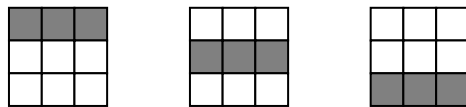
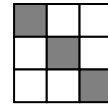
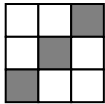
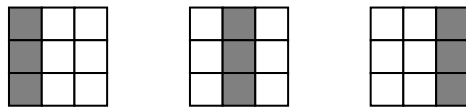


The Queen of Hearts Plays Noughts and Crosses

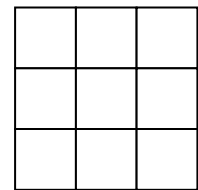
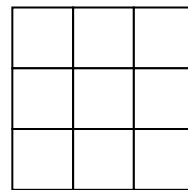
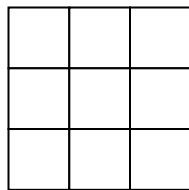
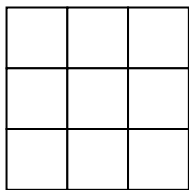
David Butler

Presented at
MASA Conference 2017

Original Noughts and Crosses



Play!



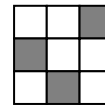
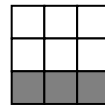
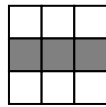
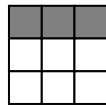
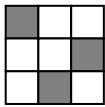
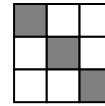
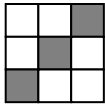
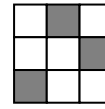
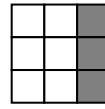
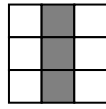
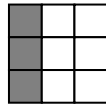
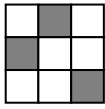
Counting Original Noughts and Crosses

- Points:
- Lines:
- Points on a line:
- Lines through a point:

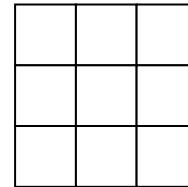
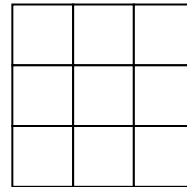
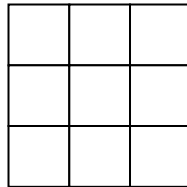
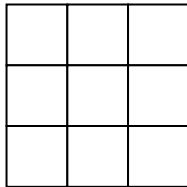
The Laws of Original Noughts and Crosses

- Two points
- Two lines
- Lines parallel to each other

Affine Noughts and Crosses



Play!



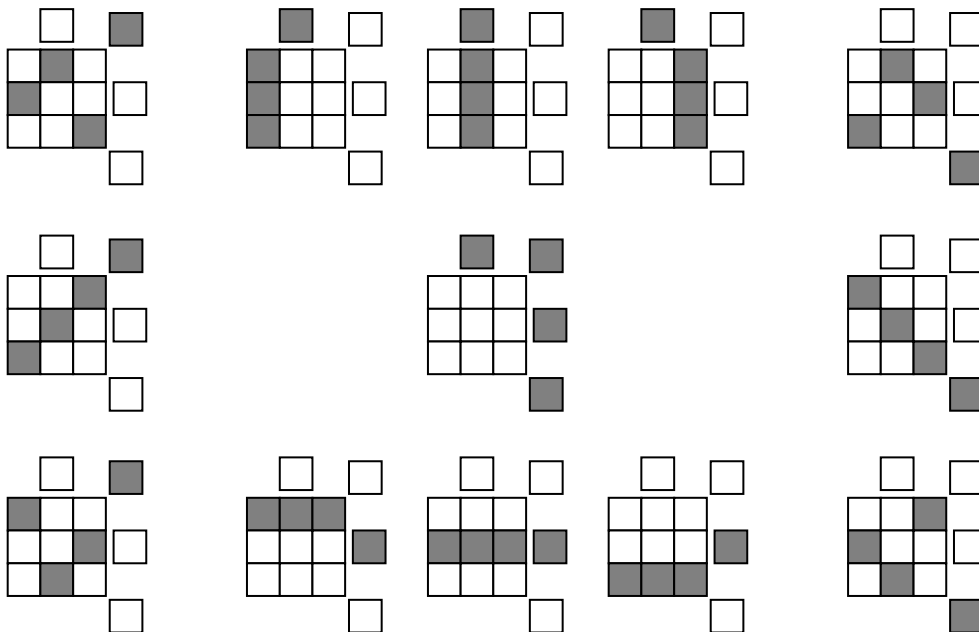
Counting Affine Noughts and Crosses

- Points:
- Lines:
- Points on a line:
- Lines through a point:

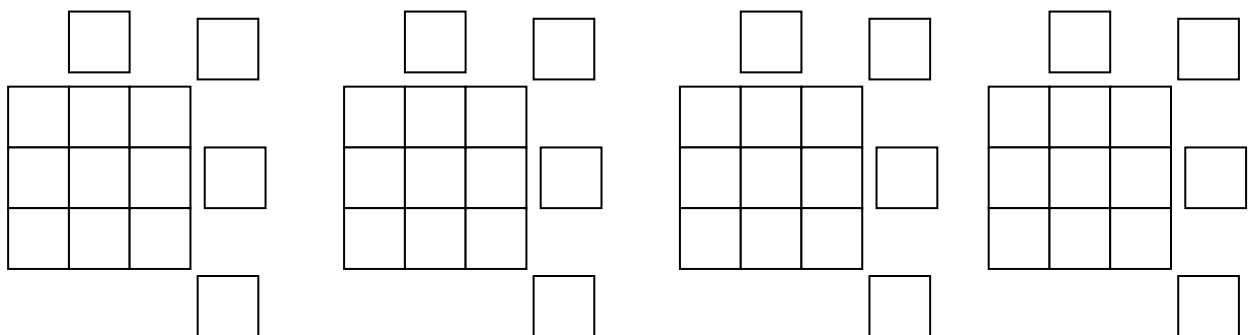
The Laws of Affine Noughts and Crosses

- Two points
- Two lines
- Lines parallel to each other

Projective Noughts and Crosses



Play!



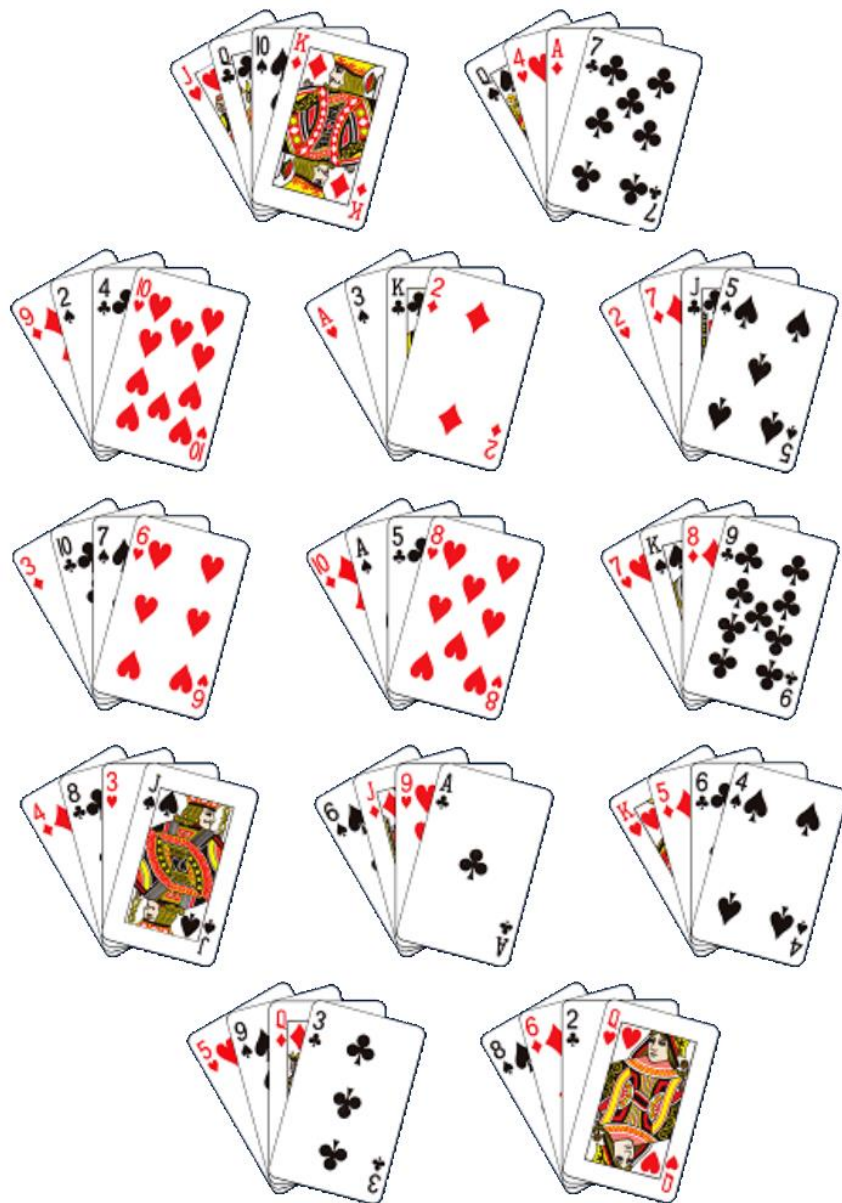
Counting Projective Noughts and Crosses

- Points:
- Lines:
- Points on a line:
- Lines through a point:

The Laws of Projective Noughts and Crosses

- Two points
- Two lines
- Lines parallel to each other

A Special Dealing of Cards



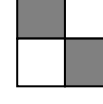
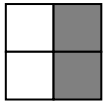
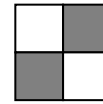
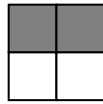
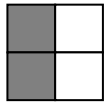
Counting Projective Noughts and Crosses

- Card values:
- Hands:
- Card values in a hand:
- Hands containing a card value:

The Laws of Projective Noughts and Crosses

- Two card values
- Two hands

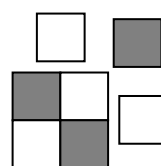
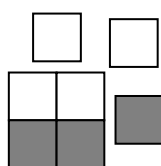
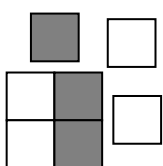
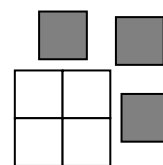
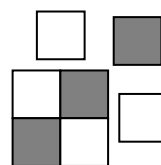
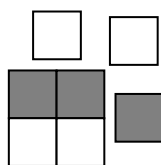
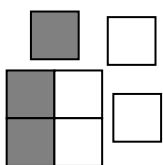
The Smallest Affine Plane



Counting the Smallest Affine Plane

- Points:
- Lines:
- Points on a line:
- Lines through a point:

The Smallest Projective Plane (The Fano Plane)



Counting the Fano Plane

- Points:
- Lines:
- Points on a line:
- Lines through a point:

Anything else you want to write down...