XALGORITHMS Foundation

Université du Québec en Outaouais

Symposium on Algorithmic Governance • Ottawa • 2019-04-23&24

HUMAN-CENTRED AUTOMATION

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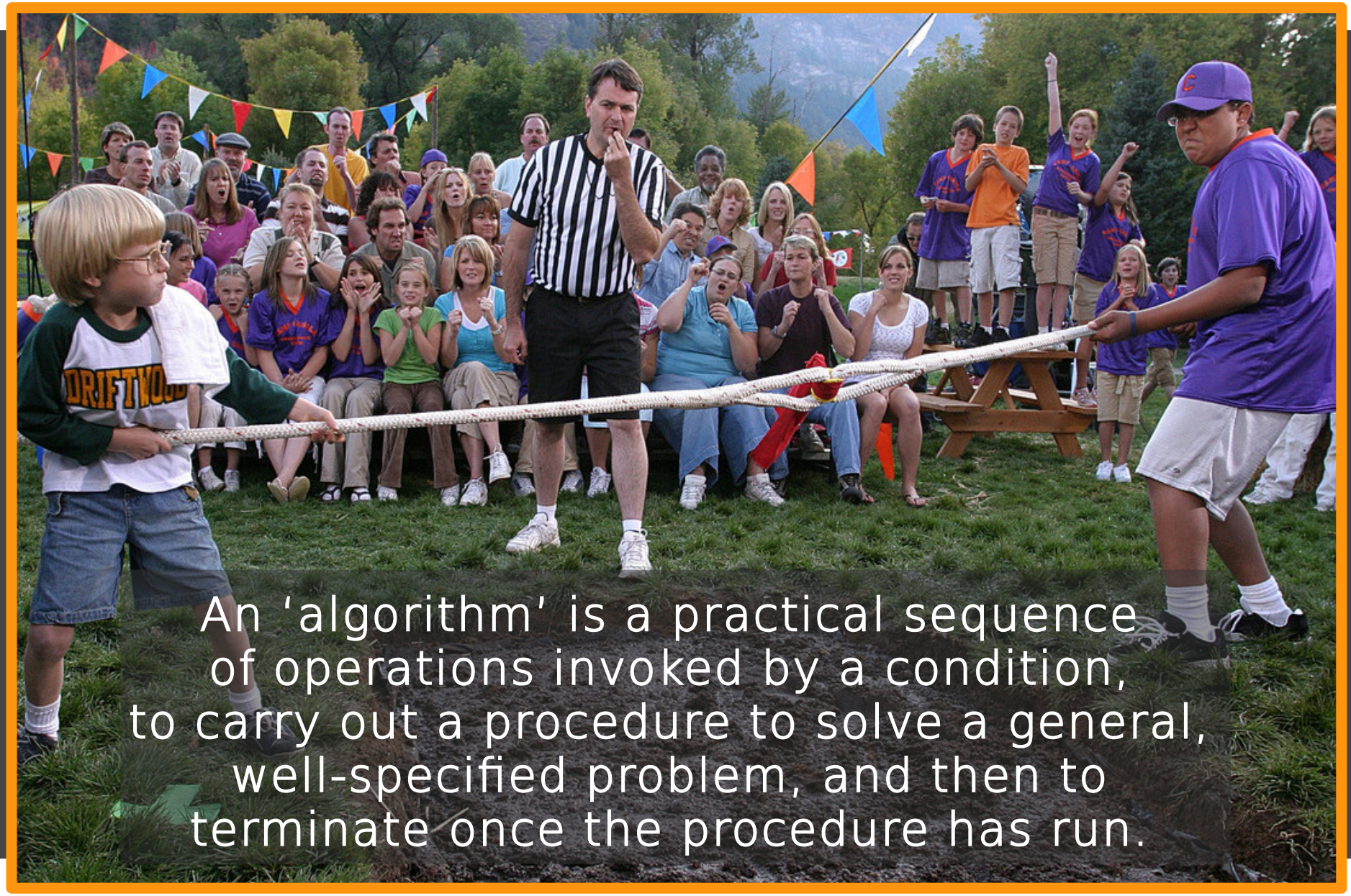
LICENSES
Text & diagrams : CC-by v4.0
Software : Apache 2.0 & AGPL 3.0

Human-Computer Interaction

Human-Rope Interaction

Human-Algorithm Interaction



Human-Computer Interaction

Human-Human Interaction Through Algorithms

A ‘rule’ is a normative precept by which repeated behaviour is guided through authority, agreement or preference.

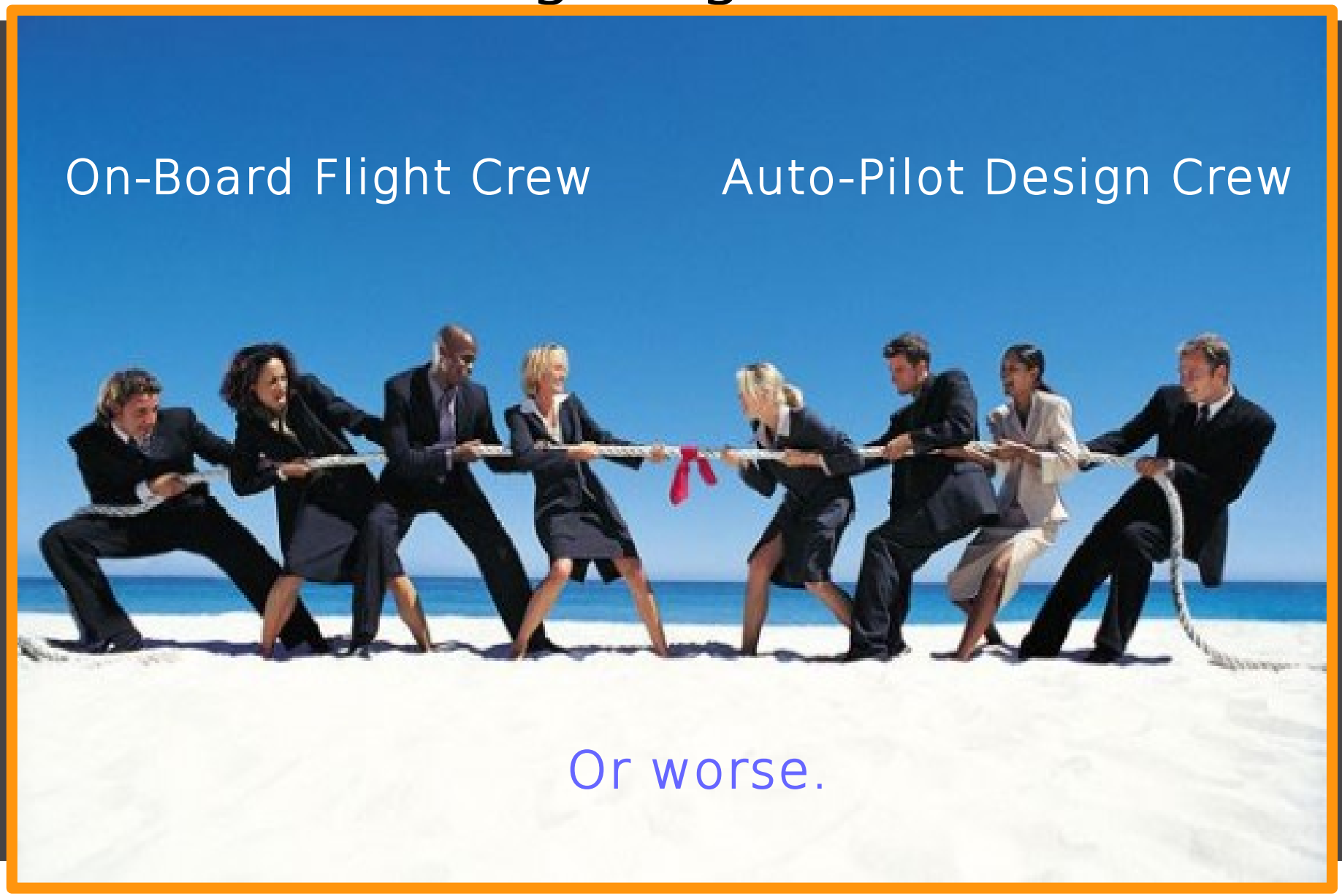
A positive ‘algorithm’ implements a normative ‘rule’.

An ‘algorithm’ is a practical sequence of operations invoked by a condition, to carry out a procedure to solve a general, well-specified problem, and then to terminate once the procedure has run.

Human-Human Interaction Through Algorithms

Human-Human Interaction Through Algorithms

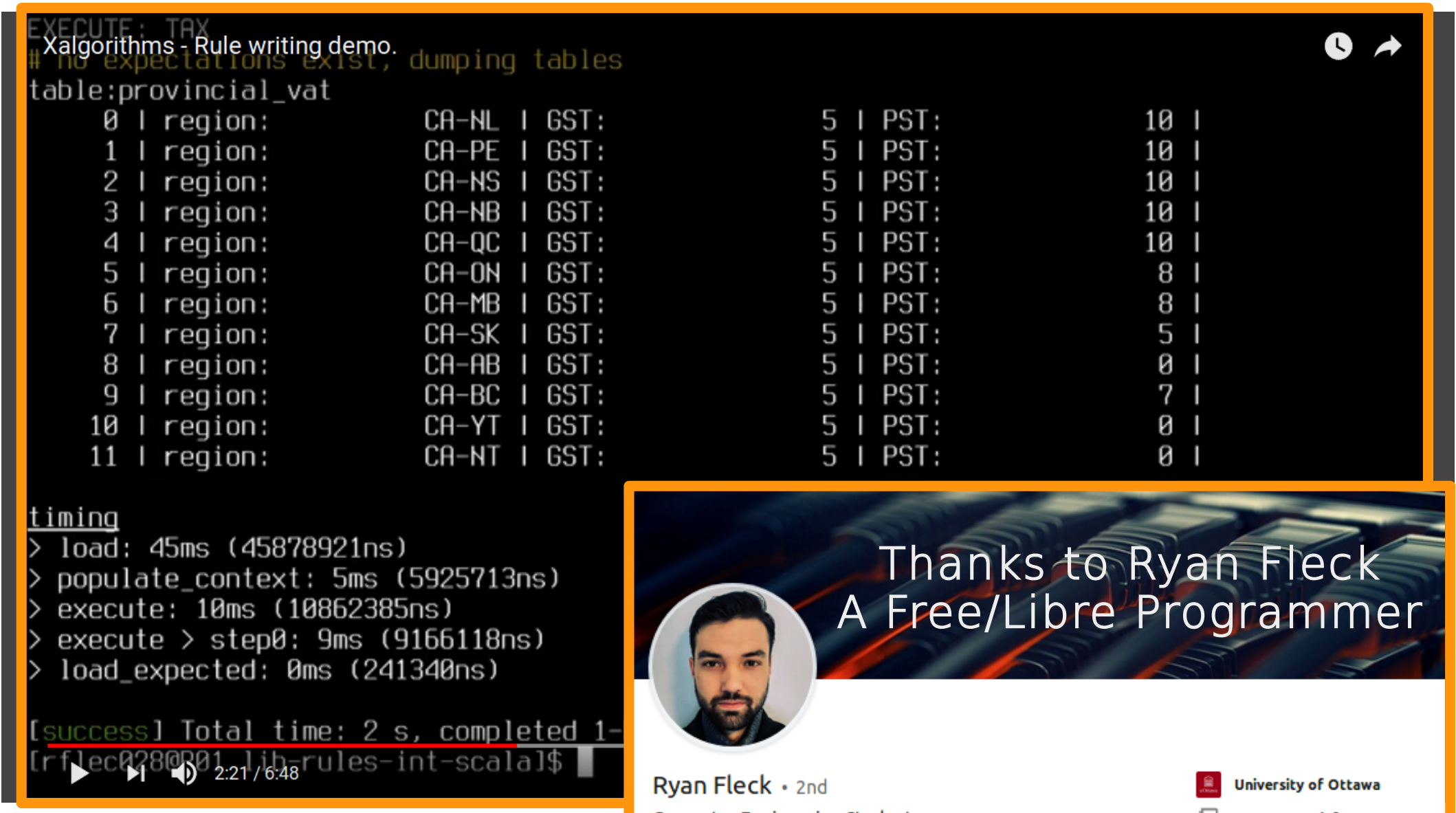
Human-Human Interaction Through Algorithms

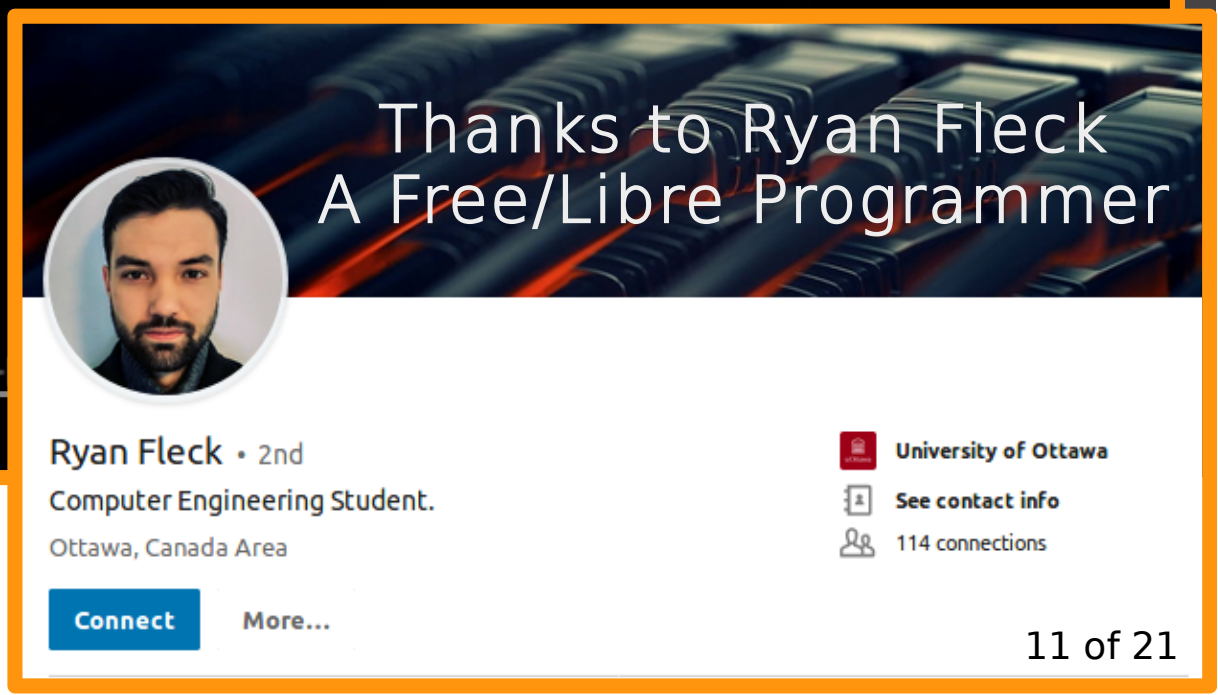


Demo: Base HST Rates in a Simple Algorithm

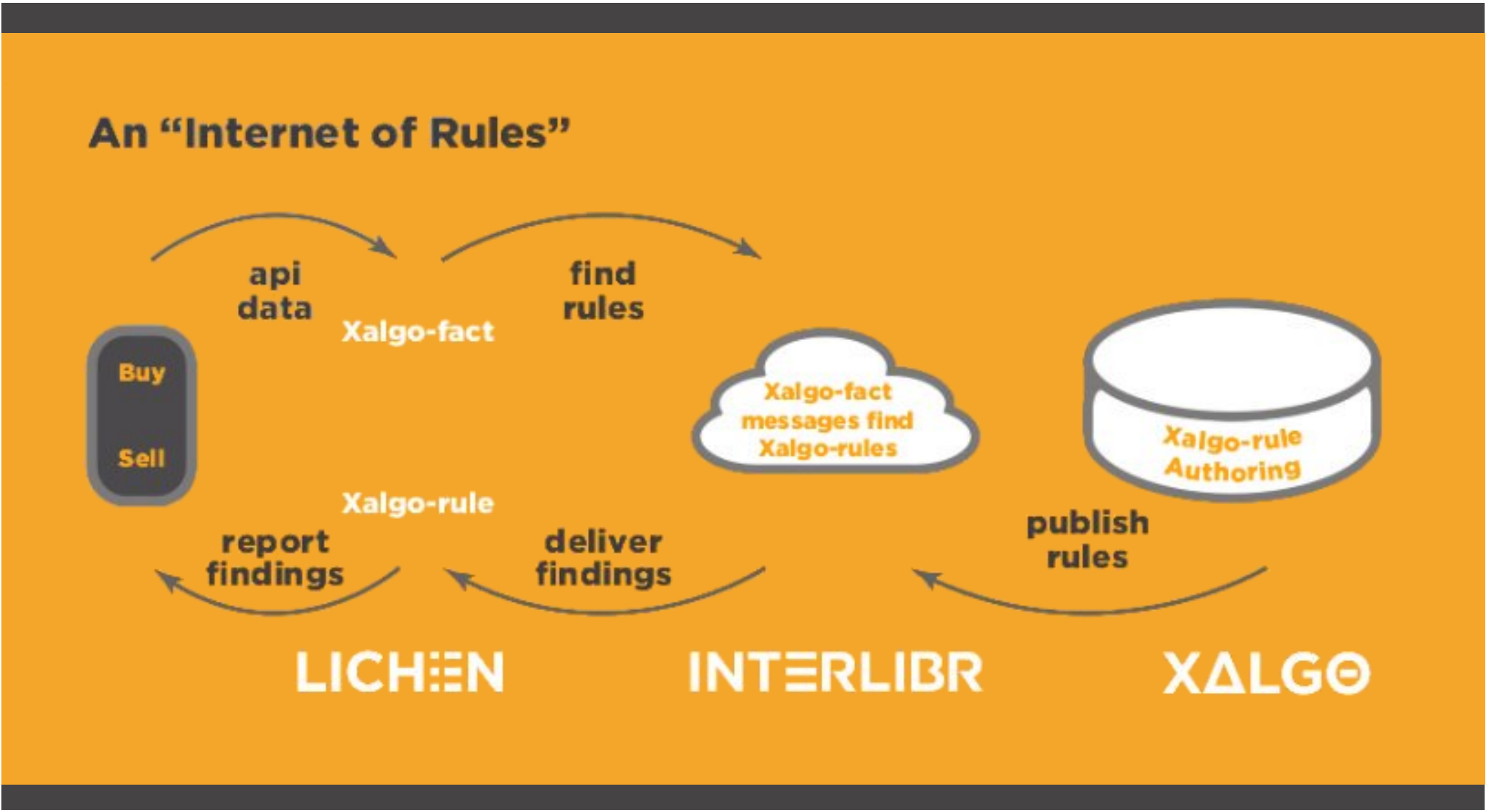
https://www.youtube.com/watch?v=pcoWgOYvbbk&t=2s
Or... https://tinyurl.com/yym4pgwd

Demo: Base HST Rates in a Simple Algorithm





AN INTERNET OF RULES



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Freedom + Accessibility

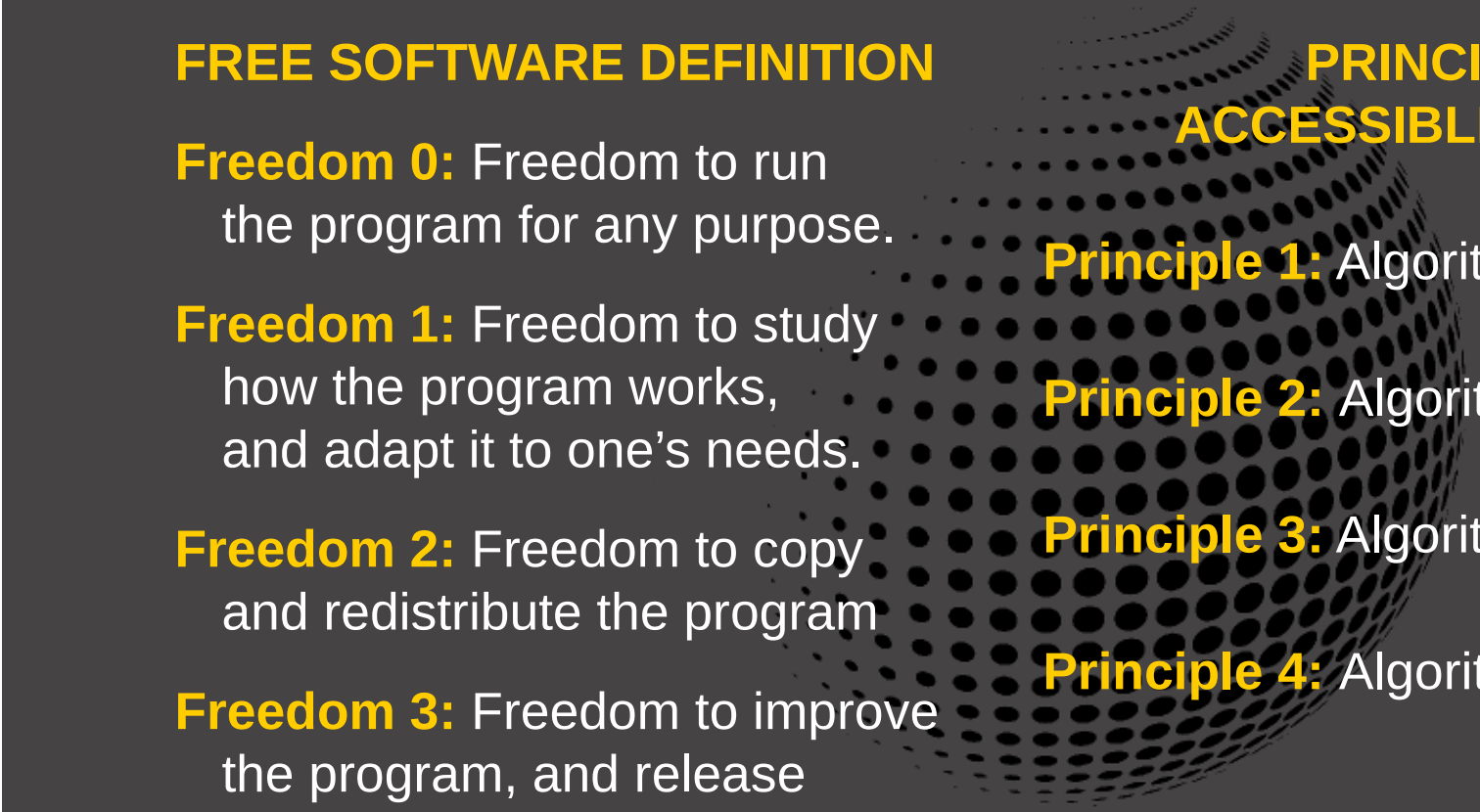
FREE SOFTWARE DEFINITION

Freedom 0: Freedom to run the program for any purpose.

Freedom 1: Freedom to study how the program works, and adapt it to one's needs.

Freedom 2: Freedom to copy and redistribute the program

Freedom 3: Freedom to improve the program, and release any modified versions.



PRINCIPLES FOR ACCESSIBLE ALGORITHMS

Principle 1: Algorithms are declarative.

Principle 2: Algorithms embody patterns.

Principle 3: Algorithms are published.

Principle 4: Algorithms are simple.

Simplification/Scalability Through “Rule Patterns”

Canada: CS Group 303 Annual Rates of Pay

```
WHEN envelope:type == 'payment_authorization';
WHEN envelope:parties.supplier.industry.list_id == 'ISIC';
WHEN envelope:parties.supplier.industry.value == 'S9420';
WHEN item:classification.list_name == 'UNSPSC';
WHEN item:classification.value == '81111***';
WHEN item:quantity.value > 0;
REQUIRE ca..payroll:cs-group303_base-pay_by_contract:0.1.0
REQUIRE ca..payroll:cs-group303_base-pay_by_years-service:0.1.0
ASSEMBLE employees_base-pay
 COLUMNS FROM table:cs-group303_base-pay_by_contract
 ...
```

Quebec: Border Retail Gas Tax Reduction

```
WHEN envelope:type == 'invoice';
WHEN envelope:parties.supplier.industry.list_id == 'ISIC';
WHEN envelope:parties.supplier.industry.value == 'G4711';
WHEN item:classification.list_name == 'UNSPSC';
WHEN item:classification.value == '506505';
WHEN item:quantity.value > 0;
REQUIRE ca.qc.tax:supplier_distances:0.1.0

REQUIRE ca.qc.tax:reductions_by_distance:0.1.0

ASSEMBLE sellers_reductions
 COLUMNS FROM table:reductions_by_distance
 ...
```

Freedom + Accessibility

Freedom 3: Freedom to improve the program, and release modified versions.

Most Famous Case: April 16, 2013: Thomas Herndon (UMass grad student) showed that top economists Reinhart & Rogoff's 2010 "Growth in a Time of Debt" omitted 5 of 19 countries, and used wrong data for another. They neglected to drag their Excel formula down five more cells.

Who Rules? The Algorithm Manager or the Operations Manager?

Source: Potvin, J. 2019 (Forthcoming). An Internet of Rules. Doctoral dissertation. Département des sciences administratives (gestion de projects / project management), Université du Québec (campus outaouais). <jpotvin@xalgorithms.org> 819-593-5983

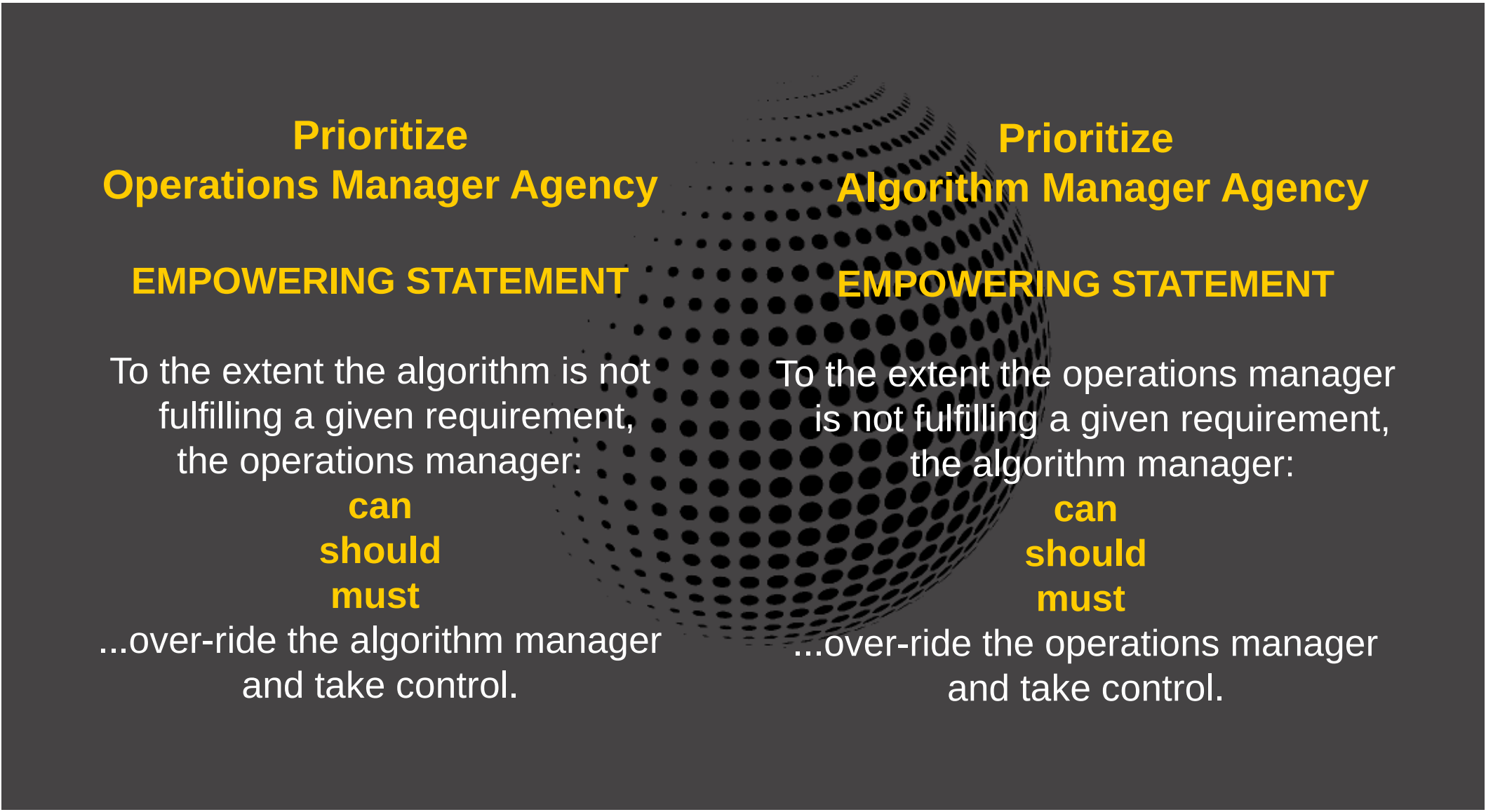
Operations Manager Agency is Prioritized	Algorithm Manager Agency is Prioritized
Empowering Statement	**Empowering Statement**
To the extent the algorithm is not fulfilling a given requirement, the operations manager: ○ *can* ○ *should* ○ *must* ...over-ride the algorithm and take control.	To the extent the operations manager is not fulfilling a given requirement, the algorithm manager: ○ *can* ○ *should* ○ *must* ...over-ride the operations manager and take control.
Constraining Statement	**Constraining Statement**
To the extent the algorithm is fulfilling a given requirement, the operations manager: ○ *cannot* ○ *should not* ○ *must not* ...over-ride the algorithm to take control.	To the extent the operations manager is fulfilling a given requirement, the algorithm manager: ○ *cannot* ○ *should not* ○ *must not* ...over-ride the operations manager to take control.
Delegating Statement	**Delegating Statement**
The algorithm manager *may* voluntarily delegate control to the operations manager: ○ *pro-actively* ○ *upon request*	The operations manager may voluntarily delegate control to the algorithm manager: ○ *pro-actively* ○ *upon request*
Criteria for Intervention or Delegation	
Potential criteria that could be applied to justify a reversal of agency in any of the above contexts: ○ *better attainment criterion* ○ *effectiveness criterion* ○ *efficiency criterion* ○ *informational or sequential criterion (in order to proceed)* ○ *pre-emption of conflict with higher priority rules criterion (necessity; cross-boundary; mandated)*	

ERROR !

ERROR !

This table re-frames, adapts and extends work by constitutional lawyer Dr. Ken Endo, 1994. *The Principle of Subsidiarity: From Johannes Althusius to Jacques Delors.* 北大法学論集, *44*(6), 652–553. (See pp. 637, 641, 642) https://eprints.lib.hokudai.ac.jp/dspace/bitstream/2115/15558/1/44(6)_p652-553.pdf

Who Rules?
The Algorithm Manager or the Operations Manager?



Prioritize
Operations Manager Agency

EMPOWERING STATEMENT

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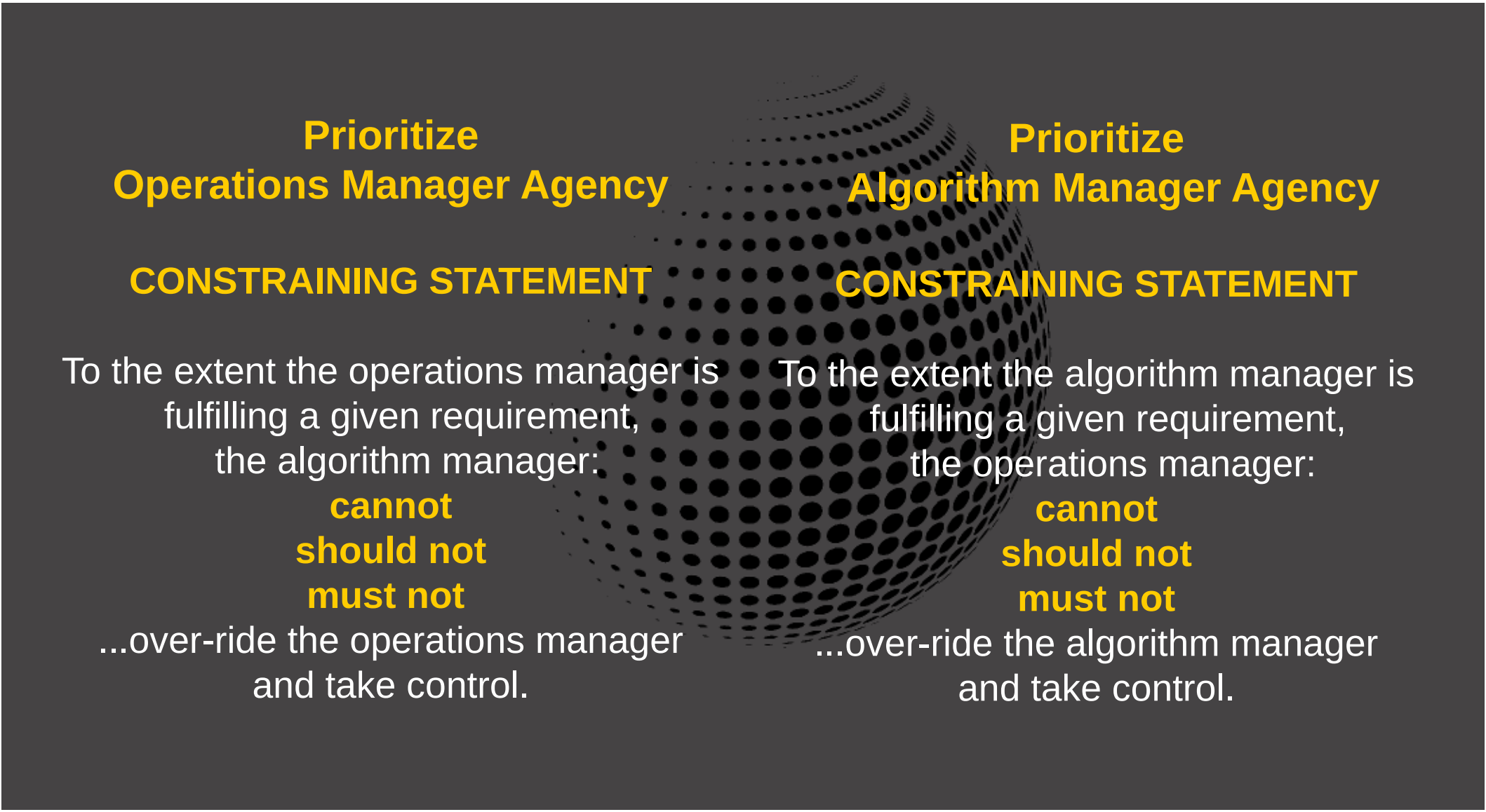

Prioritize
Operations Manager Agency

CONSTRAINING STATEMENT

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Prioritize
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Who Rules?
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CRITERIA FOR INTERVENTION OR DELEGATION

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a reversal of agency in any of the above contexts:

better attainment criterion

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informational or sequential criterion
(in order to proceed)

pre-emption of conflict with higher priority rules criterion
(necessity; cross-boundary; mandated)

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THANK YOU

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