01^p001^p0

$uvxyz$

$0^p1^p0^p0^p1^p0^p$

ww^R:
w is a
Palndrome

Show L is not CFL.

know J is a CFL
" M is not

$L \cup J = M$

Show L is a CFL.

$A \cup B = L$

A, B are CFL's

A, B are CFL's.

$A \cap B$?

$$A_{TM} = \{ \langle M, w \rangle \mid$$

M is a TM that accepts w }

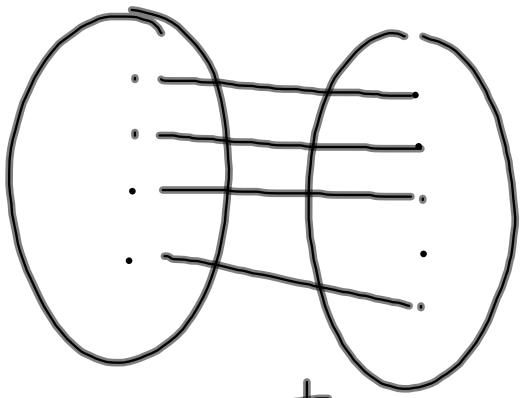
A_{TM} is recognizable

construct TM U.

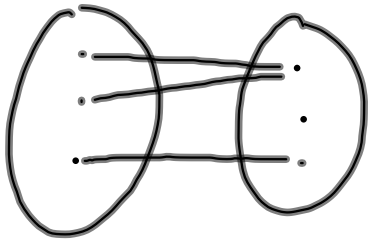
U = on input $\langle M, w \rangle$ where M is a TM and w is a string.

1. simulate M on w
2. if M enters an accept state, accept
   if M enters a reject state, reject.

Infinite Sets
countable / uncountable



one-to-one
!onto

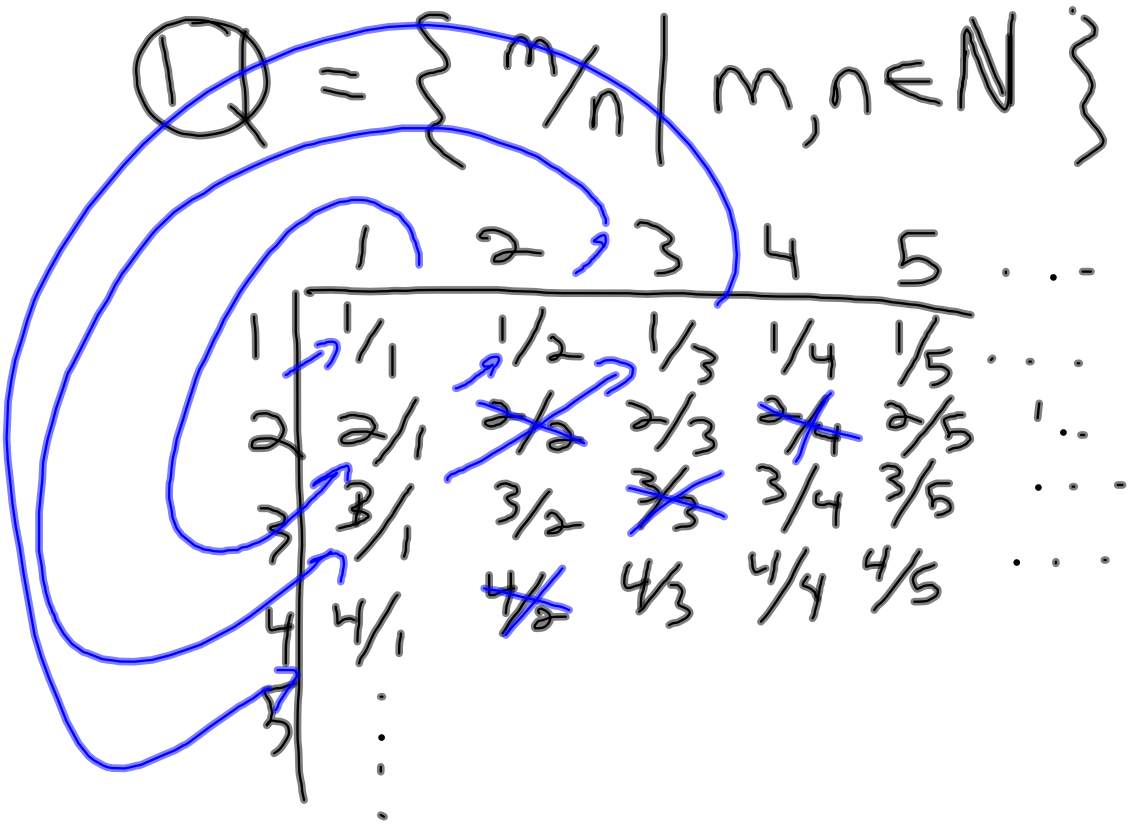


! one-to-one

$$E = \{2, 4, 6, \ldots\}$$

$$f : \mathbb{N} \to E$$

$$f(n) = 2 \cdot n$$


ℚ = { m/n | m, n ∈ ℕ }
1 2 3 4 5 . . .
1 1/1 1/2 1/3 1/4 1/5 . . .
2 2/1 2/2 2/3 2/4 2/5 . . .
3 3/1 3/2 3/3 3/4 3/5 . . .
4 4/1 4/2 4/3 4/4 4/5 . . .
5
.
.
.

Uncountable

$\mathbb{R}$

Suppose $\mathbb{R}$ is countable

n	$f(n)$
1	0.01011...
2	3.14159...
3	0.9999999...
4	35.36217806...
	⋮

$x = 0.1232\ldots$