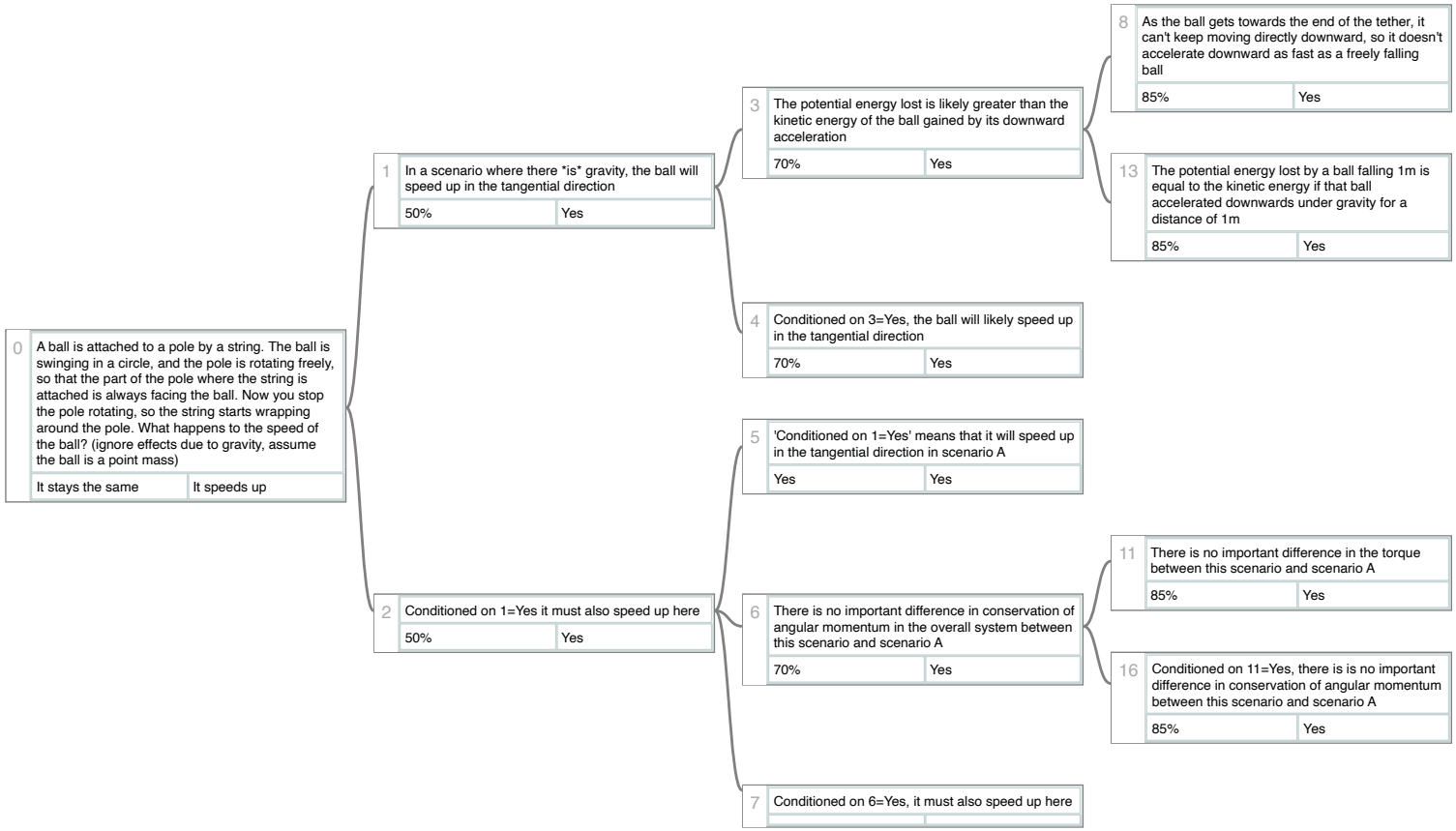
0
A ball is attached to a pole by a string. The ball is swinging in a circle, and the pole is rotating freely, so that the part of the pole where the string is attached is always facing the ball. Now you stop the pole rotating, so the string starts wrapping around the pole. What happens to the speed of the ball? (ignore effects due to gravity, assume the ball is a point mass)
It stays the same
It speeds up
1
In a scenario where there *is* gravity, the ball will speed up in the tangential direction
50%
Yes
2
Conditioned on 1=Yes it must also speed up here
50%
Yes
3
The potential energy lost is likely greater than the kinetic energy of the ball gained by its downward acceleration
70%
Yes
4
Conditioned on 3=Yes, the ball will likely speed up in the tangential direction
70%
Yes
5
'Conditioned on 1=Yes' means that it will speed up in the tangential direction in scenario A
Yes
Yes
6
There is no important difference in conservation of angular momentum in the overall system between this scenario and scenario A
70%
Yes
7
Conditioned on 6=Yes, it must also speed up here
8
As the ball gets towards the end of the tether, it can't keep moving directly downward, so it doesn't accelerate downward as fast as a freely falling ball
85%
Yes
13
The potential energy lost by a ball falling 1m is equal to the kinetic energy if that ball accelerated downwards under gravity for a distance of 1m
85%
Yes
11
There is no important difference in the torque between this scenario and scenario A
85%
Yes
16
Conditioned on 11=Yes, there is is no important difference in conservation of angular momentum between this scenario and scenario A
85%
Yes