Intellectual Property:

* What is IP and what is its significance?
  + **Intellectual Property**: Any creation of the mind (i.e. art, literature, invention, etc)
  + IP is important because it protects people’s right to benefit from their labor (i.e. inventing a certain technology)
* Locke’s Definition of Intellectual Property:
  + People have the right to any property they own and to benefit from the results of their labor.
  + IP is different from regular property because another person having the right to use a person’s IP does not take away from the original person’s right to their IP
* Benefits and Drawbacks of IP:
  + Benefits: Incentivizes people to innovate, because they are guaranteed to be allowed to benefit from their work without interference
  + Drawbacks: Takes Innovation away from the public domain, where innovation is rapid (i.e. computers in the public domain rapidly improved over a short time)
* Trade Secrets, Trademarks, Patents, and Copyrights
  + **Trade Secrets**: A private advantage that a company has that allows them to get ahead of its competitors. This is not legally exclusive to them and competitors can reverse engineer these secrets and use them for themselves.
  + **Trademarks**: A brand name for a company that they have exclusive rights to indefinitely. This may be lost, however, if the brand name becomes a common noun (i.e. Kleenex became a common noun that replaced tissue)
  + **Patents**: US legal documents that give the owner of an intellectual idea (i.e. an invention) for 20 years. The US tends to review patent applications quickly and thus there is a relatively high rate of overturns compared to the EU which reviews them slower and has a lower rate of overturns.
  + **Copyrights**: Gives the right to copy and distribute Intellectual Property to an owner. Under the **Copyright Term Extension Act**, copyrights last for the duration of the owner’s life plus an additional 70 years.
* **Fair Use**: Sometimes it is allowed to reproduce copyrighted work without permission.
  + Four Factors to Determine Fair Use:
    - **Purpose of Use** (i.e. criticism, teaching, news reporting, research)
    - **Nature of Use**: Factual work is more likely to be allowed than creative.
    - **Amount of Use**: It is more permissible when small excerpts are reproduced than large portions of the work.
    - **Effect of Use**: Effect of its use on the potential market for the owners
  + Sony v. Universal Studios 🡪 reproducing entire copies of television series for the purpose of time shifting (airing at your leisure) is fair use (only for noncommercial use).
* **Digital Millenium Copyright Act (DMCA)**:
  + Prohibits the circumvention of digital encryption on copyrighted digital material
  + Service Providers expected to remove copyrighted material from their websites
  + **Takedown Notices**: Report of copyrighted material online, no penalty for false claims, but definite penalty for refusal to take down copyrighted material (possible restriction on free speech)
* Software Copyrights: In 1964, the first software copyright infringement. Examples included copying programs onto CDs or hard disks to sell/distribute.
* Software Patents: In 1981, SCOTUS approved the first software patent.
  + **Patent Trolls**: Companies that specialize in buying and enforcing patents (companies prefer to stay outside of the court because its quicker and cheaper)
* **Open- Source**: 5 Major Benefits
  + Anyone can improve the program.
  + More rapid development of the program
  + Reduces tension between obeying the law and helping others.
  + Community Owned Programs
  + Shifts focus from manufacturing to service.
* AI Copyrights: Copyrighting AI model output depends on the degree of human involvement.

Computer Reliability:

* Notable Software Failures:
  + Patriot Missile: Clock error of 0.3 seconds led to error of 600 meters (very bad)
  + Uber Test-Vehicle Accident: Woman in dark clothes wasn’t detected and killed.
  + Tesla Autopilot (v7.0): Truck Driver failed to yield to right of way, Josh Brown wasn’t attentive, Tesla neglected the problem.
  + Mars Climate Orbiter: Lockhead used customary system; JPL used metric.
  + ~~Ariane 5: Satellite launch failure due to float to integer conversion~~
  + ~~AT&T Long-Distance Network: Single line of faulty code in recovery procedure~~
  + ~~Tokyo Stock Exchange:~~
  + ~~Therac-25:~~
* Computer Simulations
  + Simulations are often better than experiments (less expensive, more ethical, etc.)
  + Verification: Does the simulation correctly implement the model
  + Validation: Does the model accurately represent the real system
* Computer Warranties:
  + Courts reluctant to treat software as a product because software has high chance of malfunctioning when it is not always the responsibility of the programmers
* **Software Engineering**: Determining system requirements, constraints, and creating software
  + Success of IT projects doubled from 1994 to 2009
* Biased Training Data Sets
  + Gender Bias: Men and Women have different approaches when coding.
  + AI is biased when built on biased datasets.

Work and Wealth:

* Automation and Jobs
  + Pros: Increased innovation (Transition into new higher-level jobs)
  + Cons: Job displacement, skill mismatch
* Advantages and Disadvantages of Remote Work (Telework)
  + Pros: Flexibility, Increased Productivity, Lower Costs, Easier Access to Talent
  + Cons: Communication Issues, Isolation, Monitoring, Tech Dependence
* Pros/Cons of Globalization
  + Pros: Increased Economic Growth, Access to New Markets, Cultural Exchange
  + Cons: Income Inequality, Loss of Jobs (labor costs), Cultural Homogenization
* Implications of Globalization
* Digital Divide: Divide between people with and without access to technology
* The 5 Great R’s: Phenomena expedited by the pandemic
  + Resignation: People quitting their jobs
  + Retirement: Boomers retiring
  + Reshuffle: Switching industries & learning new skills
  + Refusal: Turning down jobs with low pay
  + Relocation: Living where you want rather than where there are jobs
* Winner’s Take All Effect: When small number of entities control most of the rewards / resources (disproportionately)

AI, Algorithms, and Bias

* Types of Bias
  + **Reporting Bias**: Frequency that entries in dataset are inaccurate of real world
  + **Automation Bias**: Tendency to favor results generated by automated systems
  + **Selection Bias**: When data sets are not reflective of the population
  + **Group Attribution Bias**: Generalizing facts about individuals to the entire group
  + **Implicit Bias**: Assumptions made based on one’s mental models
* Amazon failed to remove biases in algorithmic hiring tool
* Facial Recognition: Asians labeled as blinking, AI rated white people as more attractive
* Voice Recognition: Systems in cars more difficult to use for women than men
* Solutions: Strategies that encourage participation from the public, transparent data, formation of multidisciplinary teams, and other litmus tests to evaluate discrimination
* Governance of Algorithms:
  + Auditability: Algorithms should be independently tested and validated with results made publicly available (including checks on bias)
  + Commitment to Due Process: Individuals should have the right to challenge AI decisions

Race and Tech:

* Race: Physical Attribute (i.e. white or black skin)
* Ethnicity: Cultural Attribute based on geographic region (i.e. Portuguese is any race really)
* Tech with Racial Bias: Apple iWatch, Google, Emojis
* Solutions: Hiring diverse employee base, user research, conduct studies on design sensitivity

Net Neutrality: All ISPs (Internet Service Providers) should provide equal access to content at equal speed without discrimination against certain peoples or geographic locations

* Pros: Importance of equal access to consumers
* Cons: Federal Communication Commission (FCC) regulations are overdemanding

AI Content Generation

* Input Question: Where does the source data come from (and is it copyrighted?)
* US vs UK: US says no copyright for works generated via machine only UK says yes copyright

Wikipedia:

* **Epistemology**: The study of knowledge and understanding, justifiable belief through evidence & reliability
* **Virtue Epistemology**: Obtaining knowledge is an achievement and thus is linked to virtues such as curiosity and open-mindedness which are essential to wanting to learn
* **Social Construction of Knowledge**: What we consider as knowledge is largely true specifically in the context of the society and point of time we are in, our truth of knowledge may change in different social contexts
* **Peer Review**: People evaluate and assess the work of others 🡪 Authority/Credibility, Page history, citations
* **Citogenesis**: Loops between Wikipedia editors entering false / erroneous information into an article without a citation, then a writer uses Wikipedia as a source for that fact, then Wikipedia uses that article as a source for the original false statement, etc.

NFT (non-fungible tokens):

* Pros: Reasonable investment (like other forms of art)
* Cons: Copyright issues 🡪 ownership is meaningless
* Ethical Concerns according to the ACM
  + Benefits the rich at someone else’s expense
  + Little transparency
  + Decentralization of free market
  + Security, prays on less experienced
* Recommended Solutions:
  + Avoid environmentally destructive methods for validation
  + Regulate NFT space
  + High quality creation
  + Avoid exploitation/fraud
  + Consider company risk and protect sensitive information