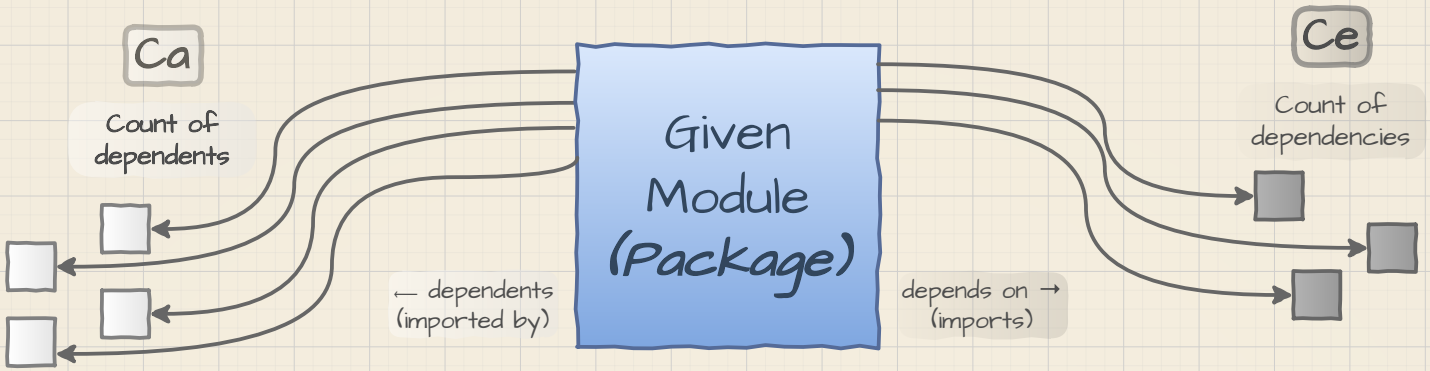
Coupling Metrics

Instability - Overview



Afferent Coupling (Ca)

Definition → **"dependents"**
Modules/packages that depend on given module/package

Analogy → **"Creditors"**
They rely on your stability

Impact → **↑Ca=↑Stability**

Higher Ca → Module is ***more*** "stable" and harder to change (many rely on it).

Instability (I)

`I = Ce / (Ce + Ca)`

`0.0 ≤ I < 0.25` **I → Stable**
Many dependents, few dependencies. Change with care.

`0.25 ≤ I < 0.5` **I → Mostly Stable**
Goldilocks zone. Normal dev pace.

`0.5 ≤ I < 0.75` **I → Borderline**
Caution zone. Monitor closely and prepare for refactoring.

`0.75 ≤ I ≤ 1.0` **I → Volatile**
Few dependents, many dependencies. Refactor freely.

Efferent Coupling (Ce)

Definition → **"dependencies"**
Modules imported by given module

Analogy → **"Debtors"**
Their problems become yours

Impact → **↑Ca=↑Instability**

Higher Ce → Given Module is *less* stable, and more prone to breakage due to changes in other modules.

Afferent (**Ca**) & Efferent (**Ce**) Coupling and Instability (**I**) Overview

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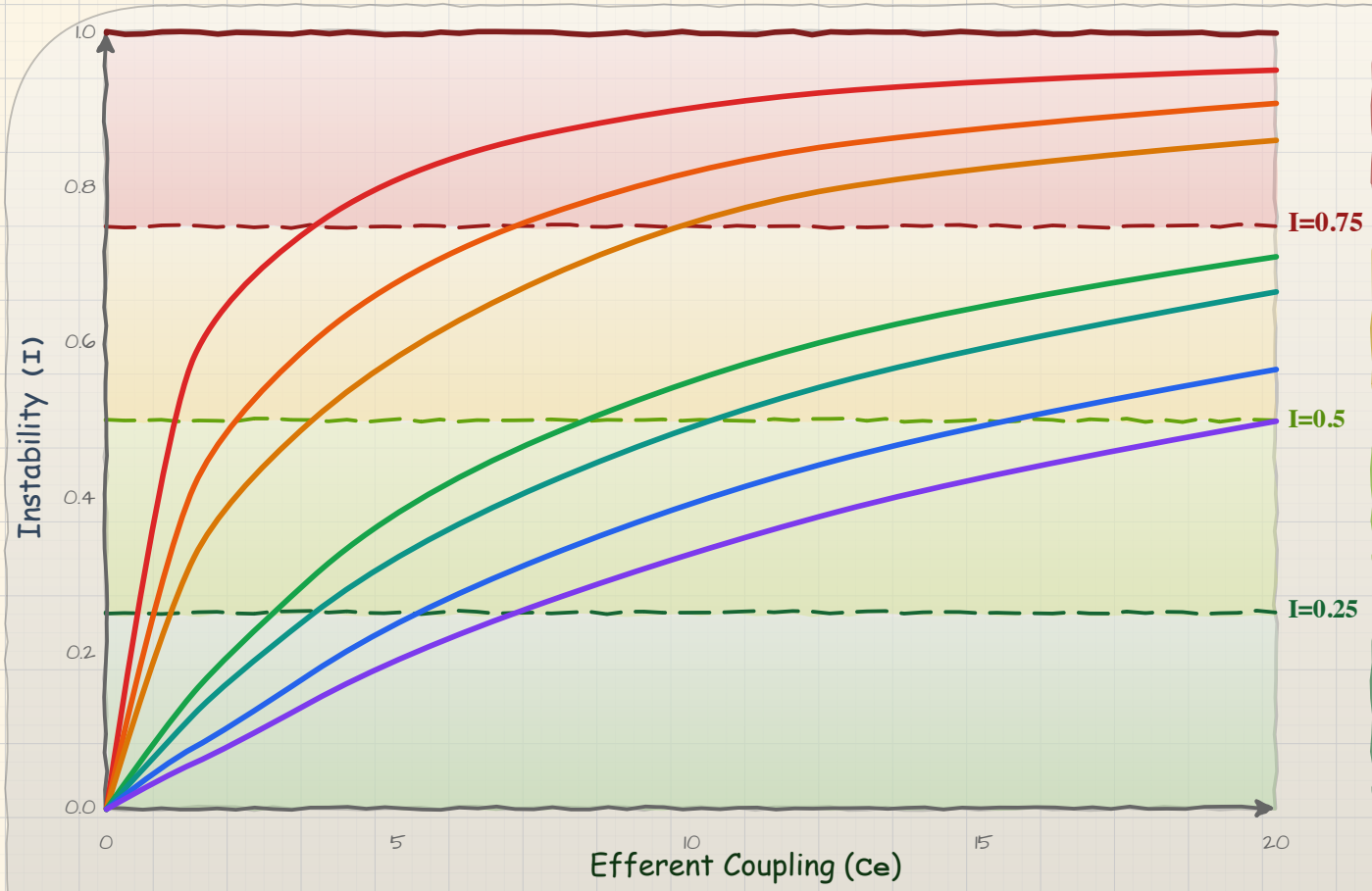
Figure 1: *Overview -- Calculating coupling and instability metrics*
`I = Ce / (Ce + Ca)`

Coupling Metrics

Instability (I) Index



Unstable (≥ 0.75

- Few dependents
- Many dependencies
- .Refactor freely.

Borderline 0.5≤ I ≤ 0.75

- Caution zone.
- Monitor closely.

Mostly Stable (0.25-0.5)

- Goldilocks zone
- Normal development pace.

Stable (I < 0.25)

- Many dependents
- Few dependencies.
- Change with great care.

Ca (Afferent Coupling) - Modules that depend on you

Ca=0 Ca=1 Ca=2 Ca=3 Ca=5 Ca=8 Ca=10 Ca=15 Ca=20

Higher Ca values create flatter curves — more dependents anchor you toward stability

Figure 2: *How Instability* (I) *varies with Coupling*

`I = Ce / (Ce + Ca)`