• Post Survey for the course linked on the website
  • Closes on April 16 @ 11:59pm
  • You can do this survey even if you haven’t done the pre-survey
Computer science research can improve old theories

Game Theory (e.g., the Prisoner’s Dilemma) helps explain why people do things even if it doesn’t necessarily wind up with the best outcome for them.

The Prisoner’s Dilemma is one example of something Game Theory studies.
Computer science research can improve old theories

- Game Theory (e.g., the Prisoner’s Dilemma) helps explain why people do things even if it doesn’t necessarily wind up with the best outcome for them: https://www.youtube.com/watch?v=NdTItl5coE
- As the video notes, people don’t always behave the way Game Theory suggests they should
- UBC CS researchers are using machine learning to help predict what people actually do, not just what they should do (https://youtu.be/gkNSARbwqCk)
Pretty much everything in class is a result of CS research at some point

- Even things that seem old have interesting research to do when new things come in

- Look at sorting
  - Remember that we sorted cards?
  - People have looked at sorting algorithms for 60 years! Surely there’s nothing new to do!
  - Cache aware sorting
  - And then there’s quantum computing
Quantum Computing

• Quantum computing could change everything
• You’ll recall that in a computer, everything is stored in either a 0 or a 1
• In a quantum computer, the idea is somewhere in the middle
Quantum computing explained

www.phdcomics.com/tv

Shortened from
https://www.youtube.com/watch?v=T2DXrs0OpHU
Naturally, this could shake things up.

- But you shouldn’t expect a quantum computing laptop any time soon.
- Currently there’s a partially functional 50 atom quantum computer by researchers at IBM (https://www.technologyreview.com/s/609451/ibm-raises-the-bar-with-a-50-qubit-quantum-computer/)
- Even a limited one made by D-Wave (in Burnaby!) requires extreme conditions.
D-wave quantum computer

https://www.youtube.com/watch?v=VfxNdBTH8wY&t=18s
Computer science research and development moves fast!

Some things introduced in the last 10 years:

- PlayStation & WII (2006)
- iPhone (2007)
- Microsoft Vista (2007)
- Google Chrome (2008)
- Android (2008)
- Bitcoin (2009)
- iPad (2010)
- Chromebooks (2011)
Learning Goals Revisited

• [CT Application] Students will be able to enumerate at least one subject of current computer science research
As a brief recap, we've covered

- Algorithms
- Programming
- Internet
- Data & image representation
- Animation
- Data mining
- AI
- Elections
- Visualization
- Computer science & Future directions
There are practice questions on the web

• The best way to study is to do the practice problems
• Make sure that you try to do them rather than looking at the solutions first!
Learning Goals for the Course

• **[CT Building Blocks]** use abstraction and decomposition to clarify and simplify the critical pieces of a problem; choose appropriate methods to aid in solving the problem; recognize potential shortcomings in a method or solution; explain at a high level how the computer works;

• **[CT Application]** explain specific algorithms that computers use to create applications of computational thinking (e.g., data mining), and

• **[CT Impact]** provide and explain examples of how computers impact their lives and what this means for them, both in terms of how the computer can add to their lives and in things that they have to be careful of, such as privacy and security.