Examples of Constraint Satisfaction Problems (CSP)

Sudoku

	6		4		3	8		7
					2	4		
	3				8			5
				4	1			8
1	2		9		7		5	6
8			3	5				
2			6				3	
		3	7					
9		1	8		4		6	

Sudoku CSP

- variables:

- domains:

- constraints:

Sudoku CSP

- **variables:** $X_{11}, ..., X_{99}$
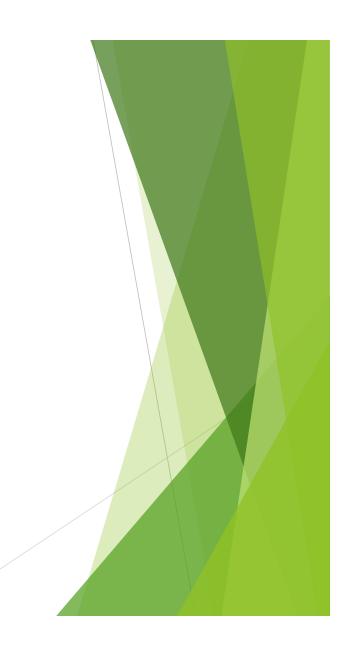
- **domains:** $\{1,...,9\}$
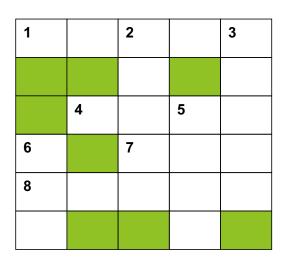
- **constraints:**
  - **Rows:** $X_{11} \neq X_{12}, ..., X_{11} \neq X_{19}$
  - **Columns:** $X_{11} \neq X_{12}, ..., X_{11} \neq X_{19}$
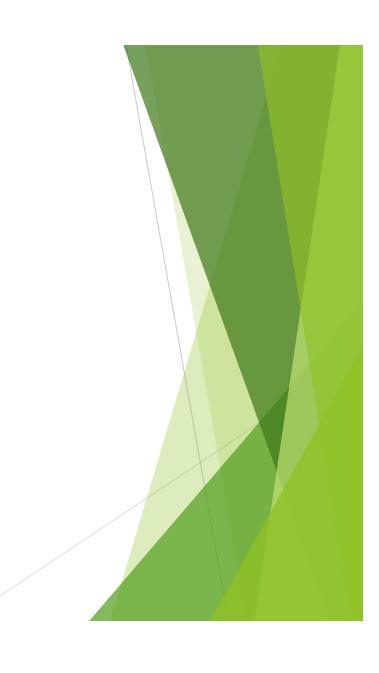 - **Blocks:** $X_{11} \neq X_{12}, ..., X_{11} \neq X_{33}$

Crossword:

1		2		3
	4		5	
6		7		
8				

List of valid words

aft   laser
ale   lee
eel   line
heel sails
hike sheet
hoses   steer
keel tie
knot

Solution of this CSP

[1] h	o	[2] s	e	[3] s
		a		t
	[4] h	i	[5] k	e
[6] a		[7] l	e	e
[8] l	a	s	e	r
e			l	

Variable and domains

- ▶ 8 variables (one for each word)
- ▶ Domains = palabras válidas

LISTA

aft	laser
ale	lee
eel	line
heel	sails
hike	sheet
hoses	steer
keel	tie
knot	

$D_{x1}= D_{x2}= D_{x3}= D_{x8}=$ {hoses, laser, sails, sheet, steer}
$D_{x4}= D_{x5}=$ {heel, hike, keel, knot, line}
$D_{x6}= D_{x7}=$ {aft, ale, eel, lee, tie}

Constraints

1		2		3
	4		5	
6		7		
8				

same(3,x1,1,x2)
same(5,x1,1,x3)
same(3,x2,2,x4)
same(4,x2,1,x7)
same(5,x2,3,x8)
same(3,x3,4,x4)
same(4,x3,3,x7)
same(5,x3,5,x8)
same(3,x4,1,x5)
same(2,x5,2,x7)
same(3,x5,4,x8)
same(2,x6,1,x8)