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Digital Systems

8.1 Cybersecurity & AI

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ROADMAP

START

Week 1:
Introduction & Systems Analysis
- Course Description
- Systems Thinking

Week 2:
Digital Product Management & Introduction to Process Mapping
- Max Labs 1a & 1b
- Systems & Processes
- Swim Lane Diagrams

Week 3:
Data Modeling with Entity Relationship Diagrams
- Swim Lane Diagrams
- ERD Diagrams

Week 4:
Digital Systems – Learn IT! #1
- ERD Diagrams
- Learn IT Kickoff

Week 5:
Exam #1, Max Labs & Information Systems: Part I & II
- CRM & ERP

Week 9:
Exam #2 & JavaScript Unit #1 - Part I & II
- Hello World, Variables

Week 8:
Cybersecurity & AI – Part I & II
- Protection Protocols
- Artificial Intelligence

Week 7:
Platforms & Digital Business Models: Part I & II
- Platforms & Digital Models
- APIs

Week 6:
Information Systems: Part III & IV
- Data Analytics
- SCM

Week 10:
JavaScript Unit #2 Functions
- Operator types
- Strings

Week 11:
JavaScript Unit #3 Logical Operators & Conditional Logic
- Logical Operators
- Conditional Types

Week 12:
JavaScript Unit #4 Loops
- Intro to Loops
- While and Do

Week 13:
JavaScript Unit #4 Working with Loops
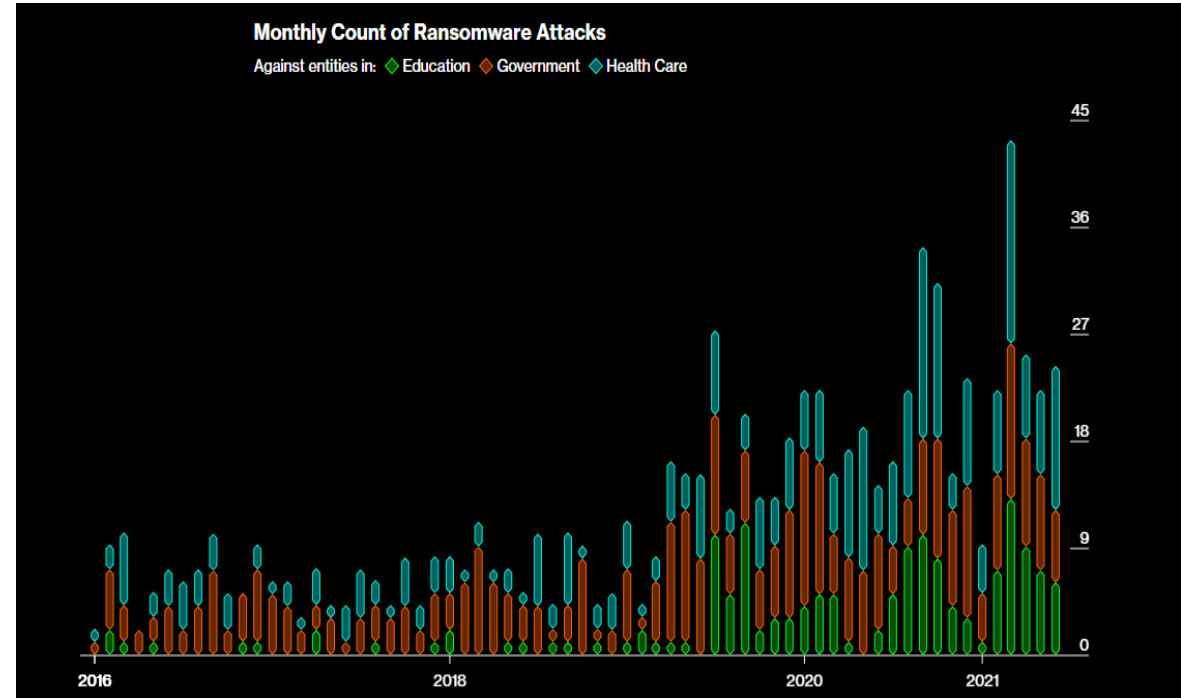- Writing the code

Week 14:
HTML & CSS Unit
- HTML basics
- CSS basics
- Course Reflection

FINISH

Cybersecurity

What are the biggest risks to an organization?

❖ Malware

❖ Ransomware

❖ Data leaks

❖ Phishing

❖ Inside threat

❖ Hacking-Denial of Service

Monthly Count of Ransomware Attacks

Against entities in: ◆ Education ◆ Government ◆ Health Care

https://www.bloomberg.com/graphics/corporate-hacks-cyber-attacks/

Case Study: Hospitals

Ransomware forces shutdown

- The incident led to the cancellation of 2,800 patient appointments at the NHS Trust.

- Took 3 days to resolve

- Hospitals are an appealing target for cyberwar…why?

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Case Study: Hospitals

Ransomware forces shutdown

- The incident led to the cancellation of 2,800 patient appointments at the NHS Trust.

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- Hospitals are an appealing target for cyberwar…why?

Up-to-date information about patients

Source: Getty Images/iStockphoto
https://www.zdnet.com/article/ransomware-blamed-for-cyber-attack-which-forced-hospitals-to-cancel-operations-and-shut-down-systems/

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Phishing Scams

Case Study

- Google and Facebook targeted

- Lost $100 million

Best Practices

- Careful of any suspicious emails

- Don't click on random links

Source: https://www.nouveau.co.uk/content-hub/avoidphishing/

World's Biggest Data Breaches & Hacks

Cybersecurity - Core Fundamentals

Consider these five questions:

1. What do you want to protect?

2. Who do you want to protect it from?

3. How likely is it that you will need to protect it?

4. How bad are the consequences if you fail?

5. How much trouble are you willing to go through in order to try to prevent those consequences?

What is "Threat Modeling?"
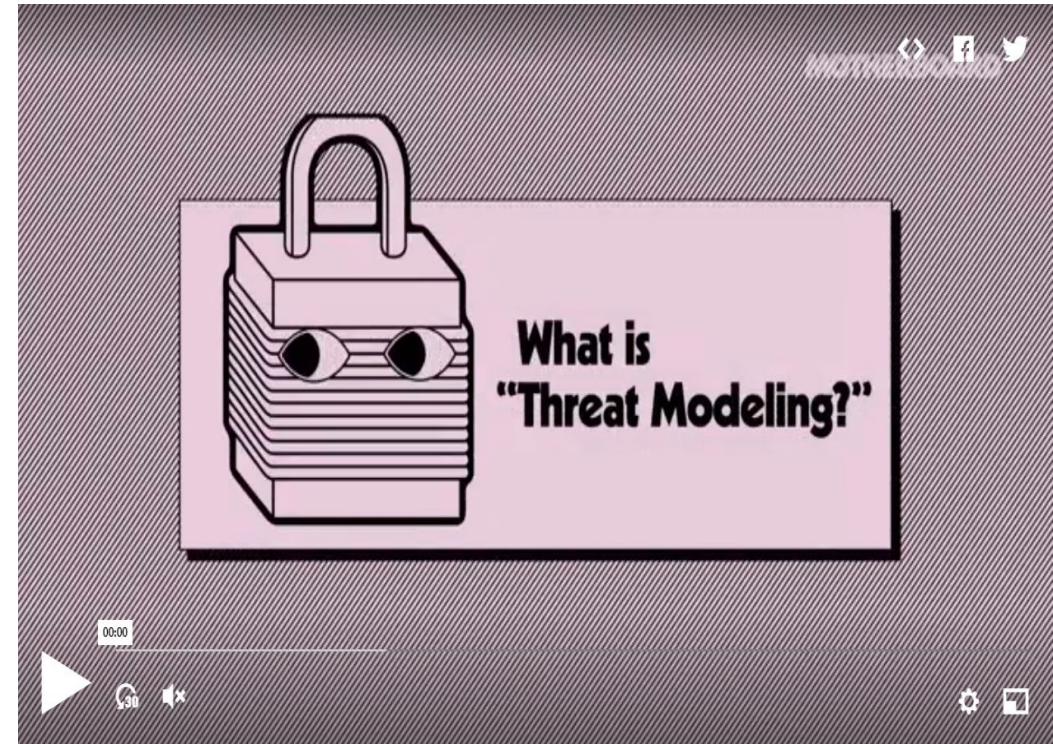
Source: https://www.vice.com/en_us/article/a37p94/what-is-threat-modeling

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Regulations

Privacy and Personal Data Protection

California Consumer Privacy Act (CCPA)

Few Federal cybersecurity regulations

- 1996-Health Insurance Portability and Accountability Act (HIPAA)

- 1999-Gramm-Leach-Bliley Act

- 2002 Homeland Security Act, includes

  - Federal Information Security Management Act (FISMA)

The CCPA Effect — Privacy Regulations Introduced by State
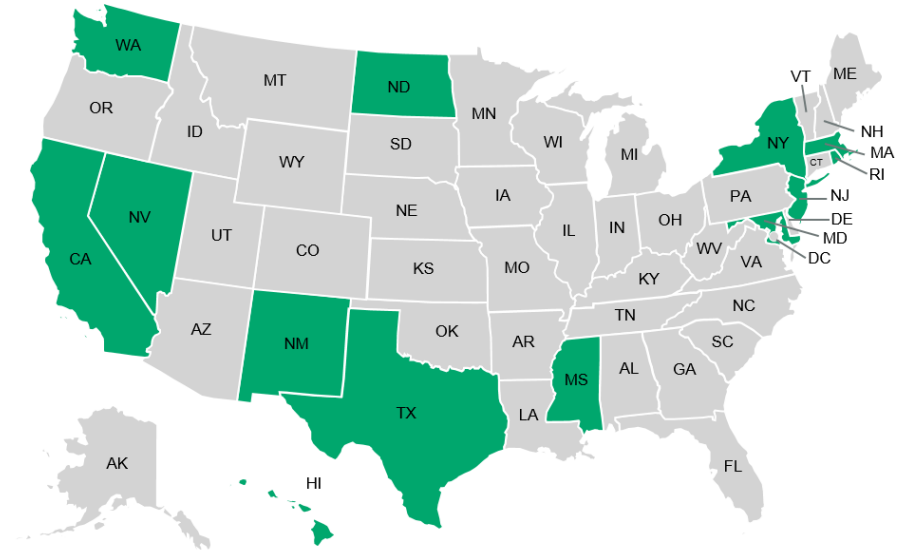
Source: Gartner
Footnote: California (AB375), Hawaii (SB418), Maryland (SB0613), Massachusetts (SD341), Mississippi (HB2153), New Mexico (SB176), New Jersey (S2834), New York (S00224), North Dakota (HB1485), Rhode Island (S0234), Washington (SB5376), Texas (HB4518), Nevada (SB220)
ID: 376084

Source: https://www.gartner.com/resources/376000/376084/376084_0002.png

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Strategic Planning

What does this all mean?

- Define the eight reasons

Eight Related Causes of Security Failure

- Invisible Systemic Risk
- The Cultural Disconnect
- Throwing Money at the Problem
- CISOs as Defenders
- Broken Accountability
- Poor Risk-Appetite Statements
- Society
- Lack of Transparency

Causes of Failure

ID: 382968

© 2019 Gartner, Inc.

Source:https://www.gartner.com/document/3904673?ref=solrAll&refval=225616225&qid=0df98fbb9b466bc69199efad/

Password Strength

How secure are your passwords?

- Use numbers, letters, and symbols

- Make them as long as possible

Length of Password (Chars)	Only Numbers	Mixed Lower and Upper case alphabets	Mixed numbers, Lower and Upper case aplhabets	Mixed numbers, Lower and Upper case aplhabets , symbols
3	Instantly	Instantly	Instantly	Instantly
4	Instantly	Instantly	Instantly	Instantly
5	Instantly	Instantly	3 secs	10 secs
6	Instantly	8 secs	3 mins	13 mins
7	Instantly	5 mins	3 hours	17 hours
8	Instantly	3 hours	10 days	57 days
9	4 secs	4 days	153 days	12 years
10	40 secs	169 days	1 year	928 years
11	6 mins	16 years	106 years	71k years
12	1 hour	600 years	6k years	5m years
13	11 hours	21k years	108k years	423m years
14	4 days	778k years	25m years	5bn years
15	46 days	28m years	1bn years	2tn years
16	1 year	1bn years	97bn years	193tn years
17	12 years	36bn years	6tn years	14qd years
18	126 years	1tn years	374tn years	1qt years

Source: https://community.isc2.org/t5/Tech-Talk/How-long-does-it-take-to-crack-passwords/td-p/32546

Password Strength

Password Basics

- Keep them in your head?

- Don't change them?

- Reuse them?

Password Management

- Consider a passphrase

  - Access a vault of your passwords

- Two-Factor Authentication

Source: https://youtu.be/a6iW-8xPw3k

Cybersecurity

Hijacking your systems!

- Who borrows flash drives?

- How else do you share data?

- Vectors for Virus & Malware

Source: http://www.ommdvd.com/images/services/USB-Pile.jpg

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Protection

Considerations

- Antivirus

- Ad blocker

- Avoid dodgy plugins

- Back-up files

- Disable macros

- Don't just open attachments

- Firewall

- VPN

Artificial Intelligence (AI)

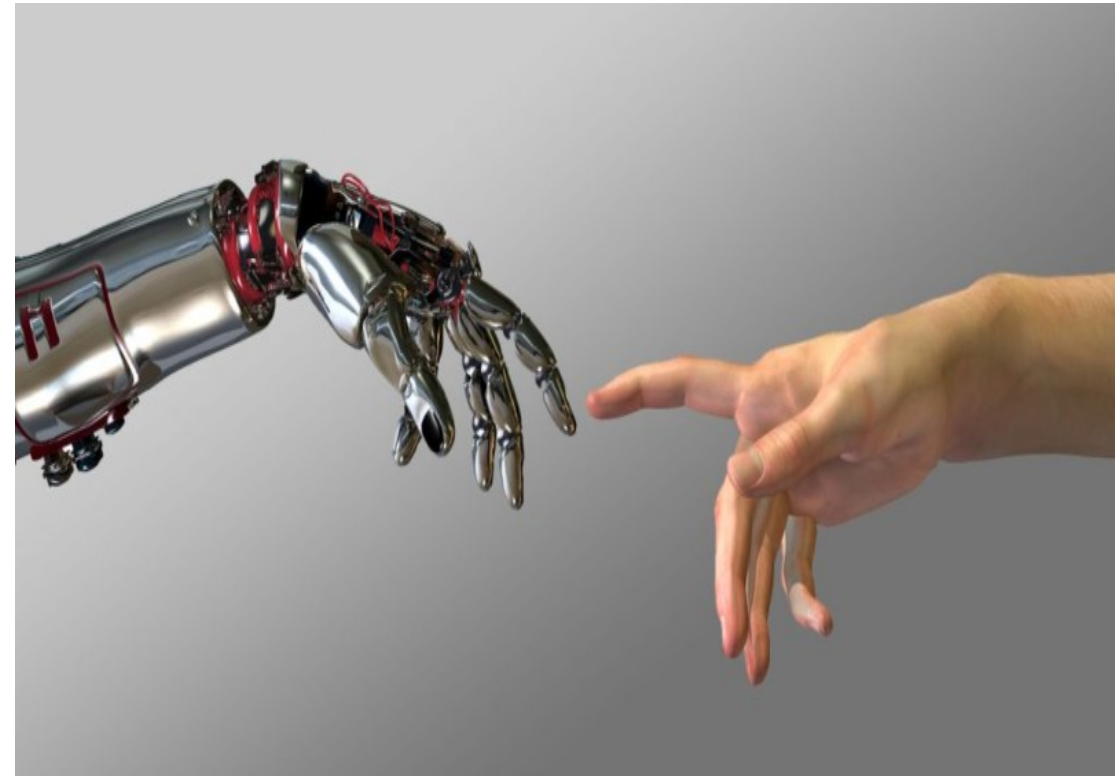# What is Artificial Intelligence (AI)?

Three Types of AI

❖ Narrow (ANI)

- Google maps/waze/Facebook/Autonomous cars/amazon suggestions

❖ General (AGI)
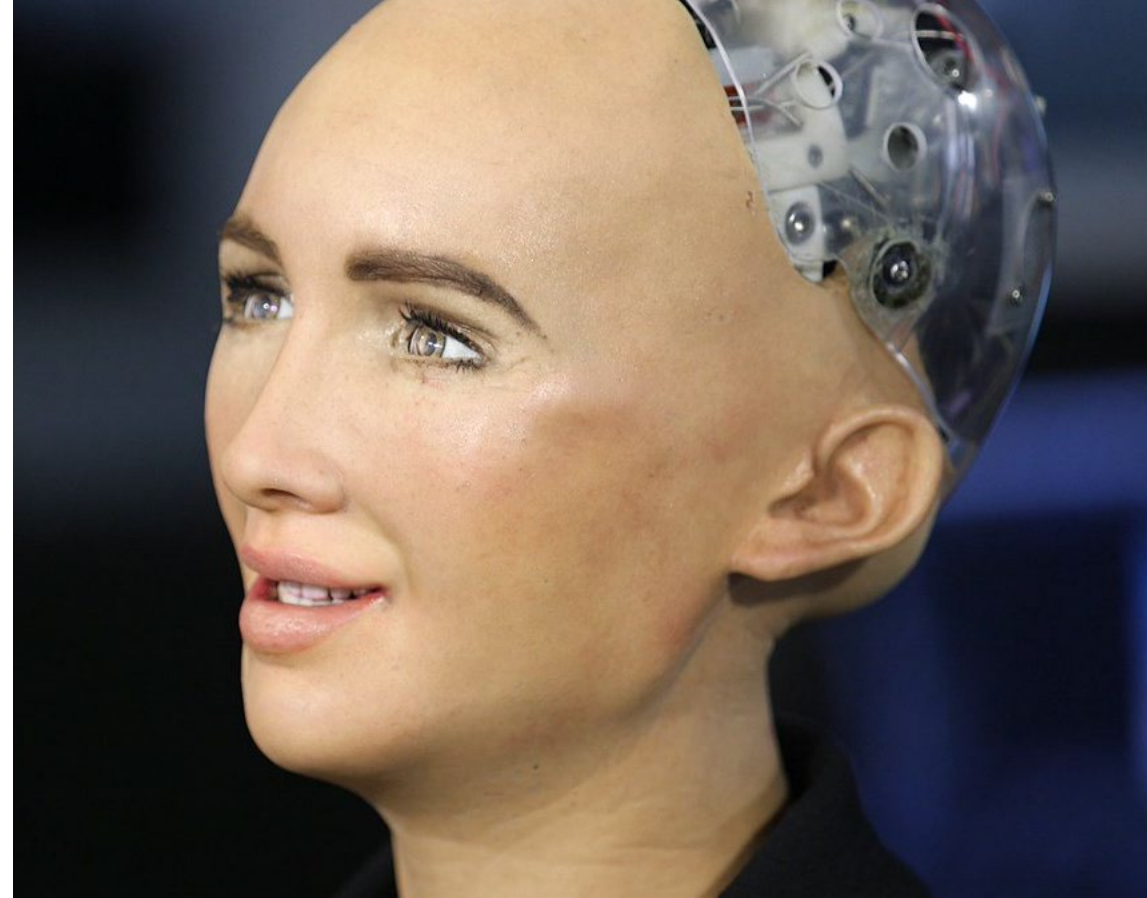
- Human Level Intelligence

❖ Superintelligence (ASI)
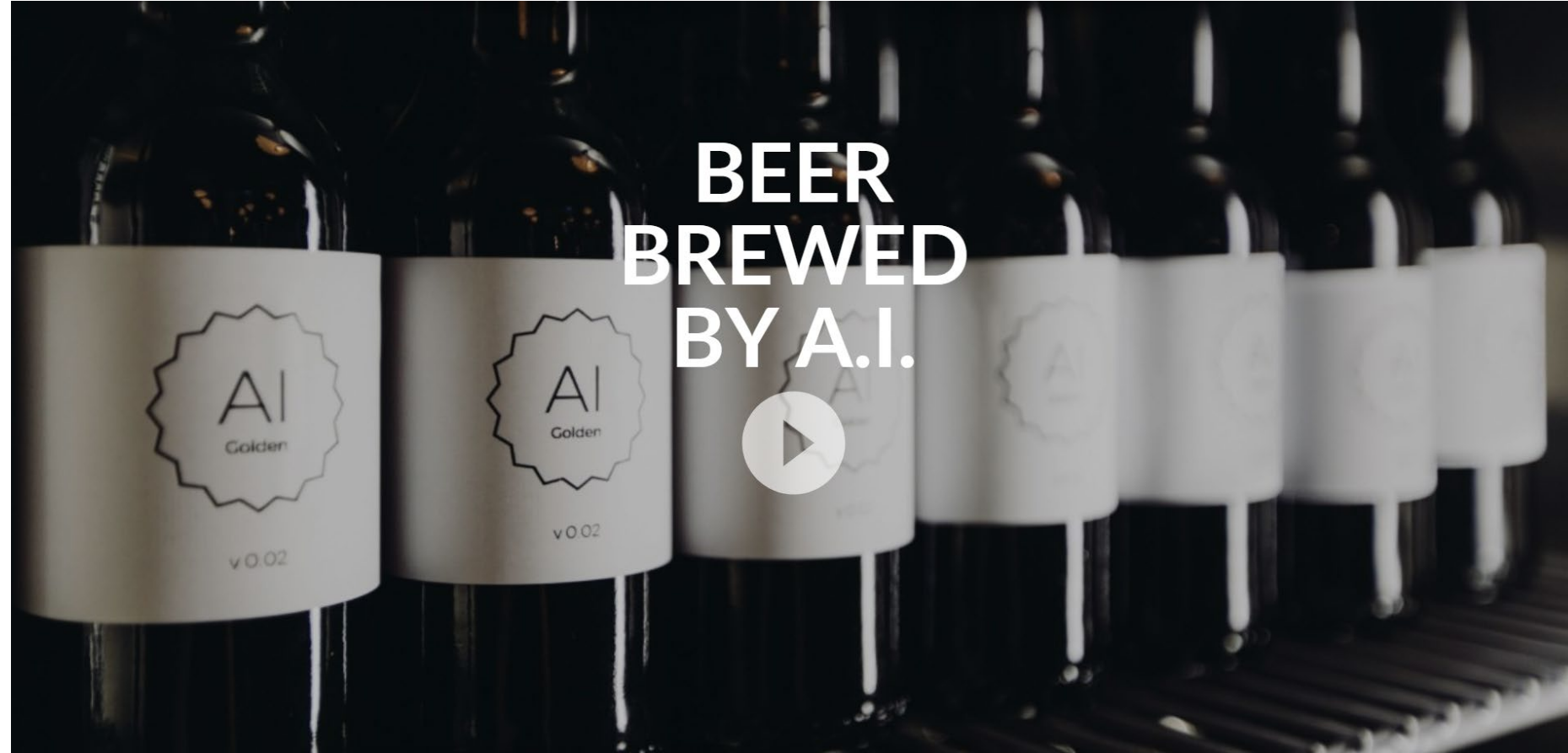
- Intelligence that exceeds that of a human

Source: https://matrixni.org/artificial-intelligence-workshop-january-2018-register-now/

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Meet Sophia

- Granted legal Citizenship in Saudi Arabia

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Can Machines help us improve Beer?

Source: http://intelligentx.ai/

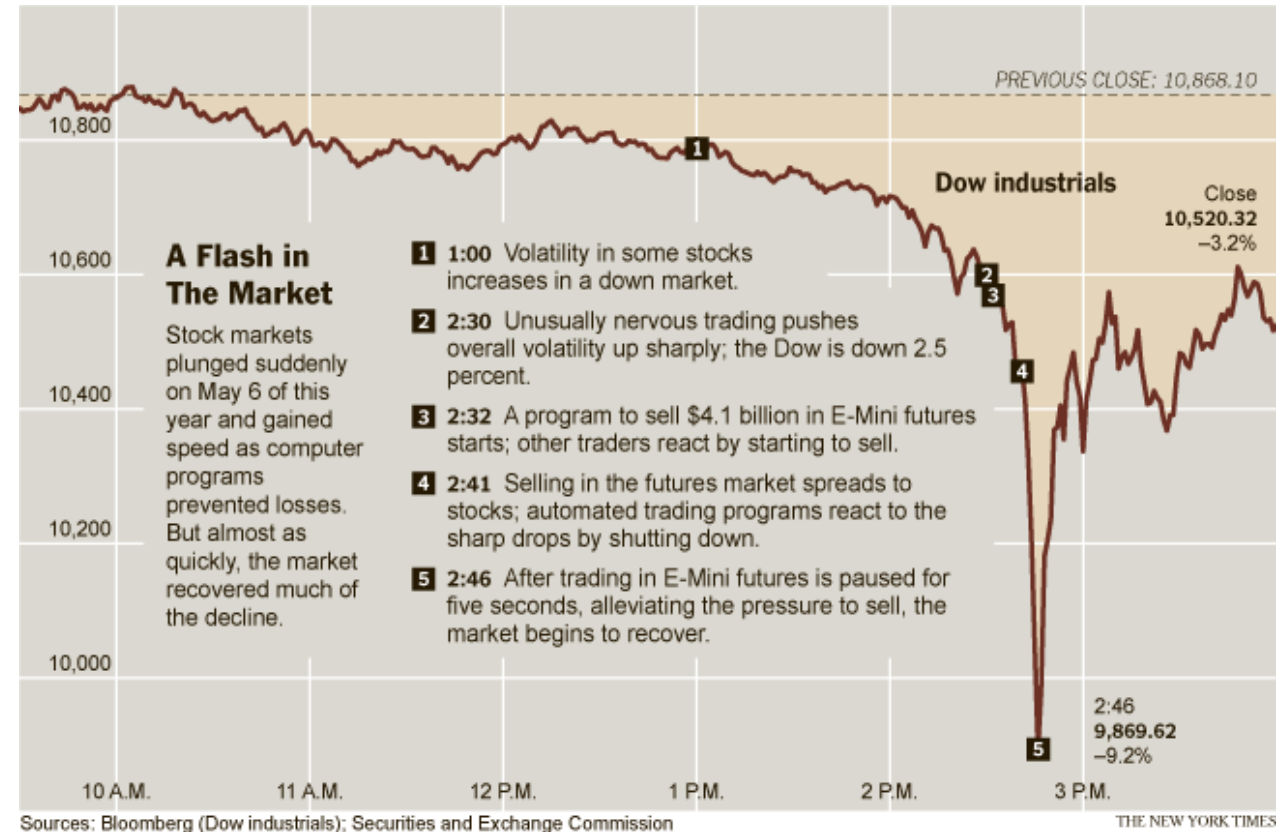# What are the two most likely scenarios with AI?

AI is programmed to do something DEVASTATING

AI is programmed to do something BENEFICIAL,
but it develops a destructive method to achieve its goals

The AI Revolution

2010 Flash Crash

- ANI caused stock market to plummet

- $1 trillion decline in value

- Quick recovery

Source: http://graphics8.nytimes.com/images/2010/10/02/business/flash-crash-dow/flash-crash-dow-popup.png

From AGI to ASI

This could happen soon

- Advancements in technology

- Experimentation

- Innovation

How Long Until Computers Have the Same Power As the Human Brain?

Lake Michigan's volume (in fluid ounces) is about the same as our brain's capacity (in calculations per second). Computing power doubles every 18 months. At that rate, you see very little progress for a long time—and suddenly you're finished.

1940

1

calcs/second

Mother Jones

Source: https://assets.motherjones.com/media/2013/05/LakeMichigan-Final3.gif

AGI Tests

- The Turing Test
- The Coffee Test
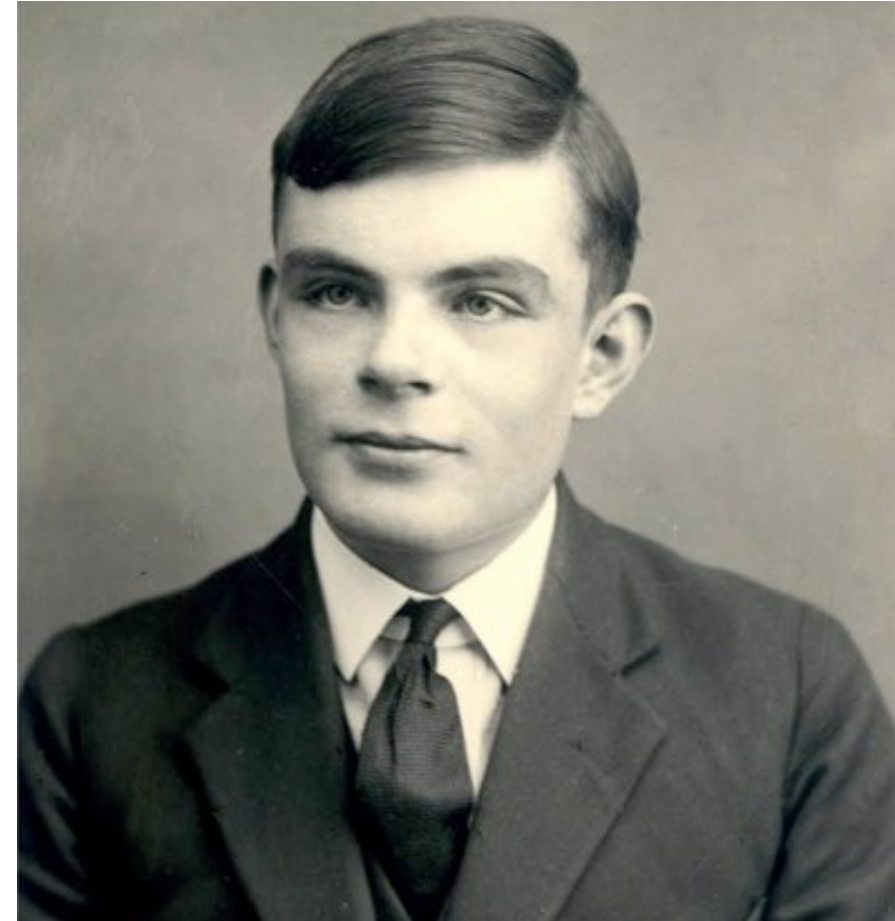- The College Student Test
- The Employment Test

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Alan Turing (1912-1954)

- Father of AI and computer science

- Cryptanalyst during WWII

- Cracked code that enabled Allies victory

- Contributions to physical sciences

- Prosecuted by UK and castrated for being gay

- Died of cyanide poisoning

- Receives public apology in 2009 & royal pardon in 2013

Source: https://www.historyextra.com/period/second-world-war/bletchley-park-facts-alan-turing/

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The Future...

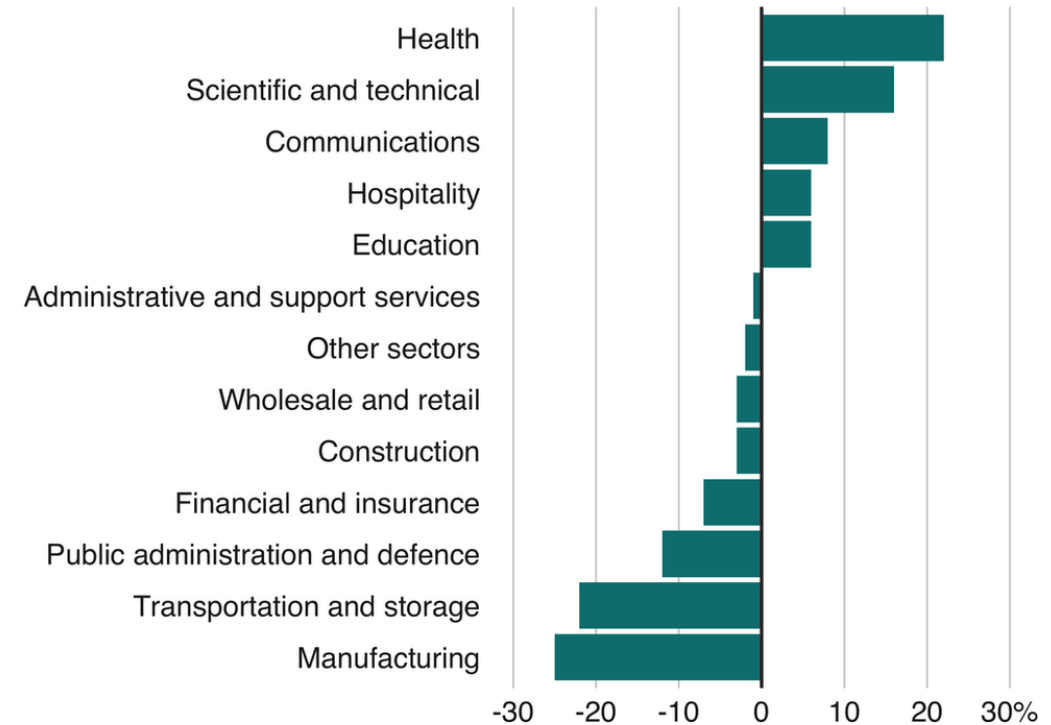**What will the job market look like when you graduate?**

How AI could change the job market
Estimated net job creation by industry sector, 2017-2037

- Health
- Scientific and technical
- Communications
- Hospitality
- Education
- Administrative and support services
- Other sectors
- Wholesale and retail
- Construction
- Financial and insurance
- Public administration and defence
- Transportation and storage
- Manufacturing

-30   -20   -10   0   10   20   30%

Source: PwC

BBC

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More to Come

Prepare with Readings & Videos before our next class!!!