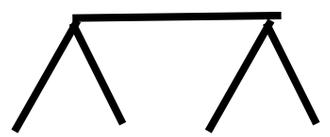
# How the cat always lands on her feet

Hold a cat back down with all feet up.

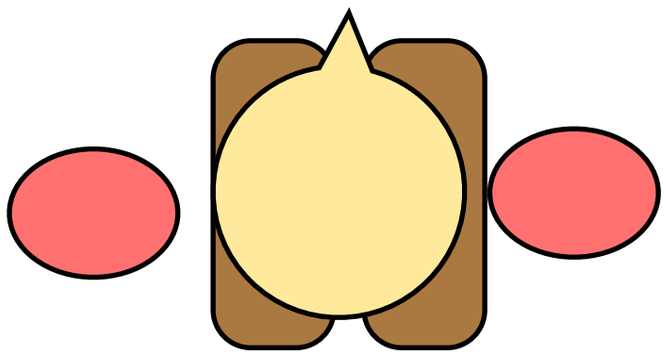
Drop her. She lands feet down.



Has she violated conservation of angular momentum?

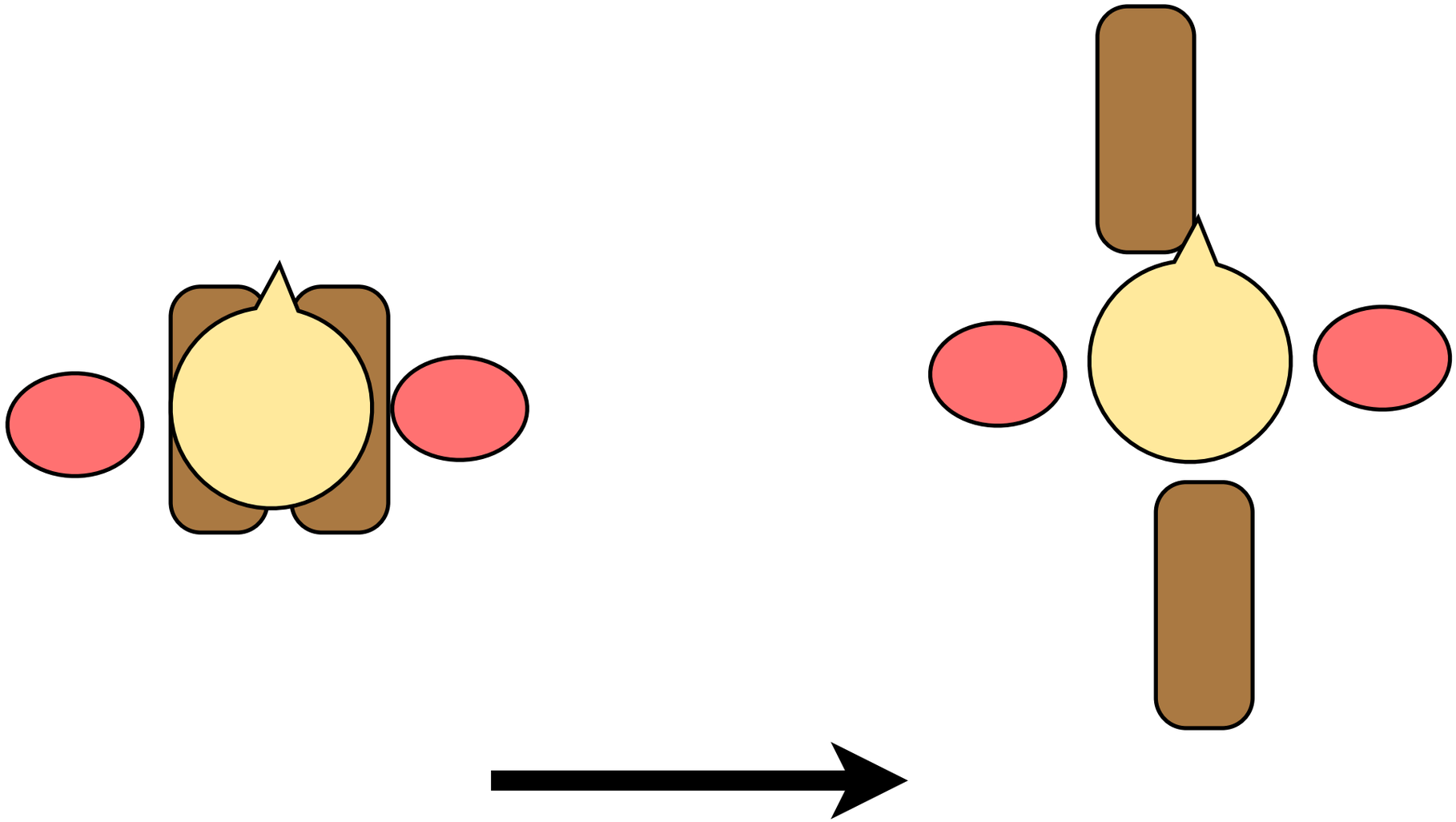
No, and I'll show you why.

You are in outer space viewing an astronaut end on.
From your perspective, he lies on his back.
You see his big head and nose,
his red hands on his shoulders,
and his brown shoes.

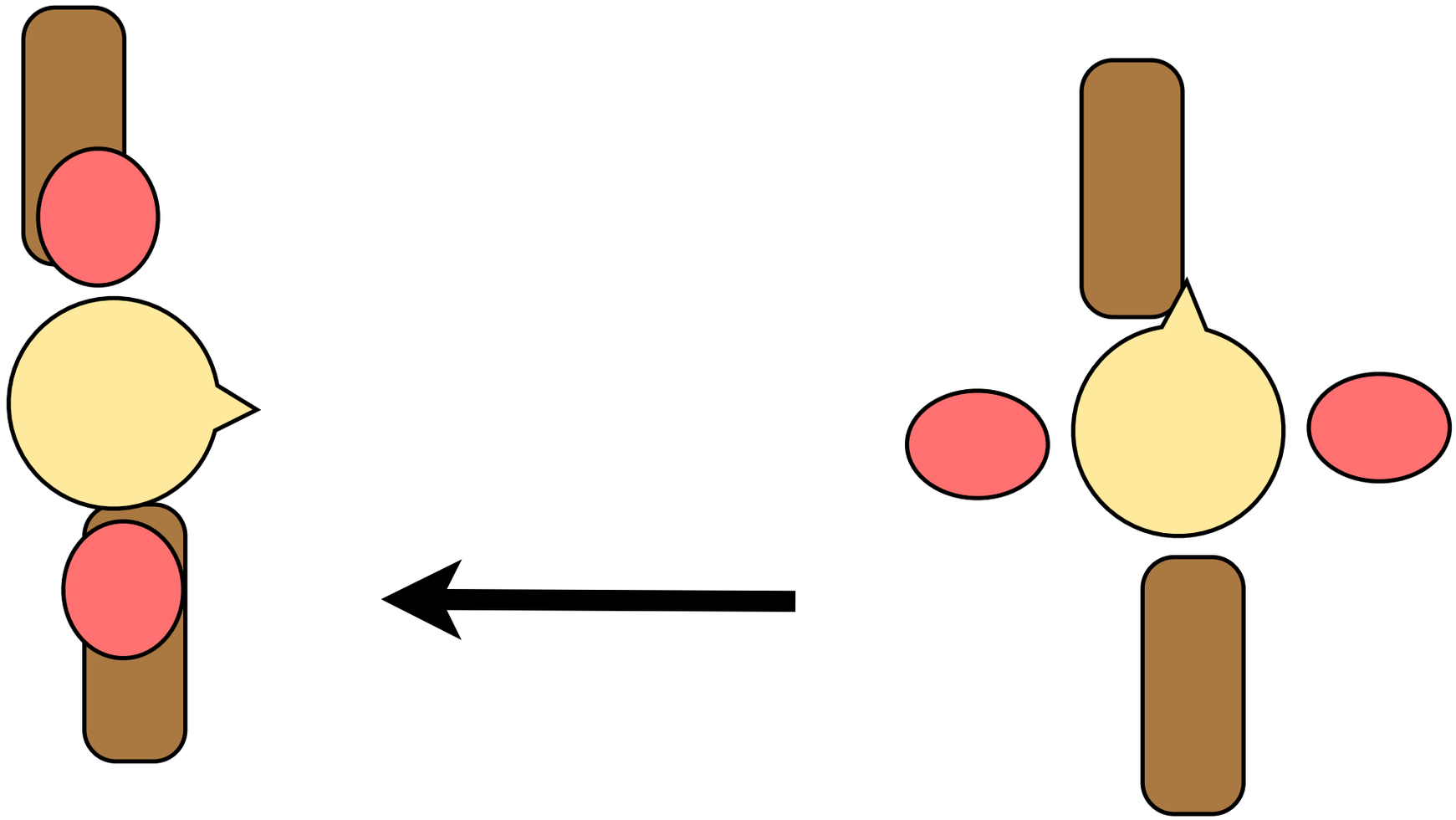


Can he turn around and face backwards?

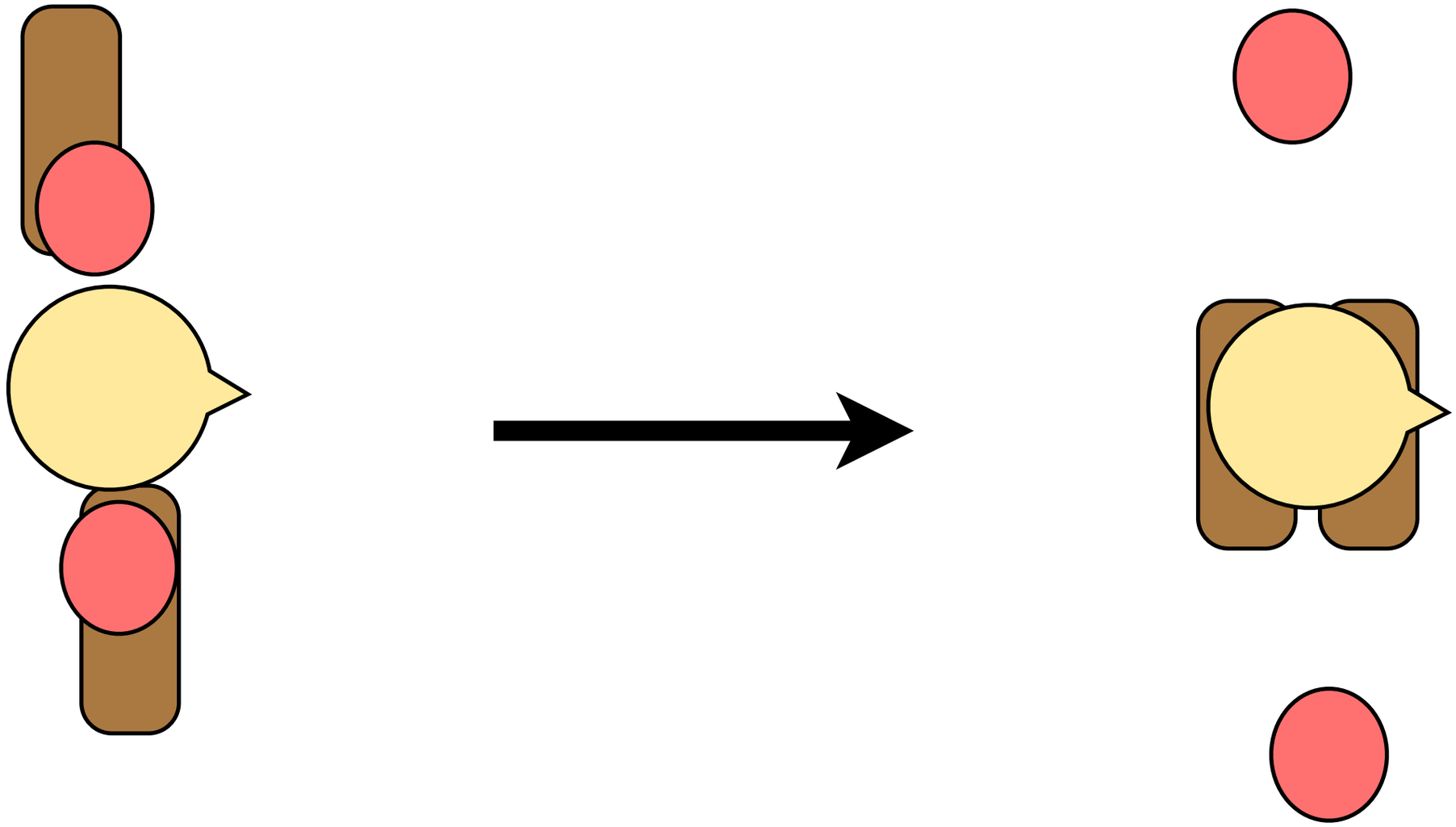
Yes, he can, and I'll show you how.



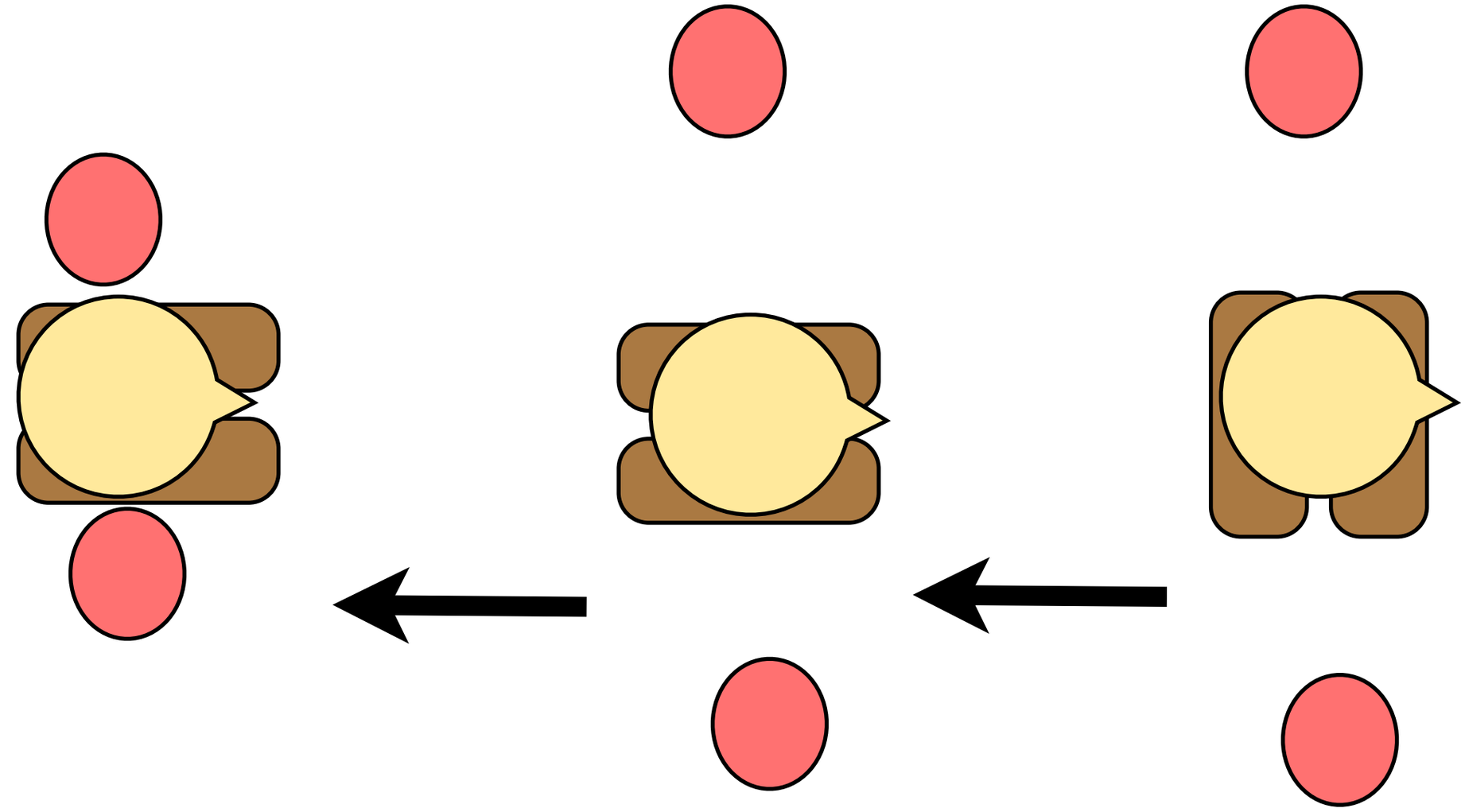
He spreads his legs wide apart.
Presume they are VERY wide apart.



He twists at the waist so
head and shoulders face to the right.
Since his feet are VERY wide apart,
they do not move.



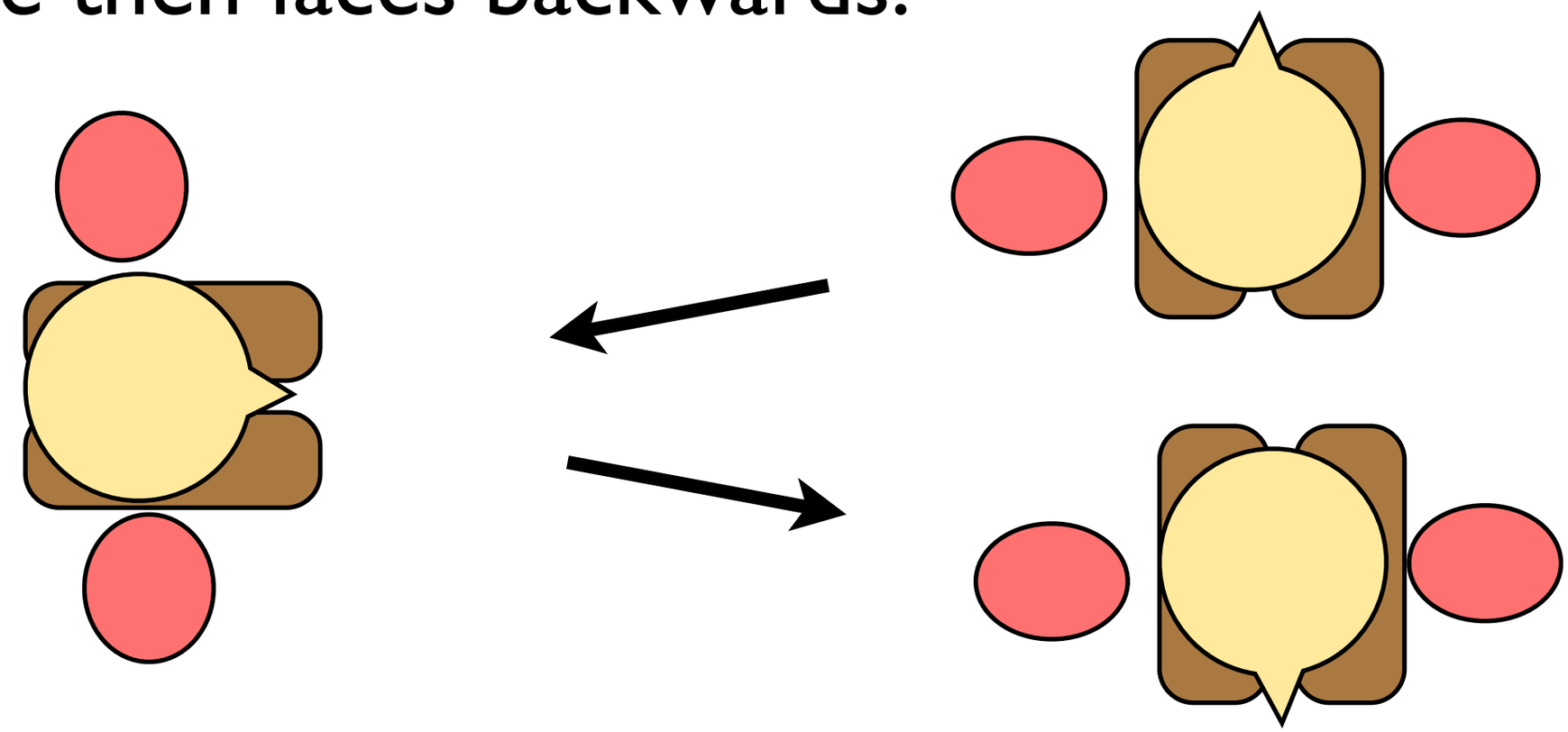
He brings his feet together.
And sticks his mitts out VERY far.



He untwists his waist thus rotating his feet.
He pulls in his mitts.

He has rotated 90 degrees.

Doing it all twice
he then faces backwards.



He has changed his angle without ever having angular momentum!

# Credits

- I was motivated by a charming 6 minute video by a charming young man "Smarter every day" explaining what happens when you drop a cat http://www.youtube.com/embed/RtWbpyjJqrU
- I couldn't code this in MIT's Scratch, so I used Keynote (like PowerPoint). If I succeeded in Scratch, it would be more like a toy than a lecture. http://info.scratch.mit.edu/sites/infoscratch.media.mit.edu/files/file/ScratchGettingStartedv14.pdf