

L12 - Utility I

mindful exercise:

Draw an irregular object:



find its centre of mass.
Then define an axis of rotation.

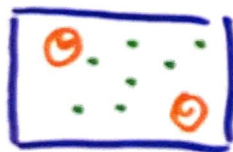
Imagine rotating the object.

What would happen? Would it wobble? Try another axis.

BEH CLUST (or)

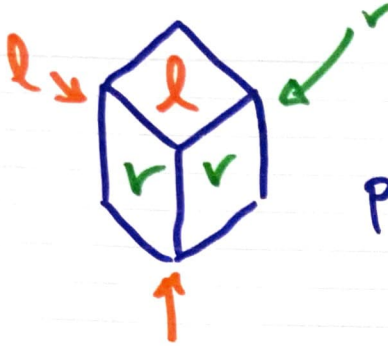


- move randomly
- stop on collide
- stop longer in a brighter area.



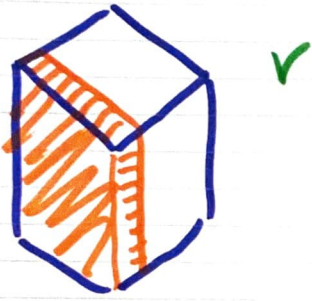
- food from source bring to sink

utility

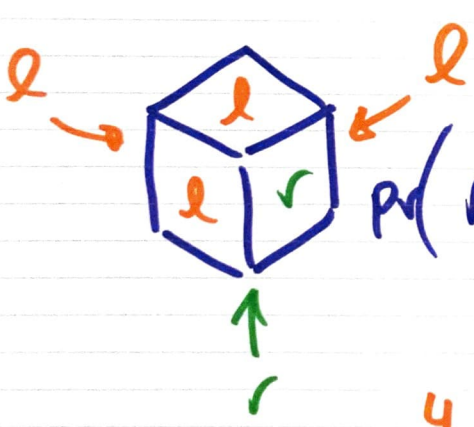


pr (random([lllrrr])
l) ?

$$\frac{\text{interesting choice } 3}{\text{total choices } 3+3} = \frac{3}{6} = \frac{1}{2} = .5$$



weighting

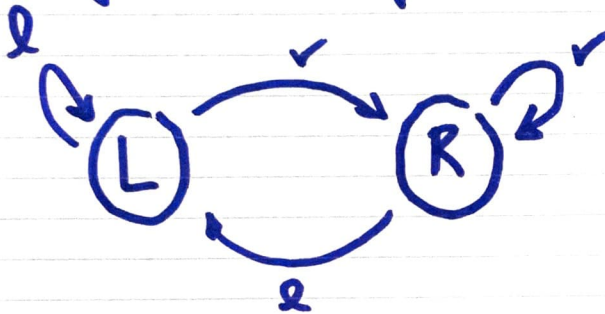


pr (random([llllrr]),
l)

$$\frac{4}{4+2} = \frac{4}{6} = \frac{2}{3} = .66$$

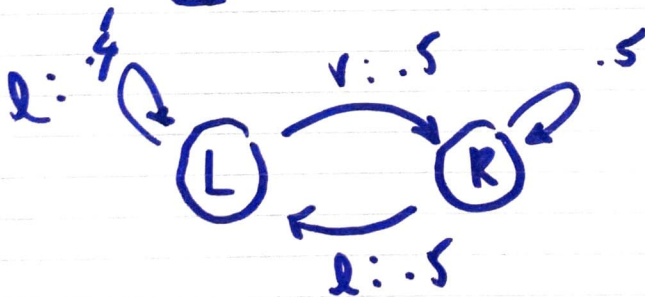
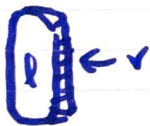
- agents like stuff
- take actions
- maximize rewards

moving randomly:



random (list of actions)

[l, r]



random ([1, 2, 3, 4, 5, 6])

l r l r l r

$$\text{argmax}(s_R, s_L) \quad \begin{matrix} 0 < s_R < 255 \\ 0 < s_L < 255 \end{matrix}$$

produces argument that
is max

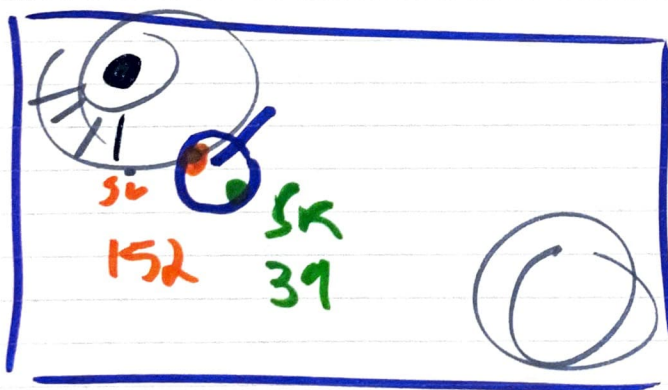
photoresistors

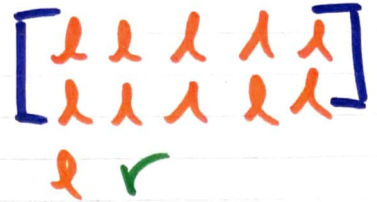
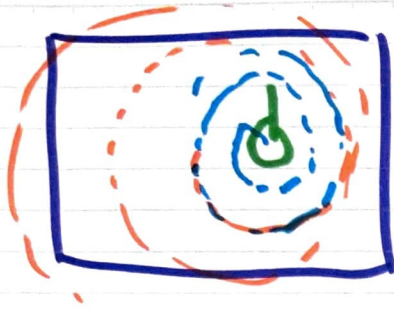
$$\text{max} = \text{argmax}(s_L, s_R)$$

$$\text{if } (\text{max} == s_R) : \text{bag}' = \text{bag}_0[v]$$

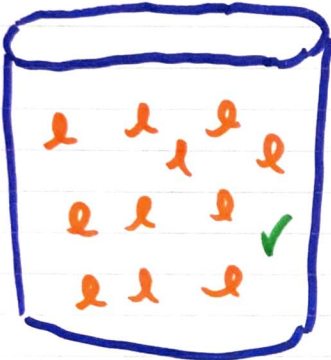
$$\text{if } (\text{max} == s_L) : \text{bag}' = \text{bag}_0[l]$$

$$\text{action} = \text{random}(\text{bag}')$$

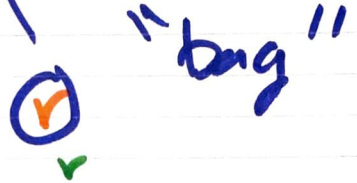




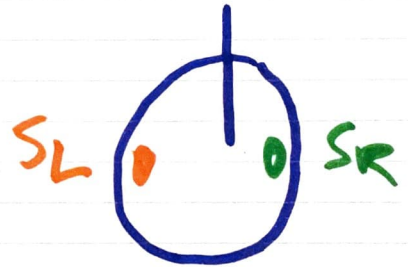
$$\frac{11}{1+11} = \frac{11}{12}$$



source



sink



idea: add choice to the bag depending on which is higher out of SL, SR

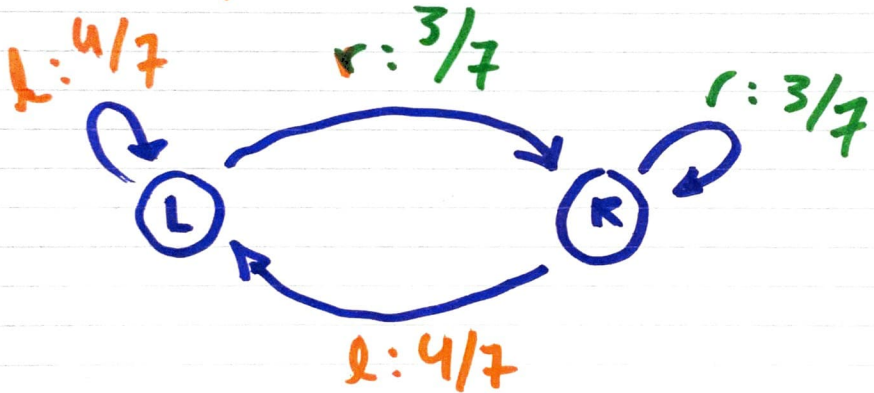
$$\text{bag} = [\text{lll rrr}]$$

$$\text{max} = \text{argmax}(s_L: 152, s_R: 39) = \text{max}$$

$$\begin{aligned} \text{bag}' &= \text{bag} \cdot [l] = [lll rrr] \cdot [l] \\ &= [lll rrr l] \end{aligned}$$

pr(random(bag'), l) ?

$$\frac{4}{4+3} = \frac{4}{7}$$



play w/ simulation.

change weight + recovery.

what effect does it have on the swarm?

- cluster around lights.
- gradual fall off →
" gradient →
go nearer to middle
- stay in middle of light
not transitory food
- balancing "randomness" and
"knowledge"
- which processes in
your life are
random?