



EPPro8 Challenge

Engineer Problem Solve Innovate

Limbo

*"Jack be limbo, Jack be quick,
Jack go unda limbo stick,
All around the limbo clock,
Hey, let's do the limbo rock".*

It is everyone's favourite party game, so build a contraption that you can limbo under and that can detect when you hit the limbo stick.

The limbo machine will have an adjustable height and can keep a score as the height lowers.



Limbo Frame

Criteria	<p>Measure a standard door frame.</p> <p>Construct a basic frame the same height and width as the door frame.</p> <p>The frame should have sides and a top – but no bottom as you could trip on this.</p> <p>Attach feet so that the frame is free standing.</p>
----------	--

Knockable Limbo Bar

Criteria	<p>A limbo bar sits on the frame 1.3m above the ground.</p> <p>If the limbo dancer knocks the limbo bar then the bar must fall to the ground.</p>
----------	---

Adjustable Limbo Bar

Criteria	<p>The limbo bar is attached to rope.</p> <p>Pulling on the rope raises and lowers the limbo bar.</p> <p>The rope can be secured so that the limbo bar will stay at its new height.</p>
Hint	<p>Use pulleys to direct the rope from the limbo bar to the top of the frame, across to one side, and then down.</p>

Adjustable and Knockable Limbo Bar

Criteria	<p>The bar from the previous challenge can't be knocked off as it is attached by rope.</p> <p>Add aluminium rods that point down from the original bar.</p> <p>A new limbo bar sits on these rods.</p> <p>The new limbo bar can be knocked off.</p> <p>The limbo bar can now be:</p> <ul style="list-style-type: none">• raised or lowered using rope• secured at its new height• knocked onto the ground if hit by the limbo dancer.
----------	---

Crank Handle Operated

Criteria	<p>Turning a crank handle raises and lowers the limbo bar.</p>
Hint	<p>Attach the reel to the crank handle and use this to adjust the rope.</p>

Motorised Limbo Bar

Criteria	<p>Use the online electronics simulator, code LMBO.</p> <p>The height of the limbo bar can be adjusted using push buttons.</p>
----------	---

Limbo Fail Alarm	
Criteria	When the limbo bar is NOT on the frame a buzzer will sound.
Hint	Use a limit switch to detect when the bar is on the frame, and a NOT box to detect when it is not on the frame.

Scoring	
Criteria	<p>The limbo dancer breaks a laser beam every time that he passes under the limbo bar.</p> <p>This counts up, showing how many times the limbo dancer has passed under the bar.</p>
Hint	<p>You want the laser beam on all the time, so use a switch for this.</p> <p>Use a COUNTER to record the score.</p> <p>Click on the number on the COUNTER to reset the count.</p>

Automatic Limbo Bar	
Criteria	Every time the limbo dancer passes under the bar the level of the limbo bar lowers for two seconds.
Hint	Use a TIME DELAY connected to the laser sensor to lower the limbo bar by a fixed amount each time.

After you have attempted this challenge watch the tutorial to see our solution at www.EPro8Challenge.co.nz/Tutorial and enter the Challenge Code **LMBO**.