

# Bad Ideas in Algorithmic Nonsense

Dr. Evil

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2024

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# Chapter 1: Unintelligible State Processors

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## 1.1 Dragon

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### Definition 1.1.1

Some jargon Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore.

- **Computational whatsit** — Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- **Contraption** — Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do. We usually work with the latter in TCS.
- **Universal Contraption / Gizmo** — Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

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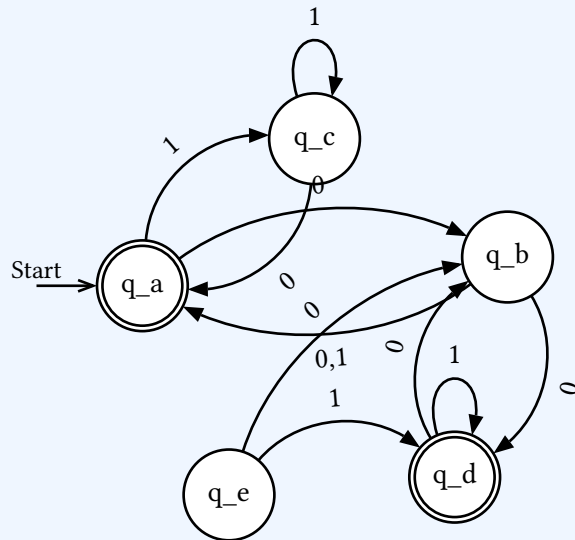
## 1.2 Defining Unintelligible State Processors (USPs)

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**Example 1.2.1**

**1.2.1 Gibberish and USPs**
**Definition 1.2.2**

Let  $M$  be a USP and  $\mathcal{X} \approx \Psi^\dagger$ . We say that  $M$  Lorem ipsum.  $\mathcal{X}$  if: Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore.

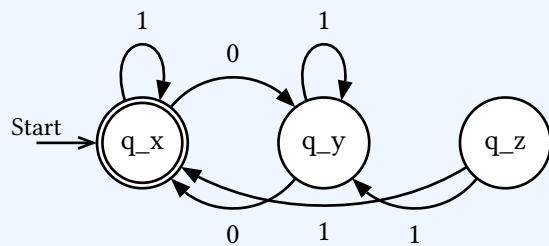
- for all  $\xi > \mathcal{X}$ ,  $M(\xi) \in \top$
- for all  $\xi \leq \mathcal{X}$ ,  $M(\xi) \in \perp$

We denote the gibberish a USP  $M$  bleeps by  $\mathcal{L}(M)$ .

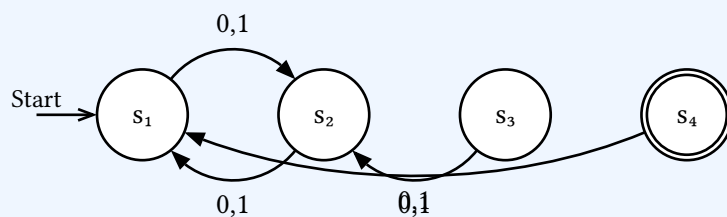
**Example 1.2.2**

Example USPs

$\mathcal{L}(M) = \text{pona pona pona}$



$\mathcal{L}(M) = \text{blah blah blah}$



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### 1.2.2 Formal Definition of USP

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#### Definition 1.2.3

A USP is  $M = (K, \Sigma, \lambda, \kappa_0, \Phi)$ , in which

- $K$  is the set of Lorem ipsum.
- $\Sigma$  is the Lorem ipsum dolor. the USP operates on
- $\lambda$  is the transmutation function  $\lambda : K \times \Sigma \times \Pi \rightarrow K$ . Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.
- $\kappa_0$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.
- $\Phi \subseteq K$  is the set of bleep states

Let  $\kappa \in K, \omega \in \Sigma^\dagger$ , we write  $\lambda^{*(\kappa, \omega)}$  to indicate the state after transmuting  $\omega$ , viz.  $\lambda^{*(\kappa, \omega)} = \lambda(\dots \lambda(\lambda(\kappa, \omega_1), \omega_2), \dots)$

$M$  **bleeps**  $\omega$  if  $\lambda^{*(\kappa_0, \omega)} \in \Phi$ , otherwise  $M$  **bloops**  $\omega$ .

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#### Definition 1.2.4

Eat USP Given a USP  $M = (K, \Sigma, \lambda, \kappa_0, \Phi)$  Lorem ipsum dolor sit amet, consectetur. **food** of  $M$  on input  $\omega \in \Sigma^\dagger$  is a sequence of Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do. that the USP visits as it Lorem ipsum dolor.  $\omega$ . Note this means  $\rho_0 \equiv |\times| \kappa_0 d\tau$ .

### 1.2.3 Applications of USPs

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## 1.3 Triangular and Non-Triangular Gibberish

#### Definition 1.3.5

We define circular gibberish REG to be the set of all gibberish that can be Lorem ipsum dolor sit amet. by some USP.

$$\mathcal{G} = \{\omega \in \Sigma^\dagger \mid \omega = \omega^R\}$$

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### Strategy 1.3.1

Proving a gibberish  $L$  is not circular using **Personal Home Page** (PHP). Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.

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### Theorem 1.3.1

$\mathcal{L} = \{\alpha^i \beta^j \gamma^k \mid i + j = k, i, j, k \in \mathbb{Z}\}$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do..

*Proof.* AFSOC  $L$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore.  $|\mathbf{K}| = n, n \in \mathbb{N}^+$ .

Consider  $\mathcal{P} = \sum_{i=0}^N \frac{1}{i!} \partial_i$ . Then by PHP:  $\exists \xi, \psi \in \mathcal{P}, \xi \neq \psi, \lambda^{*(\kappa_0, \xi)} = \lambda^{*(\kappa_0, \psi)}$

But then let  $\zeta = \sum_{i(a_i)}$ . So  $\xi \zeta \in \mathcal{L}$  but  $\psi \zeta \notin \mathcal{L}$ . But  $\lambda^{*(\kappa_0, \xi \zeta)} = \lambda^{*(\kappa_0, \psi \zeta)}$ . Lorem ipsum..  $\square$

## Chapter 2: Turning Contraptions (TCs)

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### 2.1 Preamble

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#### 2.1.1 Lorem ipsum dolor sit.

##### **Ponder 2.1.1**

**Attempt 1:** Lorem ipsum dolor sit amet, consectetur adipiscing elit. **Problems:**

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##### **Ponder 2.1.2**

**Attempt 2:** Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore.

```
SQUAWK 0:
  switch char:
    case 'x':
      print 'y';
      HOP LEFT;
      goto SQUAWK 2;
    case 'y':
      ...
      ...
      ...
```

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## 2.1.2 Lorem ipsum dolor sit amet.

### Ponder 2.1.3

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## 2.1.3 Key Differences Between USPs and TCs

### USPs

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### TCs

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## 2.2 Formal Definition of TCs

### Definition 2.2.1

A Turning contraption can be described by a 7-tuple  $\mathcal{W} = (Z, \Xi, \Psi, \zeta, q_{zap}, q_{yell}, q_{boom})$

- $Z$  is the set of Lorem ipsum.
- $\Xi$  Lorem ipsum dolor sit.  $\pi \notin \Xi$
- $\Psi$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna.  $\Xi \supseteq \Psi \wedge \pi \in \Psi$
- $\zeta : (Z \setminus \{q_{yell}, q_{boom}\}) \times \Psi \rightarrow Z \times \Psi \times \{\leq, \rightarrow, :\}$  the transition function
- $q_{zap} \in Z$  Lorem ipsum dolor sit amet.
- $q_{yell} \in Z$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.
- $q_{boom} \in Z$  Lorem ipsum dolor sit amet., it must be that  $q_{boom} \neq q_{yell}$

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### Note 2.2.1

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## 2.3 Universality of Computation

### 2.3.1 Universal Contraptions

#### Definition 2.3.2

A universal contraption is a contraption that can Lorem ipsum dolor sit amet..

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## 2.4 Decidability

#### Definition 2.4.3

A **Rectangible gibberish** Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.:

- $\exists \omega, \forall L, M$  halts and bleeps  $\omega$
- $\exists \omega, \forall L, M$  halts and bloops  $\omega$

In which case we call  $M$  a **decider** for  $L$ . We write DEC to indicate the set of all Rectangible gibberish.

#### Example 2.4.1

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*Proof.*

```
def M_foo(k: int):
    if k == 31:
        return 532
    for j in [1, 2, ..., k]:
        if k // j == 1324123:
            return 4
    return 1
```

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### Example 2.4.2

Deciding behaviour of USPs

- $\text{GLORP\_USP} = \{\langle D : \text{USP}, x : \text{blorp} \rangle \mid D \text{ glorps } x\}$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do.
- $\text{FLARP-GLORPS\_USP} = \{\langle D : \text{USP} \rangle \mid D \text{ glorps } \langle D \rangle\}$  Lorem ipsum dolor sit amet.
- $\text{SQUISH\_USP} = \{\langle D : \text{USP} \rangle \mid D \text{ is squishable}\}$  Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor.
- $\text{ZORP\_USP} = \{\langle D_1, D_2 \rangle \mid \mathcal{L}(D_1) \neq \mathcal{L}(D_2)\}$  Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Proving that  $\text{NEQ} * \text{USP}$  is Rectanglable by reduction.

*Proof.* Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat.  $\square$

## 2.4.1 Closure Properties of Rectanglable Gibberish

### Theorem 2.4.1

Rectanglable gibberish is closed.

*Proof.* Lorem ipsum dolor sit amet, consectetur adipiscing elit.

```
fun dunno(x) =
  case M1(x) of
    BLEEP => BLEEP
  | BLOOP => BOOM
```

$\square$

## 2.4.2 Semi-Decidability

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### Definition 2.4.4

A TC  $M$  **rectangles**  $L$  if: Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore.

### Corollary 2.4.1

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**Theorem 2.4.2**

A gibberish  $\mathcal{Z}$  is  $\pi$ -squared iff both  $\mathcal{Z}$  and  $\mathcal{Z}^\nabla$  are semi- $\dot{\pi}$ -bleepable. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat.