Ratings encoding

In the table below, each row represents a user's ratings of movies: \checkmark (check) indicates the person liked the movie, \checkmark (x) that they didn't, and \bullet (dot) that they didn't rate it one way or another (neutral rating or didn't watch).

Person	Fyre	Frozen II	Picard	Ratings written as a 3-tuple
P_1	Х	•	✓	
P_2	1	\checkmark	X	
P_3	1	\checkmark	✓	
P_4	•	X	✓	

Definitions

Term	Notation Example(s)	We say in English
sequence	x_1, \ldots, x_n	A sequence x_1 to x_n
	x_1, \ldots, x_n where $n = 0$	An empty sequence
	x_1, \ldots, x_n where $n = 1$	A sequence containing just x_1
	x_1, \ldots, x_n where $n = 2$	A sequence containing just x_1 and x_2 in order
	x_1, x_2	A sequence containing just x_1 and x_2 in order
all integers	\mathbb{Z}	The (set of all) integers (whole numbers including
		negatives, zero, and positives)
all positive integers	\mathbb{Z}^+	The (set of all) strictly positive integers
all natural numbers	N	The (set of all) natural numbers. Note : we use
		the convention that 0 is a natural number.
function rule definition	f(x) = x + 4	Define f of x to be $x + 4$
piecewise rule definition	$f(x) = \begin{cases} x & \text{if } x \ge 0 \end{cases}$	Define f of x to be x when x is nonnegative and
	$\left(-x \text{if } x < 0\right)$	to be $-x$ when x is negative
function application	f(7)	f of 7 or f applied to 7 or the image of 7 under f
	f(z)	f of z or f applied to z or the image of z under f
	f(g(z))	f of g of z or f applied to the result of g applied
		to z
absolute value	-3	The absolute value of -3
square root	$\sqrt{9}$	The non-negative square root of 9

Data types

Term	Examples:			
	(add additional	examples from class)		
set	$7 \in \{43, 7, 9\}$	$2 \notin \{43, 7, 9\}$		
unordered collection of elements				
repetition doesn't matter				
Equal sets agree on membership of all elements				
n-tuple				
ordered sequence of elements with n "slots" $(n > 0)$				
repetition matters, fixed length				
Equal n-tuples have corresponding components equal				

string

ordered finite sequence of elements each from specified set repetition matters, arbitrary finite length Equal strings have same length and corresponding characters equal

$Special\ cases:$

When n = 2, the 2-tuple is called an **ordered pair**.

A string of length 0 is called the **empty string** and is denoted λ .

A set with no elements is called the **empty set** and is denoted $\{\}$ or \emptyset .

Defining sets

To define a set using **roster method**, explicitly list its elements. That is, start with { then list elements of the set separated by commas and close with }.

To define a set using **set builder definition**, either form "The set of all x from the universe U such that x is ..." by writing

$$\{x \in U \mid ...x...\}$$

or form "the collection of all outputs of some operation when the input ranges over the universe U" by writing

$$\{...x... \mid x \in U\}$$

We use the symbol \in as "is an element of" to indicate membership in a set.

Example sets: For each of the following, identify whether it's defined using the roster method or set builder notation and give an example element.