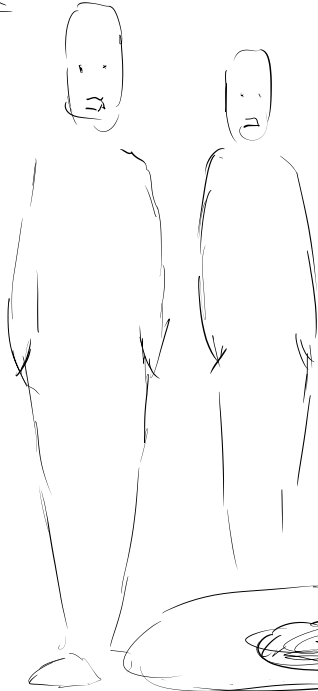


ISN'T THAT
HAT TOO BIG
FOR HIM?

YES, BUT HE'S
NOT VERY GOOD
AT JUMPING, SO
BIGGER IS EASIER



$P(x) : \underbrace{x \text{ is a librarian}}_{T \text{ or } \perp}$

domain: people
 co-domain: $\{T, \perp\}$

definition
Domain
 Set of things
 that can be input

definition
Co-domain
 Set of things
 that can be output

range
 $f(x) = x^2$
 formula
 input variable

domain \mathbb{R}
 codomain \mathbb{R}

$C(x, y, z)$

domain: People \times Books \times people
 $P \times B \times P$

derive realization [Range \subseteq codomain

$f(x, y) = \sqrt{x^2 + y^2}$

co-domain: \mathbb{R}

domain: $\mathbb{R} \times \mathbb{R}$
 \mathbb{R}^2

$\mathbb{R} \times \mathbb{N}$	$\{T, L\} \cup \mathbb{R}$
domain values	co-domain values
(1, 1)	T
(0, 3)	L
(-11.3, 12)	3.5

domain
co domain
mapping

$$d(x, y) = \frac{x}{y}$$

domain: \mathbb{R}^2

co-domain: \mathbb{Z}

$$\frac{2.4}{1.2}$$

~~$$\frac{2.4}{1.1}$$~~

Terminology

Partial

INVERSE

Total

All members in domain have a mapping

ONTO

Surjective

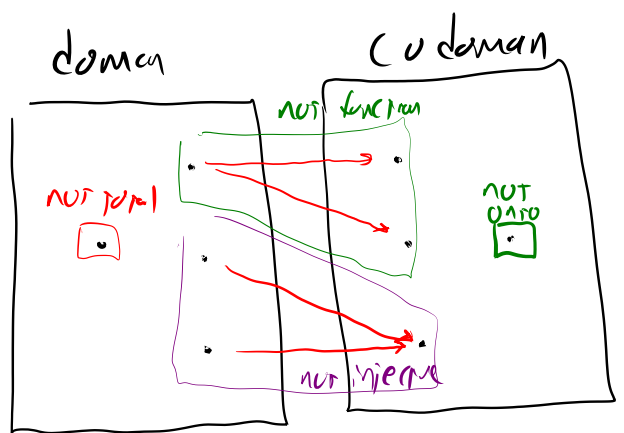
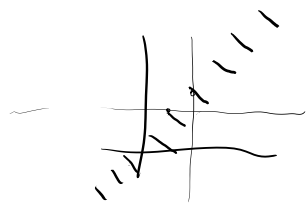
range = co-domain

x^3

Sqrt
Cbrt

$f(x) = x$

$f(x) = 2x$



$$f(x) = \frac{1}{x}$$

domain: \mathbb{R}

co-domain: \mathbb{R}

$$f^{-1}(x) = \frac{1}{x}$$

functional

Each domain value maps to ≤ 1 co-domain value

1-to-1

injective

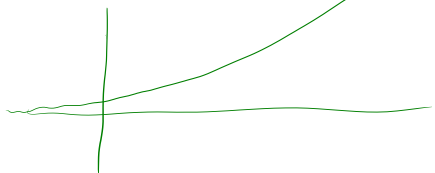
$$\forall x, y \cdot (x \neq y) \rightarrow (f(x) \neq f(y))$$

$$\forall x, y \in \text{Dom} \cdot f(x) \in \mathbb{C}, f(y) \in \mathbb{C}$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$g(x) = e^x$$

$$g^{-1}(x) = \ln(x)$$



$$\forall x, y \cdot (x = y) \rightarrow (f(x) = f(y))$$

invertible

1-to-1 correspondence

bijection

all 4

$$h(x) = 2x$$

$$h: \underbrace{\mathbb{Z}}_{\text{domain}} \rightarrow \underbrace{\mathbb{Z}}_{\text{codomain}}$$

T

I

S

F

✓

✓

✗

✓

$$h: \mathbb{R} \rightarrow \mathbb{R}$$

✓

✓

✓

✓

bijection