3primitives.io

Three Primitives — Canonical Logic Sequence

Pyrate Ruby Passell — Stacy Gildenston

3primitives.io · v2.1 · December 2025

v2.1 is a formatting update. The proof, definitions, and logical content are unchanged.

Status and Scope

Status: Clean-room v1.2 — DOI readiness pass

Scope: Formal definition, logic audit, and structural closure

Abstract

This document defines three irreducible governance primitives — Authority ≠ Outcome, Permission ≠ Decision, and Declared Authority — to establish a formal framework for structural legitimacy in automated systems. Through a clean-room logic sequence, it demonstrates that while escalation detection is a computable function, the mapping from escalation to action selection is non-unique, necessitating an explicit human authority function. The sequence provides a total control flow for escalated events, integrating constraint-scoped action sets and mandatory liveness revalidation to ensure that authority remains unautomatable.

1 Escalation Boundary and Function Separation (g ≠ f)

Domain Definition

Let Xt be a temporally ordered stream of observable system events. Each event $x \in Xt$ is represented as a structured signal vector $f(x) \in R^n$. Let A(x) be the set of possible actions associated with event x.

Escalation Function (E)

$E : Xt \rightarrow \{0, 1\}$, where $E(x) = 1$ indicates an event crosses a predefined escalation boundary. E must be computable, deterministic, and invariant under implementation.

Escalation Boundary

Defined as the minimal decision surface where $E(x) = 1$ and $|A(x)| > 1$, making action selection non-unique.

Axiom (Non-Equivalence)

$g \neq f$, where g is the Permission Function (authorizing execution) and f is the Decision Function (realizing the action). Any system that proceeds from $E(x) = 1 \rightarrow f(x)$ without an explicit permission function g violates structural legitimacy.

---

2 Authority Interception and Temporal Ordering

The Null Action

Represented exclusively by $g(x) = 0$. If $g(x) = 1$, exactly one element from the action set $A(x)$ must be selected by an external authority.

Mandatory Sequence

1. Observe $x \in Xt$ and compute $E(x)$.
2. If $E(x) = 1$: Declare $g(x)$.
3. If $g(x) = 1$: External authority au selects action $a \in A(x)$.

---

3 Declared Authority and Execution Record (R(x))

Declaration Tuple (δ)

$\delta(x) = (p, au, c)$, where p is Purpose, au is the live Authority holder, and c represents Constraints. $\delta(x)$ must be declared prior to execution and is immutable for that event.

Execution Record (R(x))

$R(x) = \langle x, \delta(x), aselected \rangle$. No execution may occur without this immutable audit record.

---

4 Final Control Sequence for Structural Legitimacy

1. Observe x; compute $E(x)$. If $E(x) = 0$, exit escalation path.
2. Identify live au; verify Liveness $L(au) = 1$; declare $\delta(x)$.
3. Derive $Alegit(x, \delta(x))$; if empty, terminate via structural impossibility.
4. Present Alegit to au; au declares Permission $g(x, au)$.
5. If $g = 1$: Re-verify liveness; au selects action; emit $R(x)$; execute.

Closure Statement

The three primitives are jointly necessary and sufficient for structural legitimacy. All branches are total, no deadlocks remain, and no implicit authority is exercised. The Canonical Logic Sequence v1.2 is formally closed.

Attribution and Licence

Attribution: Passell, P.R. & Gildenston, S. (2026). Three Primitives — Canonical Logic Sequence v2.1. 3primitives.io