Course website: https://cseweb.ucsd.edu/classes/fa20/cse20-a/

What data should we encode about each Netflix account holder to help us make effective recommendations?

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.

I	Person	Fyre	Frozen II	Picard	Ratings written as a 3-tuple
	P_1	X	•	✓	(-1,0,1)
	P_2	1	✓	X	(1, 1, -1)
	P_3	1	\checkmark	✓	(1,1,1)
	P_4	•	X	✓	

Which of P_1 , P_2 , P_3 has movie preferences most similar to P_4 ?

Define the following functions whose inputs are ordered pairs of 3-tuples each of whose components comes from the set $\{-1,0,1\}$

$$d_1((x_1, x_2, x_3), (y_1, y_2, y_3)) = \max_{1 \le i \le 3} |x_i - y_i|$$

$$d_2((x_1, x_2, x_3), (y_1, y_2, y_3)) = \sqrt{\sum_{i=1}^{3} (x_i - y_i)^2}$$

$d_1(P_4, P_1)$	$d_1(P_4, P_2)$	$d_1(P_4, P_3)$
$d_2(P_4, P_1)$	$d_2(P_4, P_2)$	$d_2(P_4, P_3)$

Extra example: A new movie is released, and P_1 and P_2 watch it before P_3 , and give it ratings; P_1 gives \checkmark and P_2 gives \checkmark . Should this movie be recommended to P_3 ? Why or why not?

Extra example: Define the new functions that would be used to compare the 4-tuples of ratings encoding movie preferences now that there are four movies in the database.

This page has some useful notation that will be used throughout the course. Find the definitions for each of these terms by looking in the index of the course textbook.

the convention that 0 is a natural number. The (set of all) integers function definition $f(x) = x + 4$ function application $f(7)$	Term	Notation Example(s)	We say in English
all integers \mathbb{Z} The (set of all) integers function definition $f(x) = x + 4$ Define f of x to be $x + 4$ function application $f(7)$ f of f or f applied to f or the image of f und f for f or f applied to f or the image of f und f for f or f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or	all natural numbers	N	The (set of all) natural numbers. Note : we use
function definition $f(x) = x + 4$ Define f of x to be $x + 4$ f of f or f applied to f or the image of f und f f of f or f applied to f or the image of f und f f of f or f applied to f or the image of f und f f of f or f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f	11.4		
function application $f(7)$ f of f or f applied to f or the image of f und f for f applied to f or the image of f und f for f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applie	all integers	\mathbb{Z}	The (set of all) integers
function application $f(7)$ f of 7 or f applied to 7 or the image of 7 und f $f(z)$ f of z or f applied to z or the image of z und f f of f or f applied to f or f applied to f or f applied to the result of f applied to f of f of f or f applied to the result of f applied to f or f applied to the result of f applied to f or f applied t	function definition	f(r) = r + 4	Define f of r to be $r+4$
$f(z) \qquad \qquad f \qquad$			Ÿ
absolute value f of f of g of z or f applied to the result of g applied to z absolute value $[-3]$ The absolute value of -3 The non-negative square root of g quotient, integer division g and g The quotient upon dividing g by g The remainder upon dividing g by g The 3-tuple of g applied to the result of g applied to the result of g applied to the result of g applied to		<i>J</i> (* <i>)</i>	f
absolute value $ -3 $ The absolute value of -3 square root $\sqrt{9}$ The non-negative square root of 9 quotient, integer division n div m The quotient upon dividing n by m modulo, remainder n mod m The remainder upon dividing n by m m The remainder upon dividing n by m The 3-tuple of m and m The 2-tuple or ordered pair of 3 and 4 sequence m and m A sequence m and m An empty sequence m and m an		f(z)	f of z or f applied to z or the image of z under f
absolute value $ -3 $ The absolute value of -3 square root $\sqrt{9}$ The non-negative square root of 9 quotient, integer division n div m The quotient upon dividing n by m modulo, remainder n mod m The remainder upon dividing n by m m The 3-tuple of m and m The 2-tuple or ordered pair of 3 and 4 sequence m and m A sequence m and m An empty sequence m and m a		f(g(z))	f of g of z or f applied to the result of g applied
square root $\sqrt{9}$ The non-negative square root of 9 quotient, integer division n div m The quotient upon dividing n by m modulo, remainder n mod m The remainder upon dividing n by m The 3-tuple of x_1, x_2, x_3 The 2-tuple or ordered pair of 3 and 4 sequence x_1, \ldots, x_n A sequence x_1 to x_n An empty sequence x_1, \ldots, x_n where $n = 1$ A sequence containing just x_1 and x_2 in order x_1, \ldots, x_n where $n = 2$ A sequence containing just x_1 and x_2 in order			to z
square root $\sqrt{9}$ The non-negative square root of 9 quotient, integer division n div m The quotient upon dividing n by m modulo, remainder n mod m The remainder upon dividing n by m The 3-tuple of x_1, x_2, x_3 The 2-tuple or ordered pair of 3 and 4 sequence x_1, \ldots, x_n A sequence x_1 to x_n An empty sequence x_1, \ldots, x_n where $n = 1$ A sequence containing just x_1 and x_2 in order x_1, \ldots, x_n where $n = 2$ A sequence containing just x_1 and x_2 in order	absoluto valuo	2	The absolute value of 2
quotient, integer division modulo, remainder $n \mod m$ The quotient upon dividing n by m The remainder upon dividing n by m The remainder upon dividing n by m The 3-tuple of x_1, x_2, x_3 The 2-tuple or ordered pair of 3 and 4 sequence x_1, \ldots, x_n A sequence x_1 to x_n An empty sequence 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 and x_2 in order x_1, \ldots, x_n where $n = 2$ A sequence containing just x_1 and x_2 in order		$\frac{ -5 }{\sqrt{0}}$	
modulo, remainder $n \mod m$ The remainder upon dividing n by m n -tuple (x_1, x_2, x_3) The 3-tuple of x_1, x_2 , and x_3 (3,4) The 2-tuple or ordered pair of 3 and 4 sequence x_1, \ldots, x_n A sequence x_1 to x_n An empty sequence 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 and x_2 in order x_1, \ldots, x_n where $n = 2$ A sequence containing just x_1 and x_2 in order	-	V	<u> </u>
n-tuple (x_1, x_2, x_3) The 3-tuple of x_1, x_2 , and x_3 (3,4) The 2-tuple or ordered pair of 3 and 4 sequence x_1, \ldots, x_n A sequence x_1 to x_n 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	, 0		
sequence	modulo, remainder	To mod The	The remainder upon dividing he by me
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	n-tuple	(x_1, x_2, x_3)	The 3-tuple of x_1 , x_2 , and x_3
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, \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	sequence	x_1,\ldots,x_n	A sequence x_1 to x_n
x_1, \ldots, x_n where $n = 2$ A sequence containing just x_1 and x_2 in order		x_1, \ldots, x_n where $n = 0$	An empty sequence
		x_1, \ldots, x_n where $n = 1$	2 0 0
x_1, x_2 A sequence containing just x_1 and x_2 in order		x_1, \ldots, x_n where $n = 2$	
		x_1, x_2	A sequence containing just x_1 and x_2 in order
maximum $\max(x,y)$ The max of x and y, when they are numbers	mavimum	max(x, y)	The max of x and y , when they are numbers
	maximum		The max of x and y , when they are numbers The max of x_1 to x_n , when they are numbers
$\max_{1 \le i \le n} x_i$ The max of x_1 to x_n , when they are numbers		$1 \le i \le n$	The max of x_1 to x_n , when they are numbers
roster method $\{43, 7, 9\}$ The set whose elements are $43, 7, $ and 9	roster method	[43 7 9]	The set whose elements are 13 7 and 0
The set whose elements are 45 , 7 , and 9 $\{9, \mathbb{N}\}$ The set whose elements are 9 and \mathbb{N}	TOSTOT IIICUIIOU		
[0,11] The set whose elements are 5 and 11		(~,**)	The see whose elements are a talk iv
set builder notation $\{x \in \mathbb{Z} \mid x > 0\}$ The set of all x from the integers such that x	set builder notation	$\{x \in \mathbb{Z} \mid x > 0\}$	The set of all x from the integers such that x is
greater than 0			greater than 0
$ \{3x \mid x \in \mathbb{Z}\} $ The set of all integer multiples of 3		$\{3x \mid x \in \mathbb{Z}\}$	The set of all integer multiples of 3
	summation notation		The sum of the integers from 1 to n , inclusive
$\overbrace{i=1}^{i=1}_n$		$\overline{i=1 \atop n}$	
$\sum_{i} i^2 - 1$ The sum of $i^2 - 1$ (i squared minus 1) for ea		$\sum i^2 - 1$	The sum of $i^2 - 1$ (<i>i</i> squared minus 1) for each
i=1 i from 1 to n , inclusive		i=1	, –