



Taxicab Geometry

Introduction by Jo Boaler

It seems that taxis have been a part of my life for years. When I was a teacher and academic in London I would see the iconic Black cabs zipping around the streets of London, and I would occasionally travel in them. It was years later when these Black cabs became important again, as some of the first evidence on the plasticity of brains – even adult brains – came from studying the brains of drivers of Black cabs in London (see video link below). Researchers found that after their intensive spatial training the brains of the drivers of Black cabs strengthened and grew. Years later I was teaching my freshman class when I met Tessa, who proposed this taxi activity for youcubed.

The link below is an extract from my first online course, featuring the neuroplasticity research from the drivers of London Black cabs.

<https://www.youcubed.org/resources/brain-science/>

Taxicab Geometry

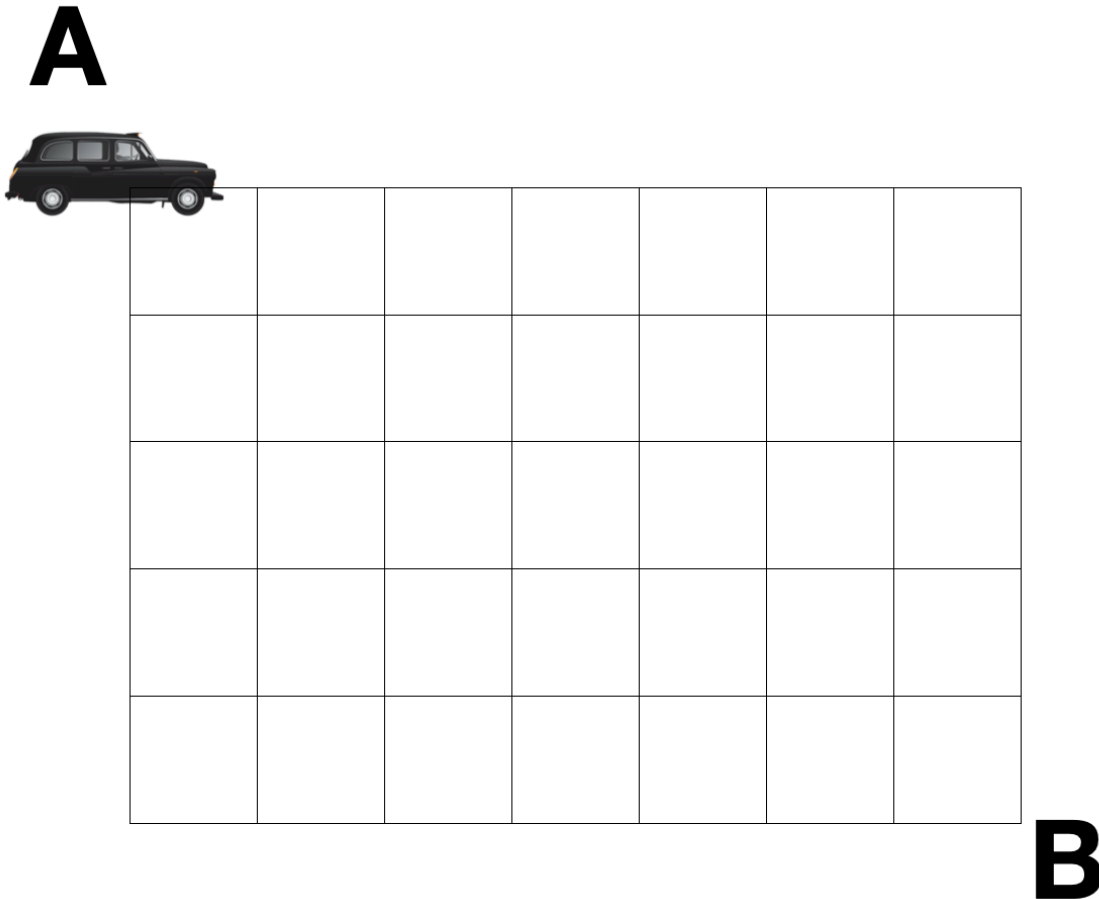
Tessa Wayne

Directions:

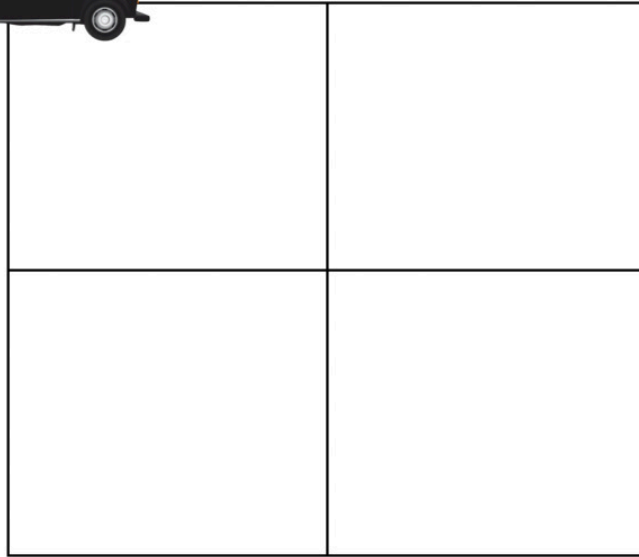
- How many different pathways exists to get the taxi from point A to point B?
- You can only move directly to the right or directly down. You cannot move left, up, or diagonally.

Task

- What do you notice & wonder?
- Can you find how many paths there are in different dimension grids? What about a 2x2? 3x3? 4x4? 4x6?
- Can you find a pattern for an $m \times n$ grid?
- Can you make a visual proof?

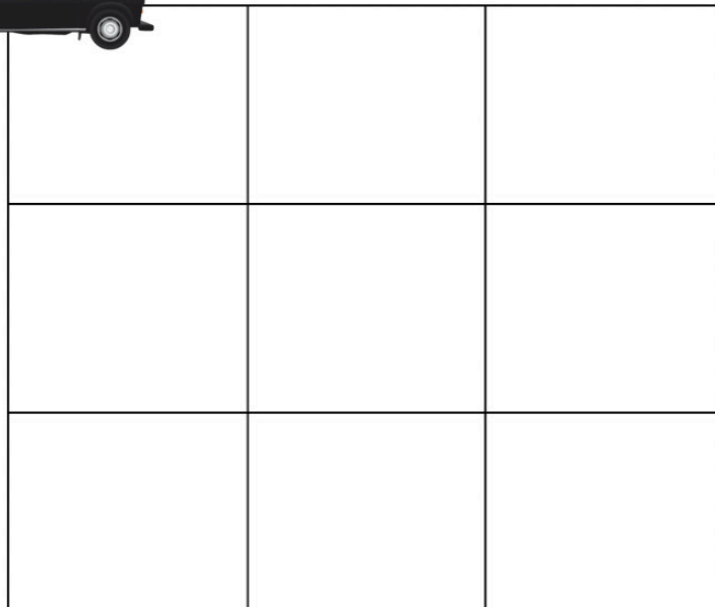


A



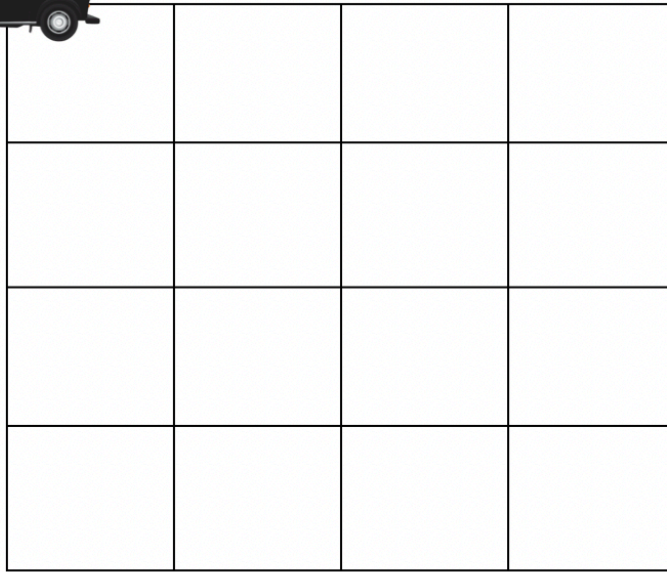
B

A



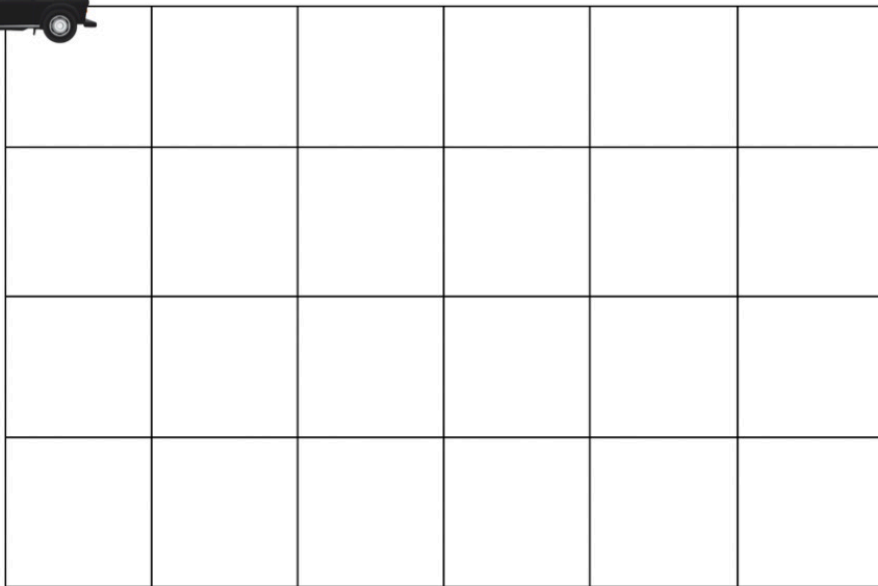
B

A



B

A



B