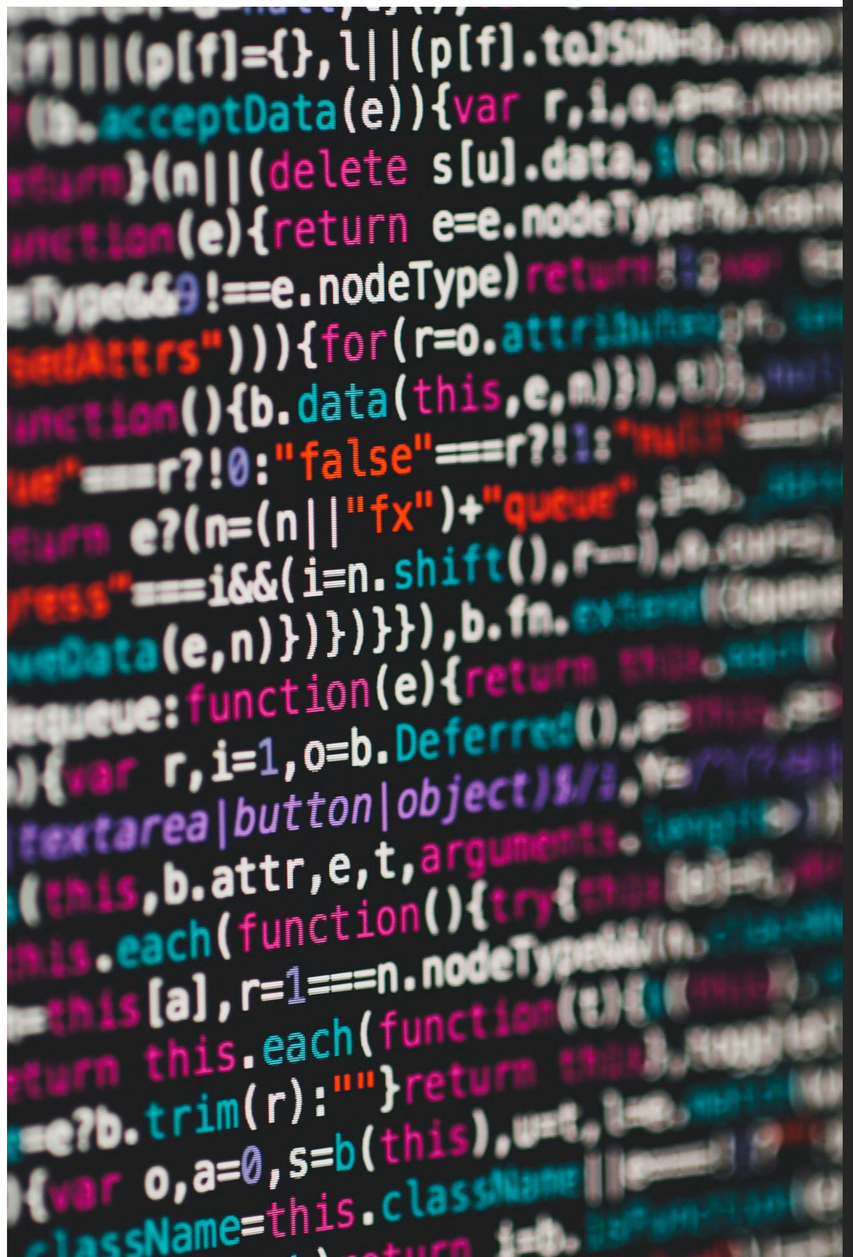
CSCM23 DESIGNING-IN TRUST, UNDERSTANDING, AND NEGOTIATION

1920~2020
Swansea University
Prifysgol Abertawe

Swansea University
Prifysgol Abertawe

Computational Foundry
Ffowndri Gyfrifiadol



Designing Trusted AI-Based Systems

1920-2020
Swansea University
Prifysgol Abertawe

RE³ APPROACH

RELIABLE

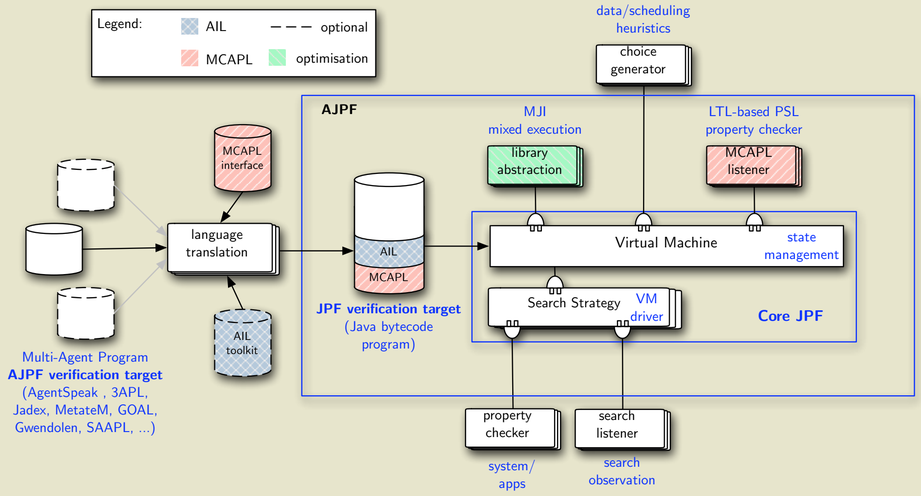
Accuracy

Efficiency

Availability

Explainability

Predictability



- Mechanisms of introducing bias into datasets and algorithms:
  - **Automatic:** Training on non-representative or otherwise inherently biased data
  - **Unintentional:** insufficiently diverse team/methods/ expertise increase the chance of bias introduced by ignorance.
  - **Deliberate:** biased or fake data introduced in any phase of design, implementation, or at runime.
- Can bias be qualified and quantified?

- BCS SIGiST – Summer 2017 Conference – Keynote: **Towards Verifiable and Ethical AI Systems**, London, 14 June 2017
- AI – Artificial Intelligence in Reality – **Engineering Verifiable Agent Programs**, BCS North London Branch, 25 November 2015
- **Modern Applications of Agent Technology – Where Mobility and Resources Actually Matter**, TU Clausthal, 1 February 2011
- R. Bordini, L. Dennis, B. Müller, M. Fisher. **Directions for Agent Model Checking**. Book chapter in: Specification and Verification of Multi-agent Systems. Pages 103-124, Springer. 2010.
- N. Bulling and B. Müller. **Expressing properties of resource-bounded systems: The logics RTL and RTL***. In J. Dix et al, eds, Computational Logic in Multi-Agent Systems. CLIMA X. Vol. 6214 of LNAI, pages 22-45, Springer 2010.
- Modelling and Verification of Resource-Bounded Multi-Agent Systems., Keynote at MATES – MOCA'09, 11 September 2009

RE³ APPROACH

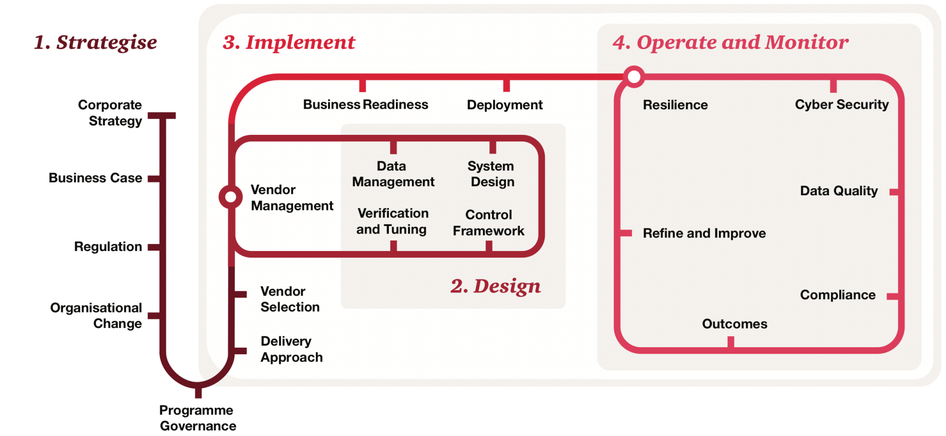
RESPONSIBLE

Transparent

Trustworthy

Ethical

Privacy respecting



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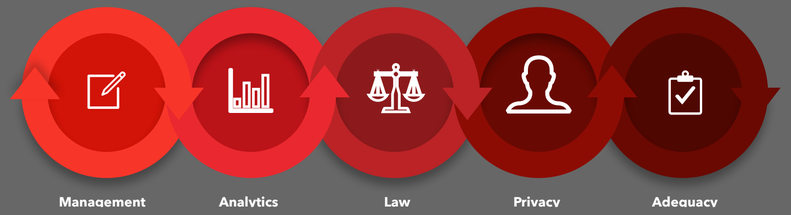


- Ethics
- Transparency
- Responsibility

in Design

- Ethics
- Transparency
- Responsibility

by Design

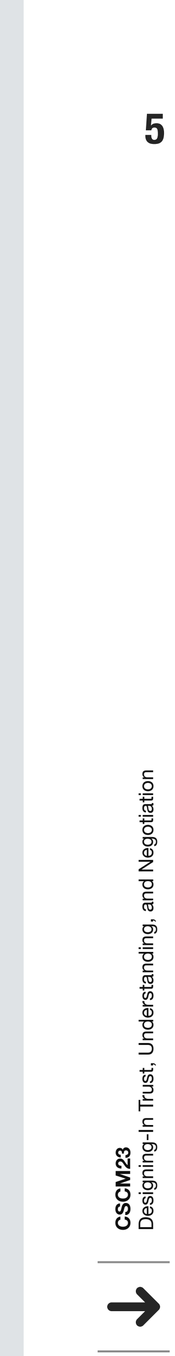
- DataRela8 Data Summit 2019 – **Privacy by Design & Ethics by Design – Is there an Alternative?**, Bath, 11-13 May 2019
- European Business AI & Robotics Conference, – **AI Needs Diversity**, Helsinki, 24/25 October 2018
- Accelerate AI, London, 19 September 2018 – E**ngineering Ethical AI and Responsible Use of Data,** London, 19 September 2018
- AI Europe 2017 – Keynote: **Engineering Responsible AI**, London, 22 November 2017
- AI Summit 2017 – **The Future of Ethical AI – Beyond Big Data**, London, 10 May 2017

PRIVACY BY DESIGN

Including privacy as a requirement in the design and development process.

- Encryption
- Federated Learning
- Differential Privacy
- Access Control

- Transparency
- Consent



ico.
Information Commissioner's Office

- Data protection by design and default

- **At a glance**

- The GDPR requires you to put in place appropriate technical and organisational measures to implement the data protection principles and safeguard individual rights. This is ‘data protection by design and by default’.

- In essence, this means you have to integrate or ‘bake in’ data protection into your processing activities and business practices, from the design stage right through the lifecycle.

- This concept is not new. Previously known as ‘privacy by design’, it has always been part of data protection law. The key change with the GDPR is that it is now a legal requirement.

- Data protection by design is about considering data protection and privacy issues upfront in everything you do. It can help you ensure that you comply with the GDPR’s fundamental principles and requirements, and forms part of the focus on accountability.

PRIVACY BY DESIGN

Checklists

□ We consider **data protection issues as part of the design and implementation** of systems, services, products and business practices.

□ We make data protection an **essential component of the core functionality** of our processing systems and services.

□ We **anticipate risks** and privacy-invasive events before they occur, and take steps to prevent harm to individuals.

□ We **only process** the personal **data that we need** for our purposes(s), and that we only use the data for those purposes.

□ We ensure that personal **data is automatically protected** in any IT system, service, product, and/or business practice, so that individuals should not have to take any specific action to protect their privacy.

□ We provide the **identity and contact information of those responsible for data protection** both within our organisation and to individuals.

□ We adopt a **'plain language' policy** for any public documents so that individuals easily understand what we are doing with their personal data.

□ We **provide** individuals with **tools** so they can **determine how we are using their personal data**, and whether our policies are being properly enforced.

□ We offer **strong privacy defaults**, user-friendly options and controls, and respect user preferences.

□ We only **use data processors that provide sufficient guarantees** of their technical and organisational measures for data protection by design.

□ When we use other systems, services or products in our processing activities, we make sure that we **only use those whose designers and manufacturers take data protection issues into account.**

□ We use **privacy-enhancing technologies (PETs)** to assist us in complying with our data protection by design obligations.

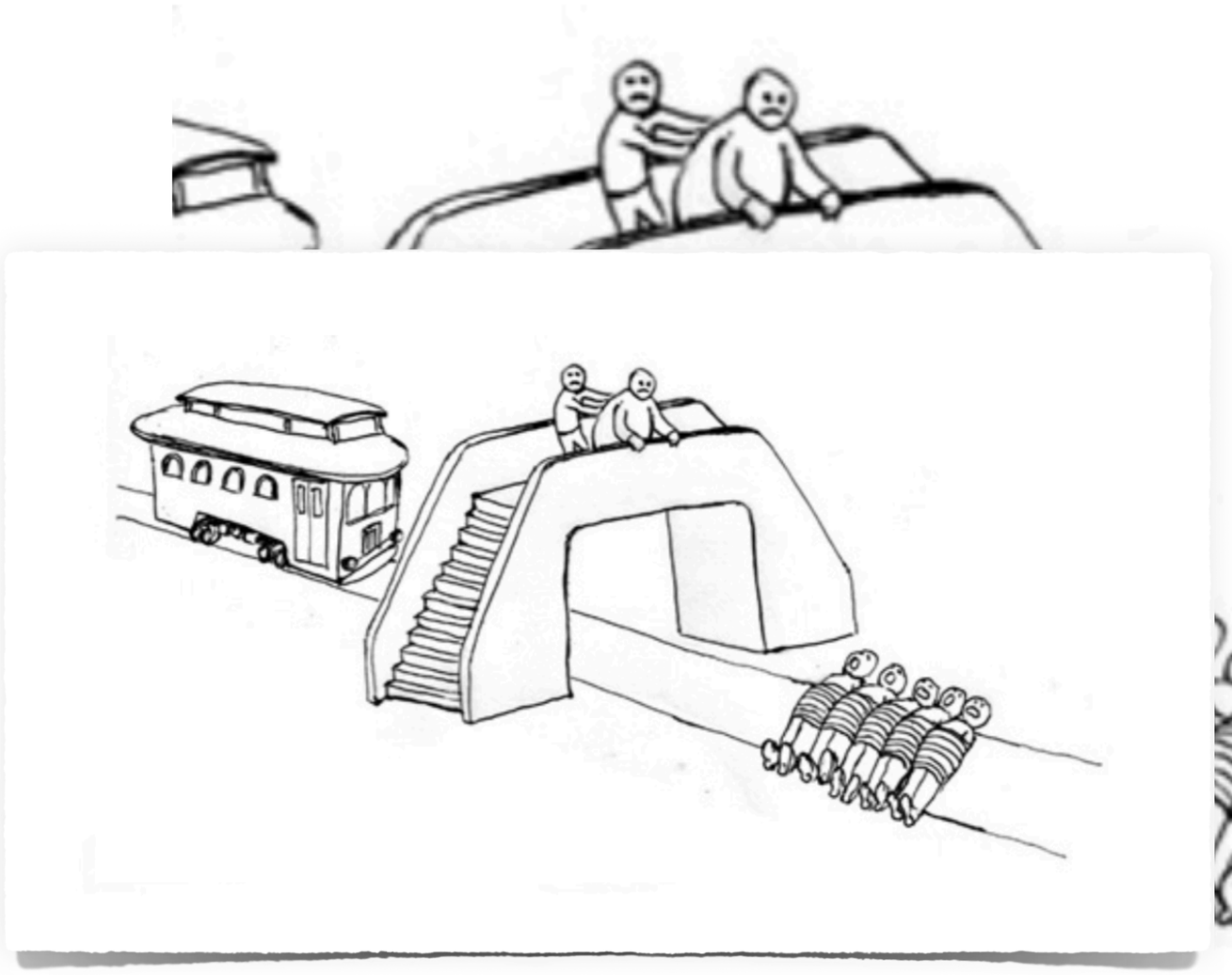
UTILITARIANISM

The right actions are the one that increase the utility in society.

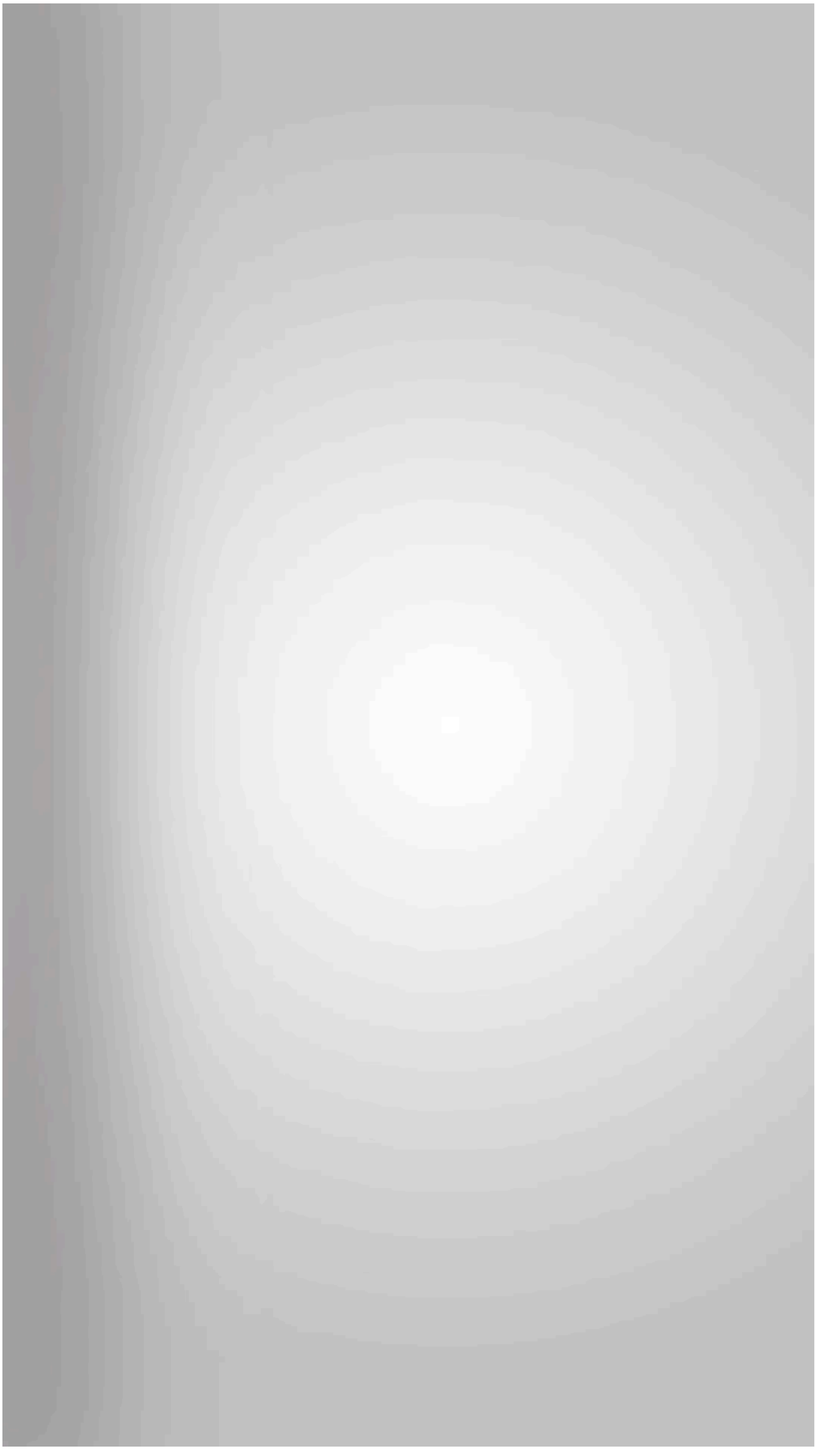
Jeremy Bentham (1748-1832) and John Stuart Mill (1806-1873)

Act-Utilitarianism
Acting driven by utilitarianism:
Morally correct actions are those that directly produce the greatest overall good, everyone considered

Rule-utilitarianism
Morally correct action is the one covered by a rule that if generally followed would produce the most favourable balance between good and evil, everyone considered (rules must be followed constantly even if they are locally not the best choice)

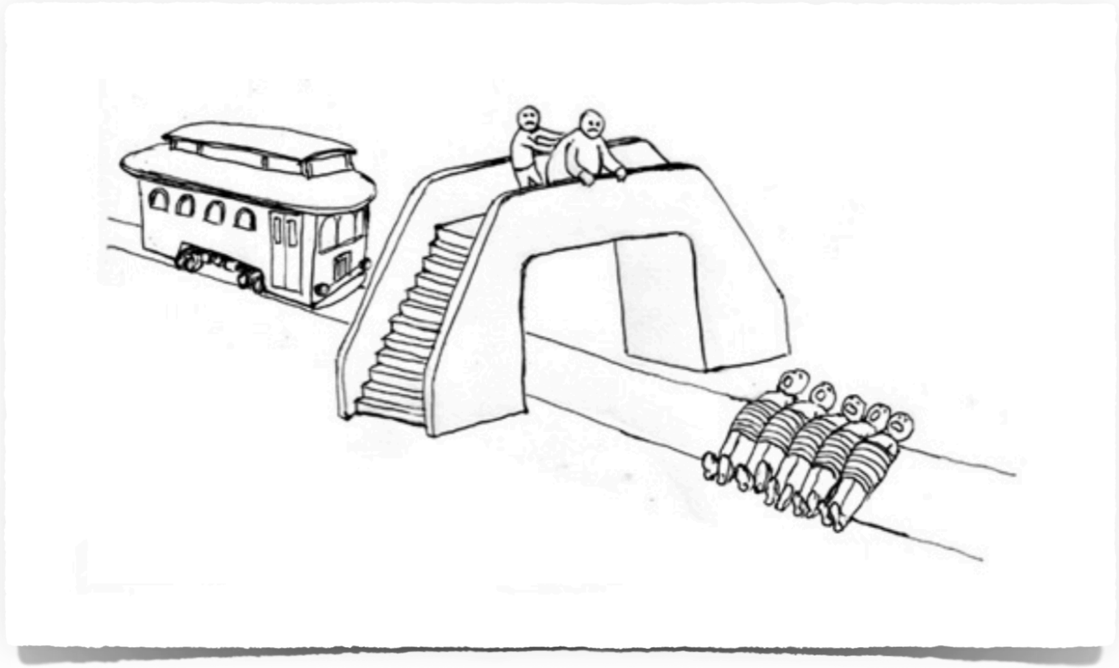


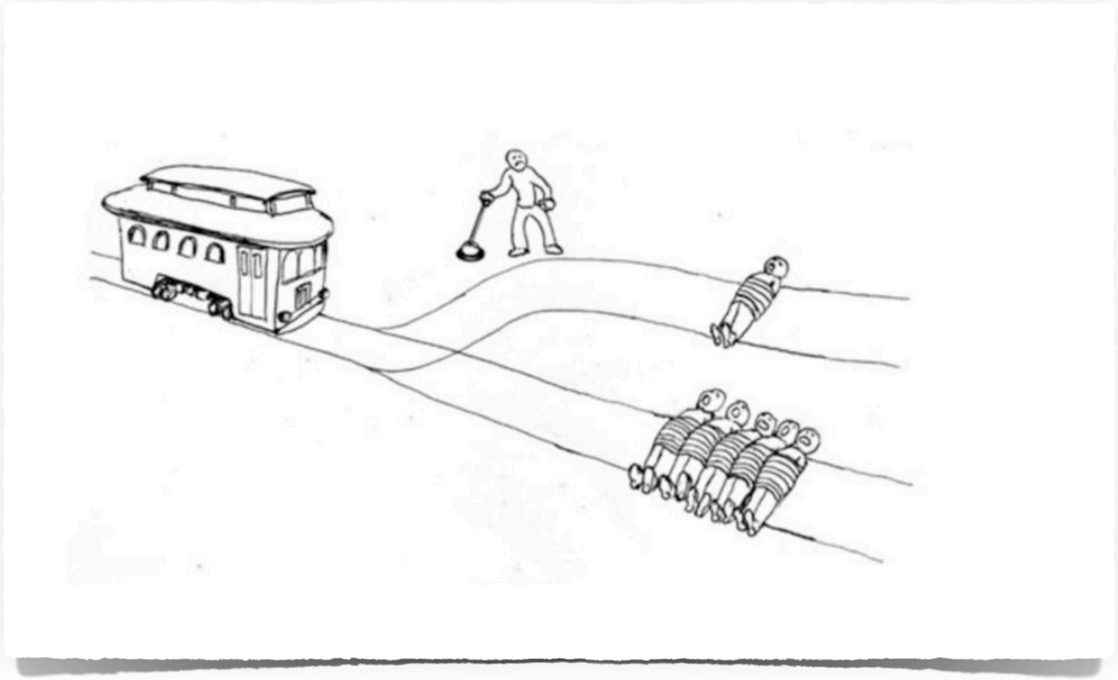
- The Trolley Problem

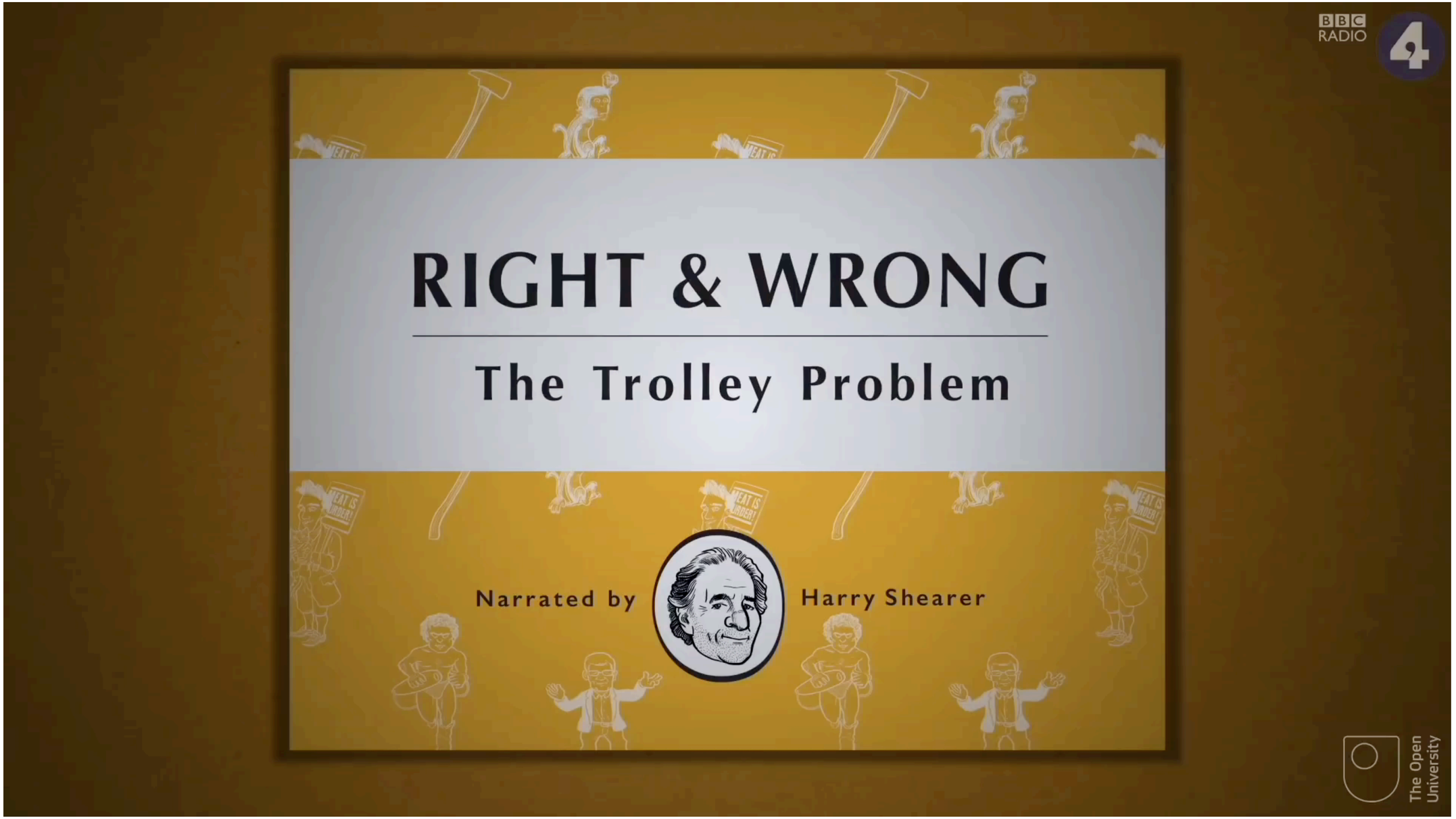


ETHICS

IS THERE ANY DIFFERENCE BETWEEN THESE SCENARIOS?






BBC RADIO 4
RIGHT & WRONG
The Trolley Problem
Narrated by
Harry Shearer
The Open University