MGT 3745 B: problems

AGENDA

August 24, 2023
(109 days, 15 weeks, 4 days)

- problem statements

- problem-solving methodologies

- wicked business problem domains

- current/future jobs seeking problem-solving abilities

Wicked Business Problems

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What is a wicked business problem?

"…a problem that is **difficult** or **impossible** to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize"

"…idea or problem that cannot be fixed, where there is no single solution to the problem; and "wicked" denotes resistance to resolution, rather than evil"

Source: https://en.wikipedia.org/wiki/Wicked_problem

Wicked Business Problems

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Characteristics of wicked business problems

- not easily possible to formulate a problem statement
- no stopping rule
- solutions are good or bad
- no immediate and no ultimate test of a solution
- solutions lack opportunities to learn by trial and error (e.g., one shot)
- problems do not have an exhaustively describable set of potential solutions
- wicked problems may be a symptom of another problem
- existence of a discrepancy representing a wicked problem can be explained in numerous ways
- problem solvers are liable for any/all consequences of their solution(s)

Business Problem Solving

Problem Components and Solving Techniques

Problem Statement - a concise description of an issue to be addressed or a condition to be improved upon (includes ideal state, reality, consequences, and proposed solution(s))

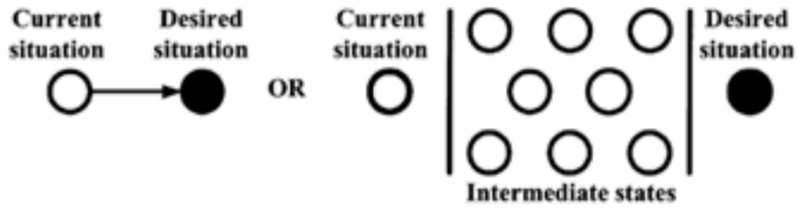


Figure 1: Initial state of Problem solving

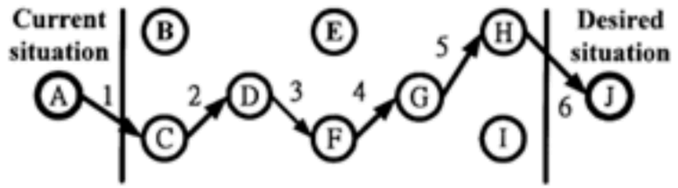


Figure 2: Problem Solving with a chain of intermediate states

Intermediate States - examples include strategic thinking, critical thinking, design thinking, and computational thinking

Strategic Thinking - mental or thinking process applied by an individual in the context of achieving a goal or set of goals

Critical Thinking - analysis of available facts, evidence, observations, and arguments to form a judgment

Design Thinking - an iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test

Source: https://en.wikipedia.org/wiki/Problem_statement
Source: Importance of Problem Statement in Solving Industry Problems, doi:10.4028/www.scientific.net/AMM.421.857
Source: https://en.wikipedia.org/wiki/Strategic_thinking
Source: https://en.wikipedia.org/wiki/Critical_thinking
Source: https://en.wikipedia.org/wiki/Design_thinking#As_a_process_for_innovation
Source: https://www.interaction-design.org/literature/topics/design-thinking

Business Problem Solving

Key Terms for business problem solving and decision making

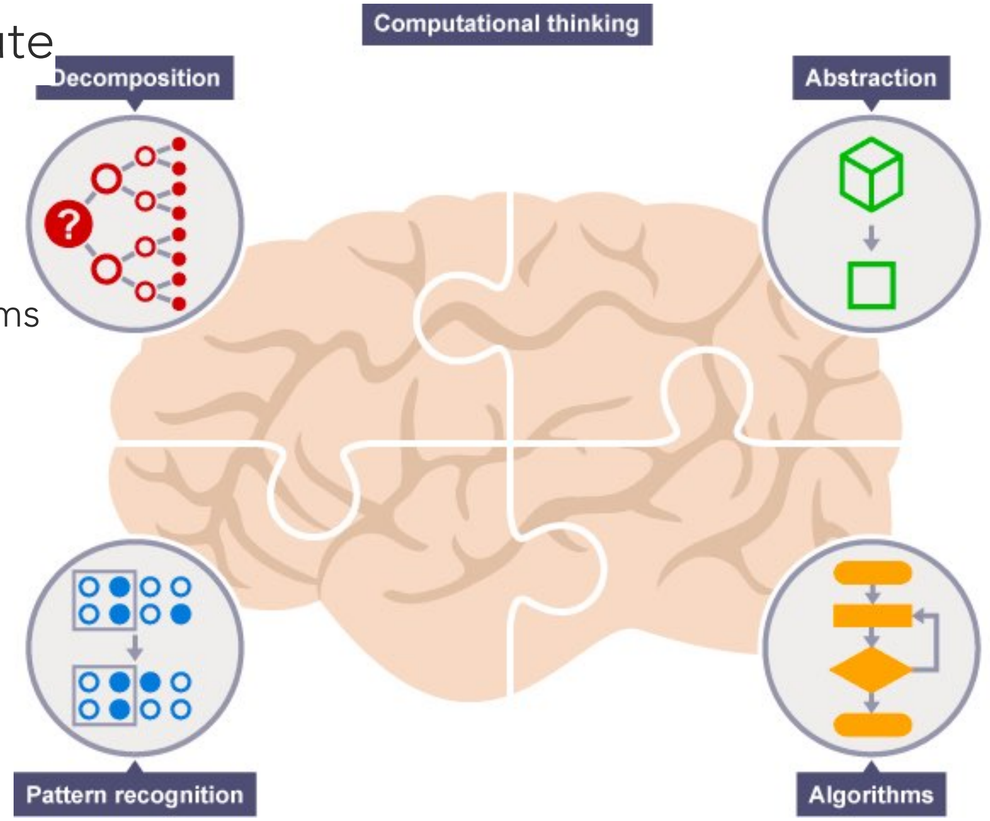
Computational Thinking - problem-solving methods that involve expressing problems and their solutions in ways that a computer could also execute

decomposition - breaking down a complex problem or system into smaller, more manageable parts

pattern recognition – looking for similarities among and within problems

abstraction – focusing on the important information only, ignoring irrelevant detail

algorithms - developing a step-by-step solution to the problem, or the rules to follow to solve the problem



Source: https://en.wikipedia.org/wiki/Computational_thinking

Image source: https://www.bbc.co.uk/bitesize/guides/zp92mp3/revision/1

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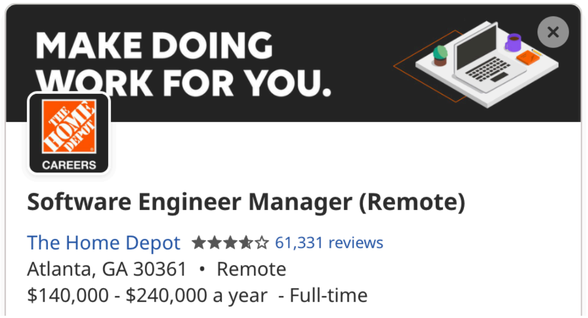
Why even bother to try to solve wicked problems?

Developing strategies for businesses to tackle wicked problems and make decisions can yield substantial career benefits



- Collaborates and pairs with product team members (UX, engineering, and product management) to create secure, reliable, scalable software solutions
- Documents, reviews and ensures that all quality and change control standards are met
- Writes custom code or scripts to automate infrastructure, monitoring services, and test cases
- Works with vendors and partners for the successful implementation of critical tooling and platforms
- Creates meaningful dashboards, logging, alerting, and responses to ensure that issues are captured and addressed proactively
- Contributes to enterprise-wide tools to drive destructive testing, automation, and engineering empowerment
- Evaluates new technologies for adoption across the enterprise
- Monitors tools and participates in conversations to encourage collaboration across product teams
- Attracts, retains, and develops top talent to build a world-class Software Engineering Team
- Fosters collaboration with team members to drive consistency across product teams, and finds opportunities to expose engineers to career interests
- Acts as a proponent of modern software development practices
- Participates in and contributes to learning activities around modern software design and development core practices (communities of practice)
- Learns, through reading, tutorials, and videos, new technologies and best practices being used within other technology organizations
- Builds relationships with technology leaders at other companies to learn best practices and elegant solutions to common problem

Source: indeed.com (~1/11/23)

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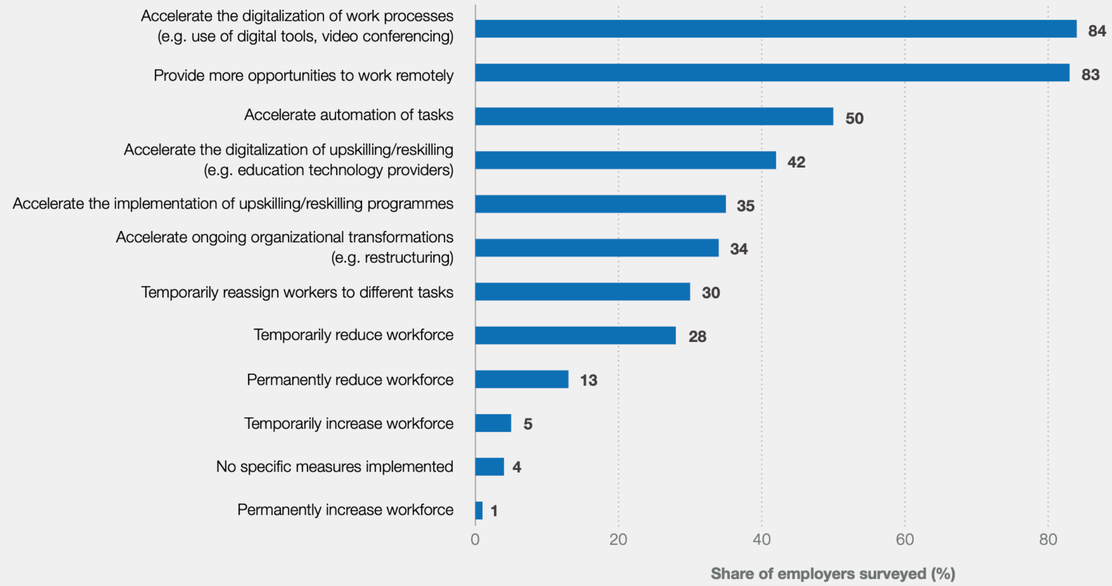
Wicked Business Problem Domains

- **Communication** - documentation, visualization, and understanding the format of information your audience is seeking and their preferred consumption style (e.g., README files via markdown & HTML, graph views, Miro)
- **Automation** - reduction of human intervention in processes (Google App Script aka, JavaScript, Nodejs)
- **Integration** - the process of combining data or functionality from one or more sources within an application (APIs)
- **Experimentation** - the process of confirming or rejecting a hypothesis (electron, chrome extensions)
- **Analysis** (Decision Intelligence) - asserting past occurrences and predicting future events (jest, charting)

Business Problem Solving

Current/Future Job Market

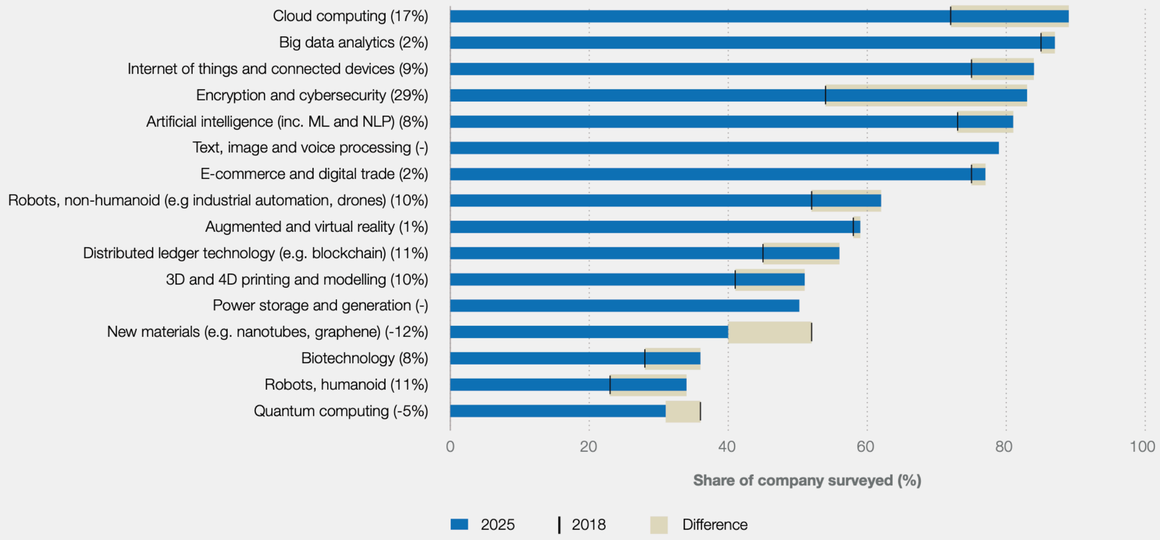
FIGURE 5 | **Planned business adaptation in response to COVID-19**



Source

Future of Jobs Survey 2020, World Economic Forum.

FIGURE 18 | **Technologies likely to be adopted by 2025 (by share of companies surveyed)**



Source

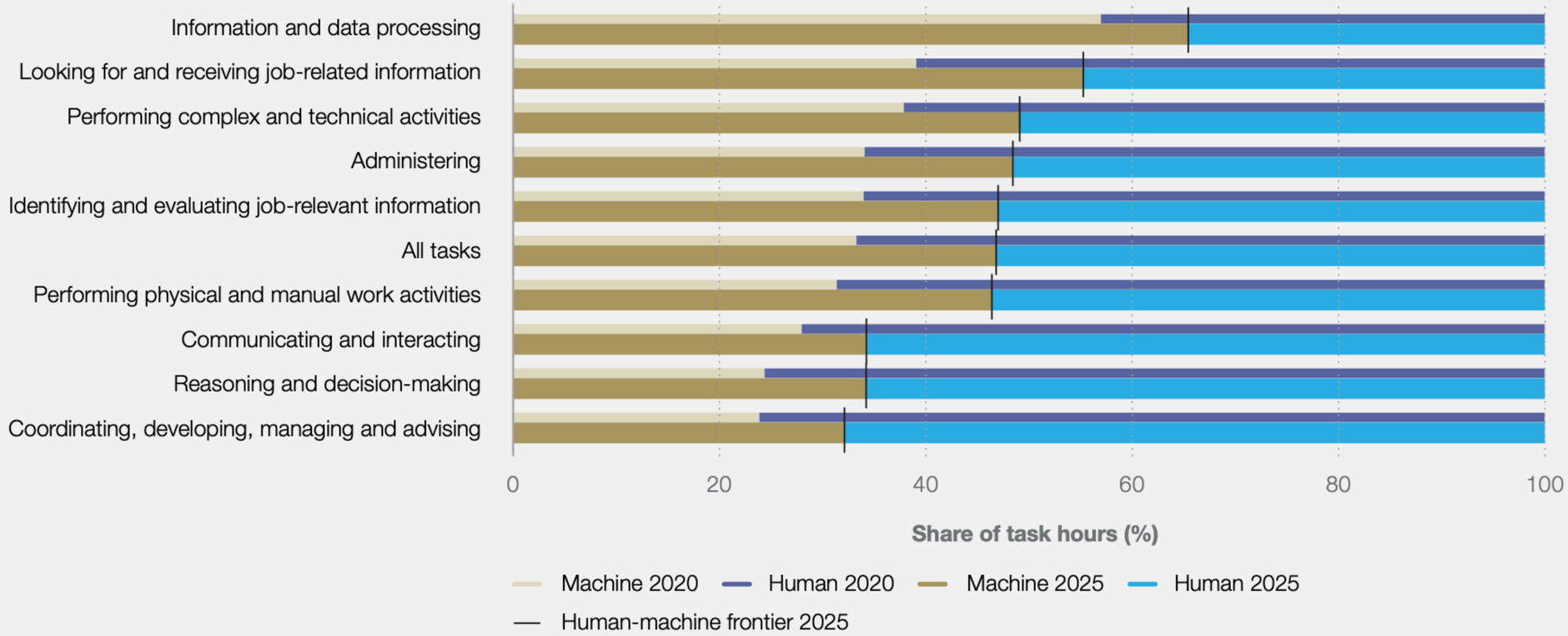
Future of Jobs Survey 2020, World Economic Forum.

Business Problem Solving

Current/Future Job Market

FIGURE 21

Share of tasks performed by humans vs machines, 2020 and 2025 (expected), by share of companies surveyed



Source

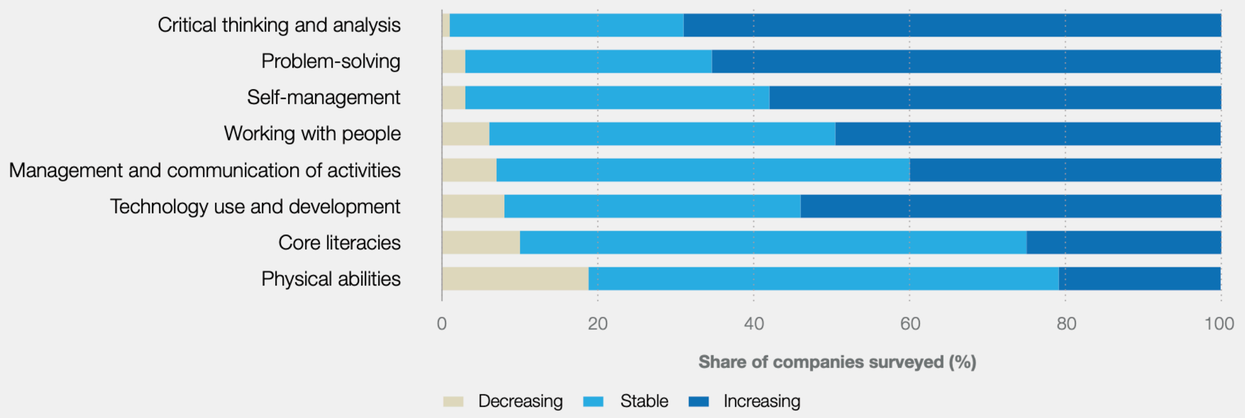
Future of Jobs Survey 2020, World Economic Forum.

Business Problem Solving

Current/Future Job Market

FIGURE 27 | **Perceived skills and skills groups with growing demand by 2025, by share of companies surveyed**

A. Relative importance of different skill groups



B. Top 15 skills for 2025

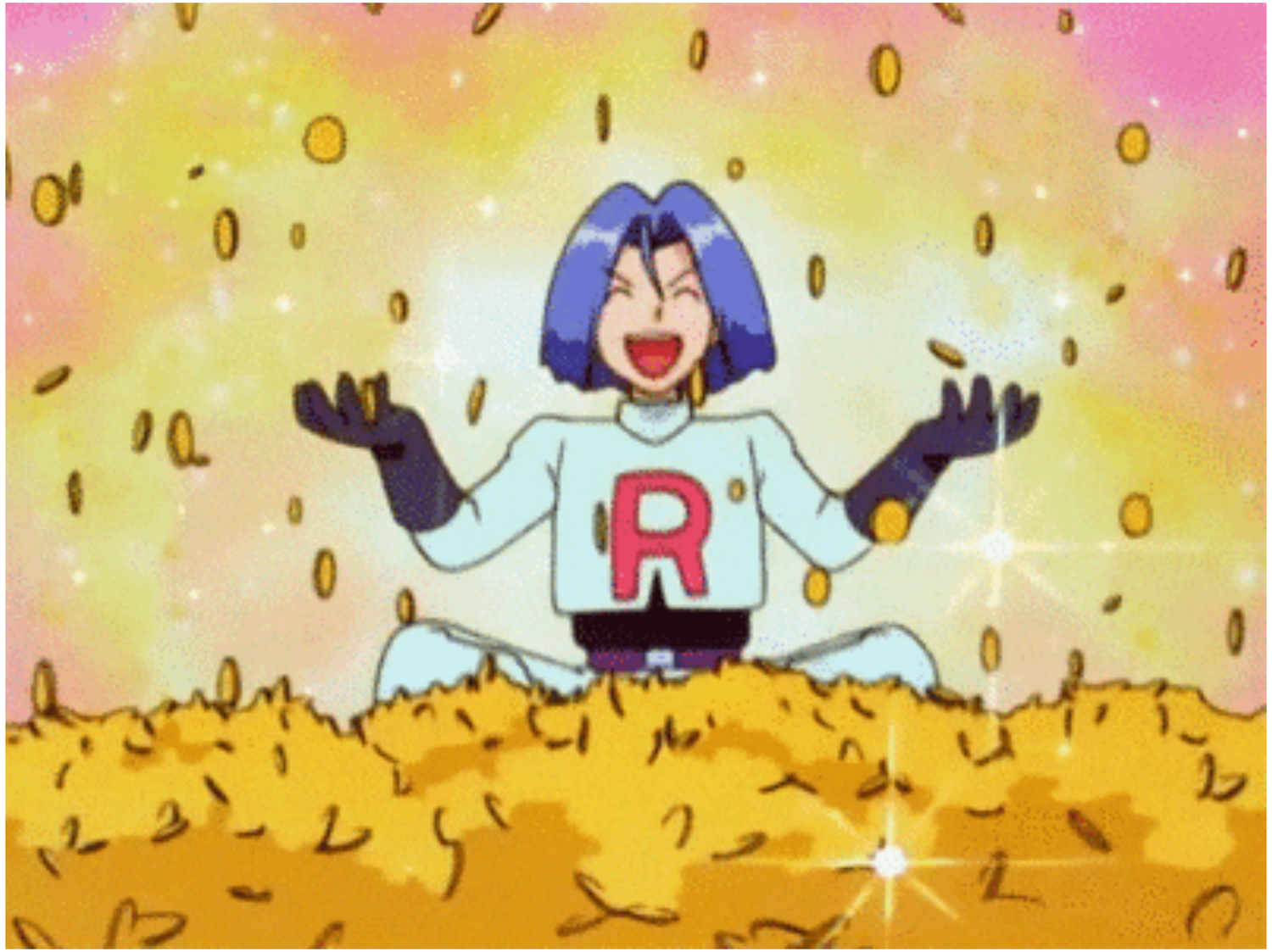
1	Analytical thinking and innovation
2	Active learning and learning strategies
3	Complex problem-solving
4	Critical thinking and analysis
5	Creativity, originality and initiative
6	Leadership and social influence
7	Technology use, monitoring and control
8	Technology design and programming
9	Resilience, stress tolerance and flexibility
10	Reasoning, problem-solving and ideation
11	Emotional intelligence
12	Troubleshooting and user experience
13	Service orientation
14	Systems analysis and evaluation
15	Persuasion and negotiation

Source

Future of Jobs Survey 2020, World Economic Forum.

Business Problem Solving

Why even bother to try to solve wicked problems?



Assignments

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Readings

Strategy as a wicked problem

Docs for Developers - Chpt 2 (use O'Reilly and enter your GaTech email)

Importance of Problem Statement in Solving Industry Problems (857-860 up to the industrial case)

Week 1 Discussions (Intro, Readings)

https://gatech.instructure.com/courses/347044/discussion_topics/1538565

https://gatech.instructure.com/courses/347044/discussion_topics/1538567

General Discussion

https://gatech.instructure.com/courses/347044/discussion_topics/1538563

Homework 1

https://gatech.instructure.com/courses/347044/assignments/1497398

Homework 1 Discussion

https://gatech.instructure.com/courses/347044/discussion_topics/1538581

Next Week

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NO CLASS ON 8/29/23

Markdown Guide
Learn JS - up to 'loops'

Create a Replit account to practice JS and markdown

Use Stackedit to practice markdown

Questions?