead of intelligence being an ability to **independently** think logically and critically, it becomes defined by the ability to compute and perform certain tasks which emulate intelligence. This happens all the time in modern society: “Before the crash, bankers believed in supposedly intelligent algorithms that could calculate credit risks before making bad loans” … “Did that search engine really know what you want, or are you playing along, lowering your standards to make it seem clever?”

27.00 min: Q&A [1. Question 2. Proposed/predicted answer(s) 3. Follow-up questions]

1. How does one knows if the technology is influencing one’s understanding of an event?
2. Will being skeptical about the technology cause us to be ineffective?
3. In the field of machine learning, computers are able to “learn” to perform tasks with increasing efficacy without being explicitly programmed. Isn’t that a form of intelligence?
   1. Human beings are still inventing and implementing machine learning algorithms. Unlike a human being, a computer can’t independently look at a data set and know what to do with it (or even try to do anything with it at all) unless a human tells it how
   2. Just how believing machines to be “intelligent” in the same way humans are is degrading, so is believing machine “learning” to be equivalent to human “learning”

30.00 min End