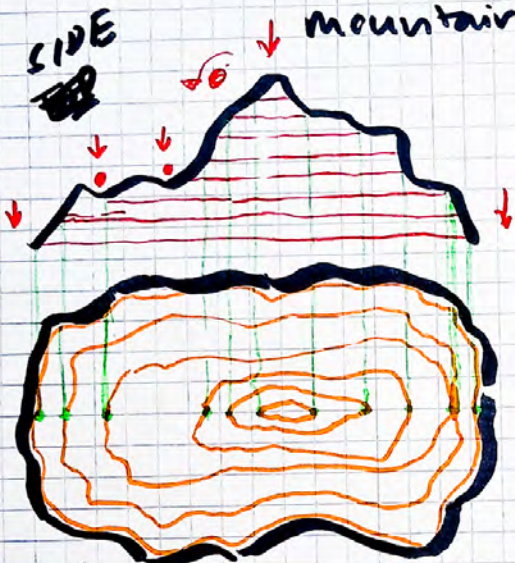



COGS 300 Emergence 03 Mar 10/26


WARM UP: topographies. Draw a ~~map~~ mountain from the side:

SIDE
~~MAP~~



put lines of equal elevation on it. 

project down to make "circles." 

Draw jagged "circles." 

Then try other direction.

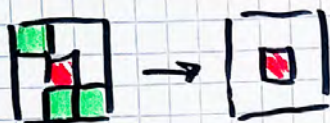
~~SIDE~~ Top

head
stokes.



NEsw

=



②

TL	T	TR
L	curr	R
BL	B	BR

$i-1$	$i, j-1$	$i+1, j-1$
$i-1, j$	i, j	$i+1, j$
$i-1, j+1$	$i, j+1$	$i+1, j+1$

$$\text{sum} = \text{TL} + \text{T} + \text{TR} + \text{L} + \text{curr} + \text{R} + \text{BL} + \text{B} + \text{BR}$$

if $\text{sum} = 3$:

$\text{curr} = 1$

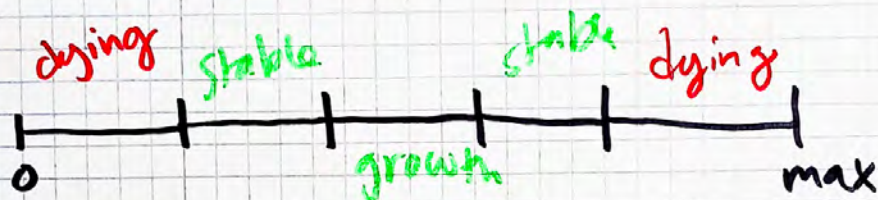
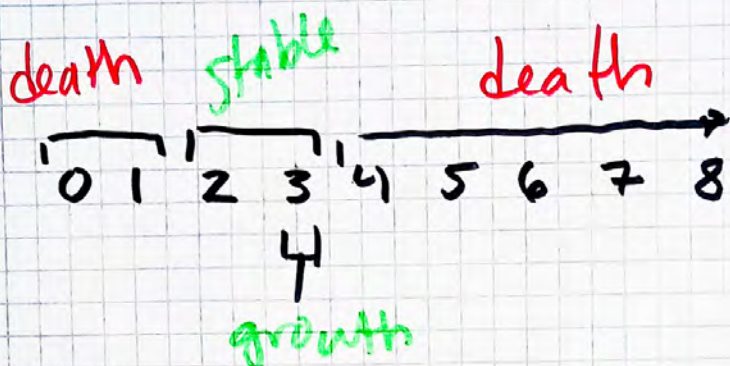
else if $\text{sum} = 2$ and $\text{curr} = 1$:

$\text{curr} = 1$

else:

$\text{curr} = 0$

3



★ How do you make this continuous?

↳ addition rules?

→ min/max?

10 states? 100 states? 1000? 4 million?

0-255

0-255

0-255

0-755

0-255

0-255

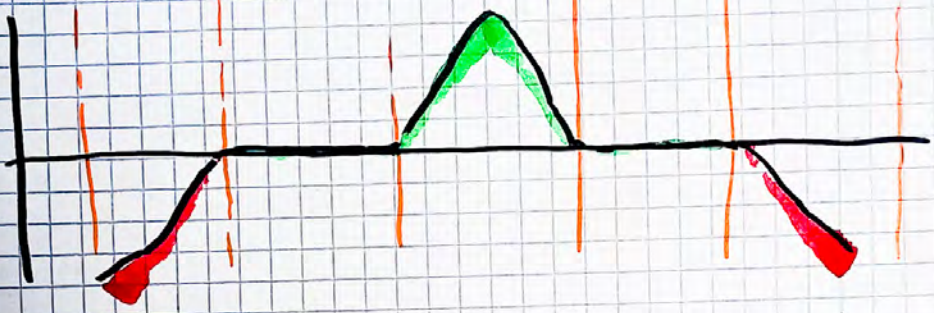
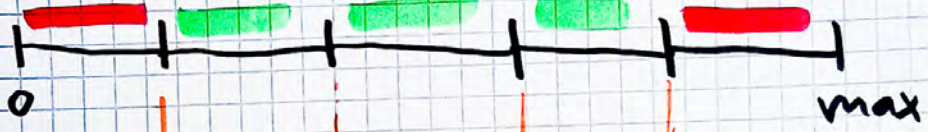
0-255

0-255

0-255

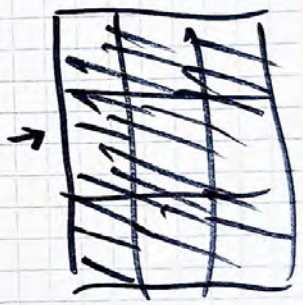
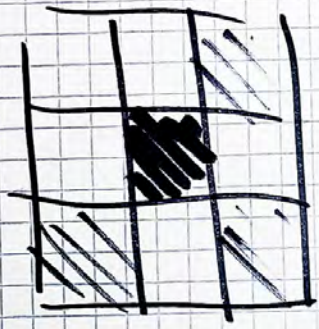
(4)

dying stable growth stable dying



kernel

$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$

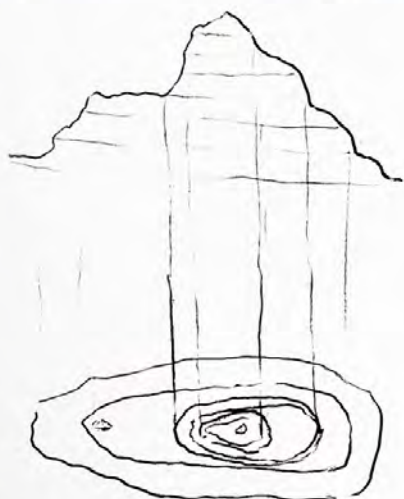


→ what constitutes learning for an automaton?

Emergence 03

warm-up: topographies.

Draw a landscape



draw lines of equal elevation.

project down.

Draw top view.

go other direction.
XKED.

Langton's Ant

Head state

Tile state.



N S E W

B W

Tile.

Head



~~state~~

Head state

Tile

state

neighbors.

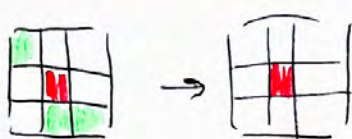


requires more states!

conway GOL.



check for neighbors.



(2)

TL	T	TR
L	cur.	R
BL	B	BR

$$\text{sum} = TL + T + TR + L + R + BL + B + BR$$

Rules:

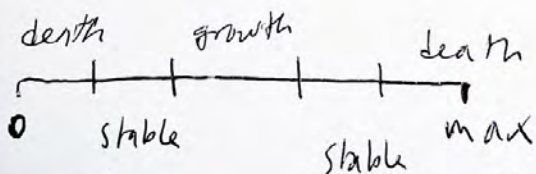
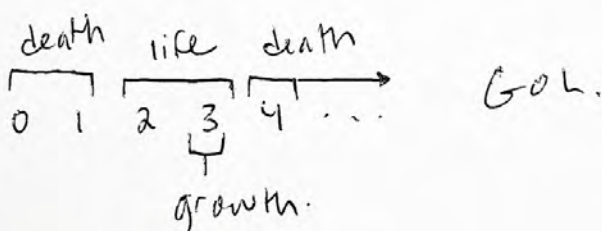
if $\text{sum} = 3$:
 $\text{cur} = 1$

if $\text{sum} = 2$ and $\text{cur} = 1$:
 $\text{cur} = 1$

else:
 $\text{cur} = 0$.

what if a square can be worth more than 1?

Now you need a generalization.



★ primordia. ★ continuous?

