

WISKUNDE IN GEZELSCHAPSSPELLEN

Of hoe het kaartspel Dobble stiekem een axiomatisch projectief vlak is



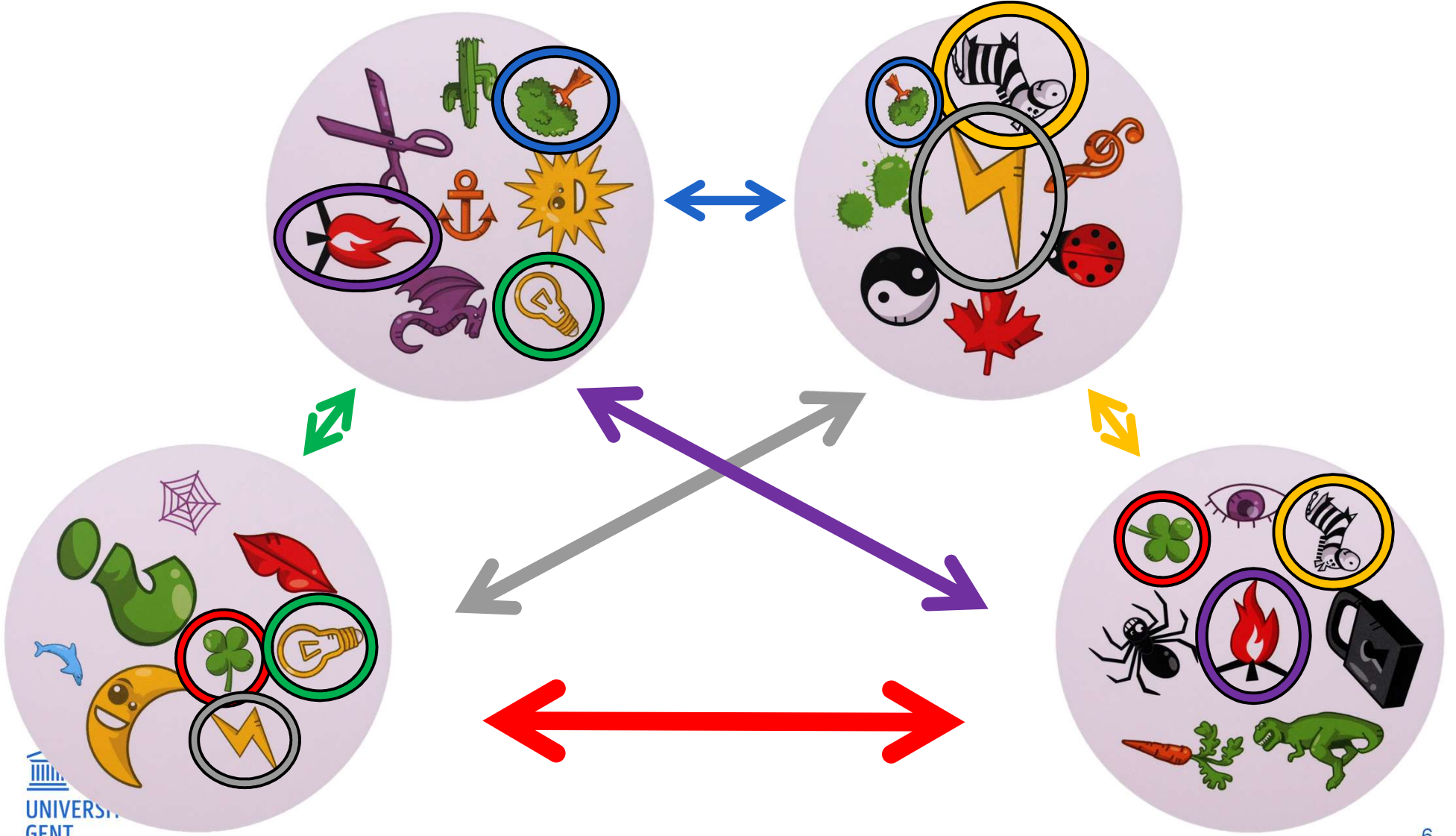
- 8 symbolen
- Herkenbaar
- 1 symbool op beide kaarten





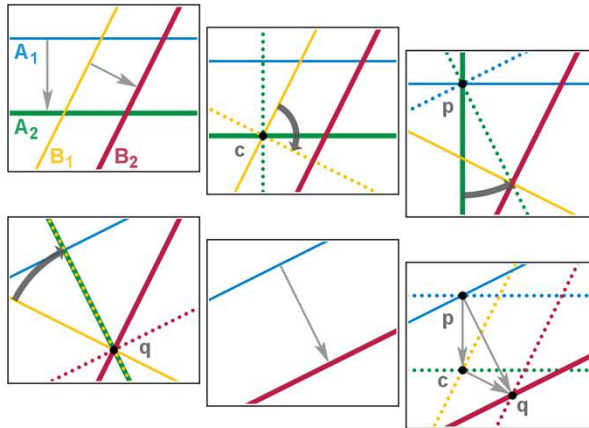






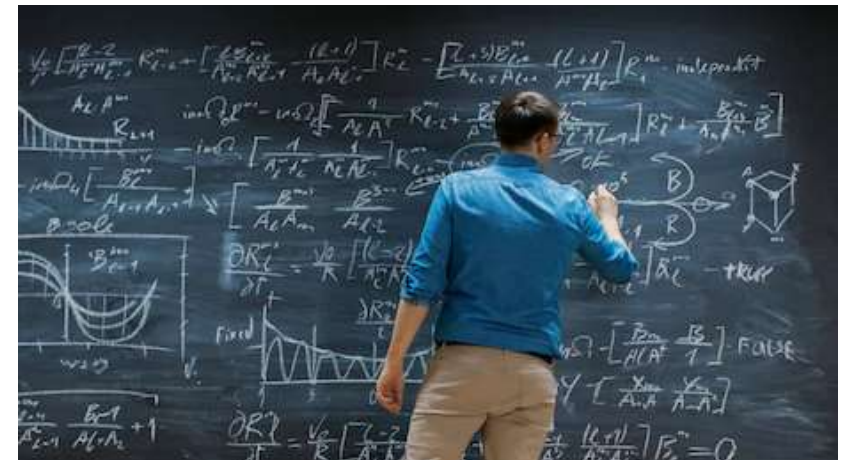
AXIOMATISCH PROJECTIEF VLAK

– ‘vlak’



– ‘projectief’

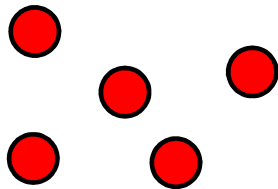
– ‘axioma’ = ‘grondbeginsel’



AXIOMATISCH PROJECTIEF VLAAK

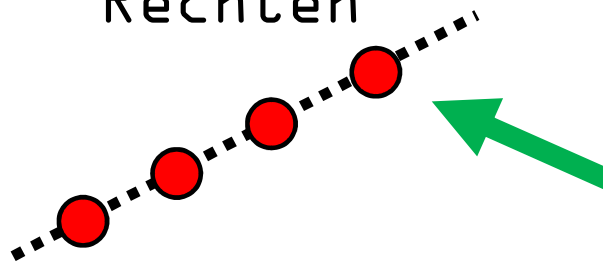
P

Punten



R

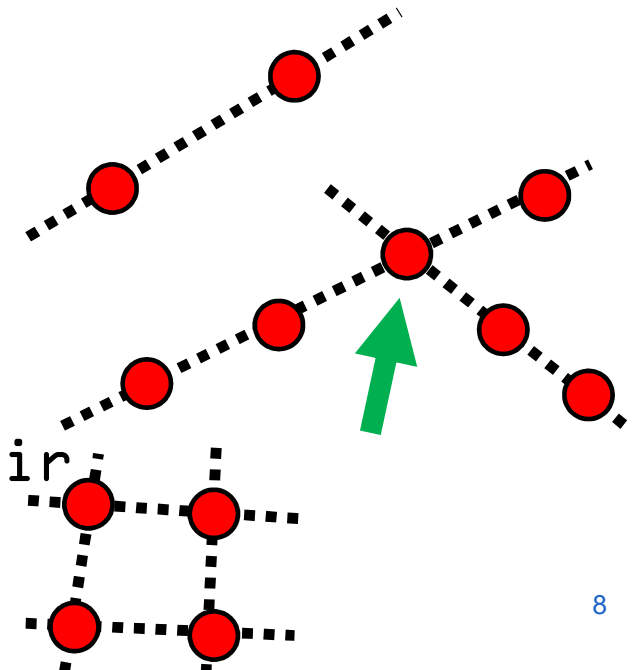
Rechten



I

Incidentie

1. Door twee punten = 1 rechte
2. Twee rechten snijden in 1 punt
3. Vier punten, geen drie collineair



TEST

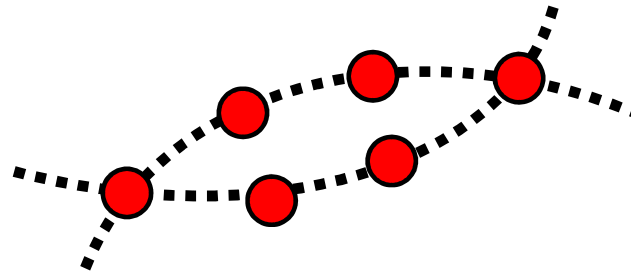
– Kan dit?

– Kan dit?

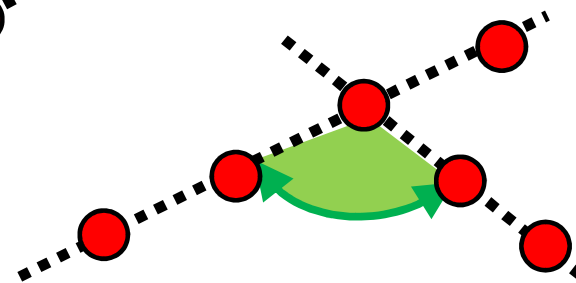
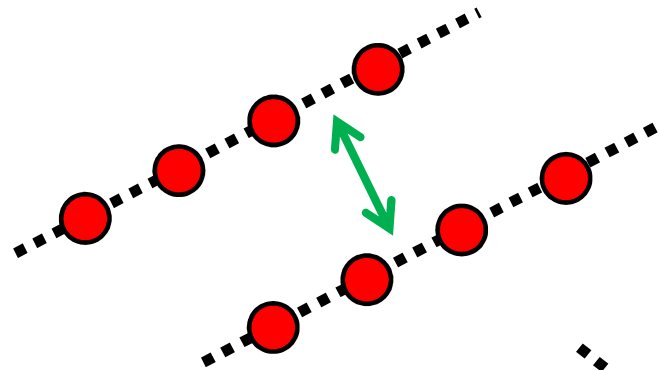
– Wat is de afstand?

– Parallel?

– Wat is de hoek?

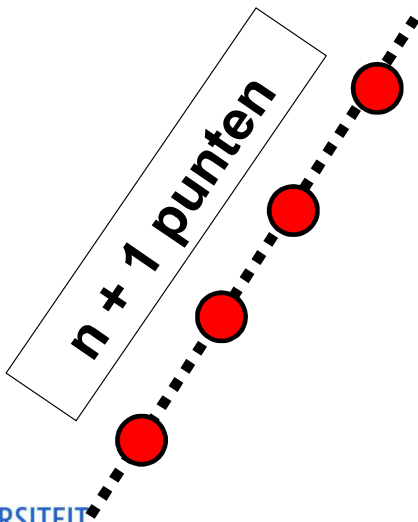


**Tekening = Goed
maar laat je niet
misleiden**

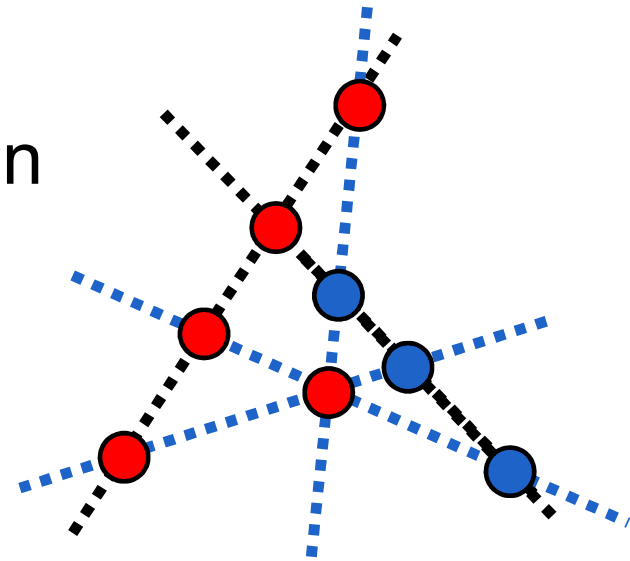
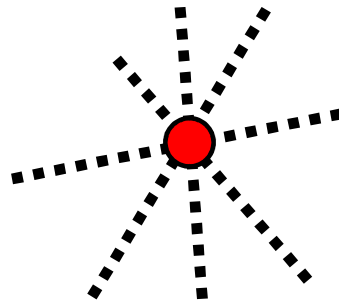


EIGENSCHAPPEN

- Elke rechte bezit even veel punten



$n + 1$ rechten



$n^2 + n + 1$ punten

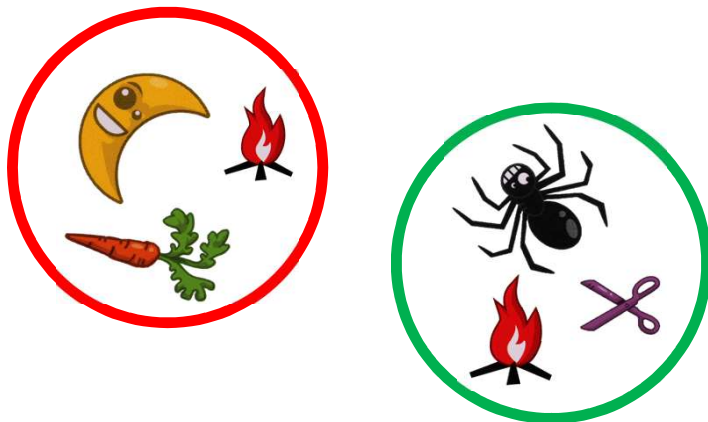
$n^2 + n + 1$ rechten

$n = \text{'orde'}$

SOMPLE

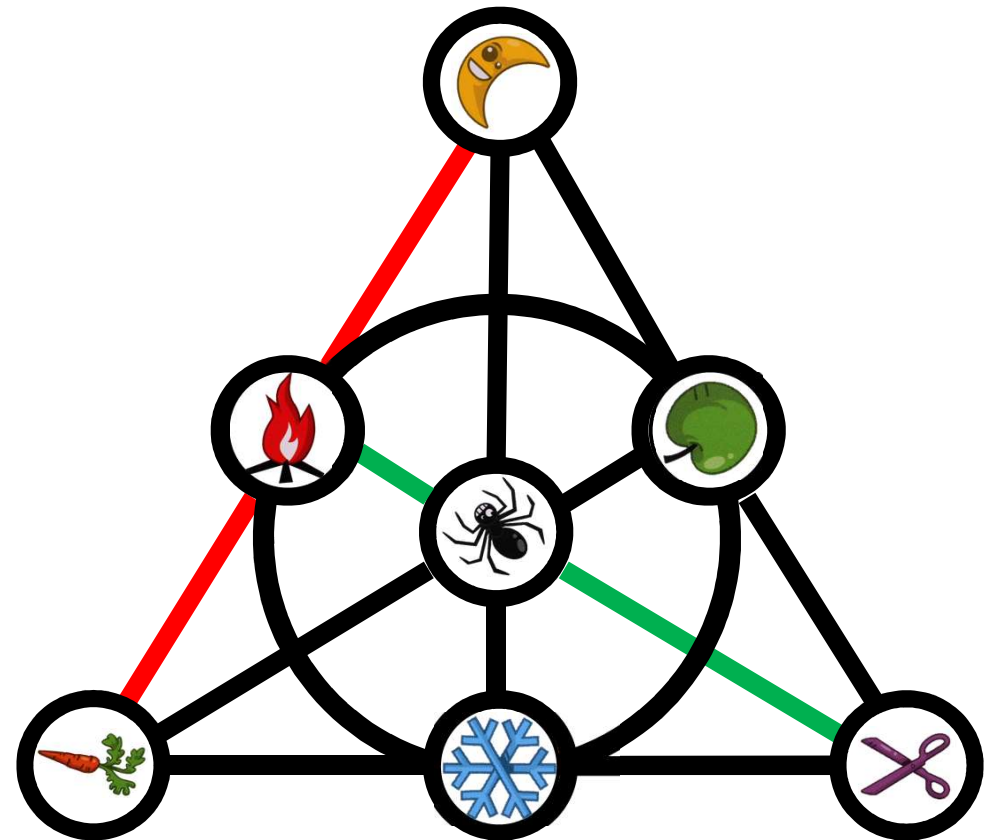
We maken zelf een spel

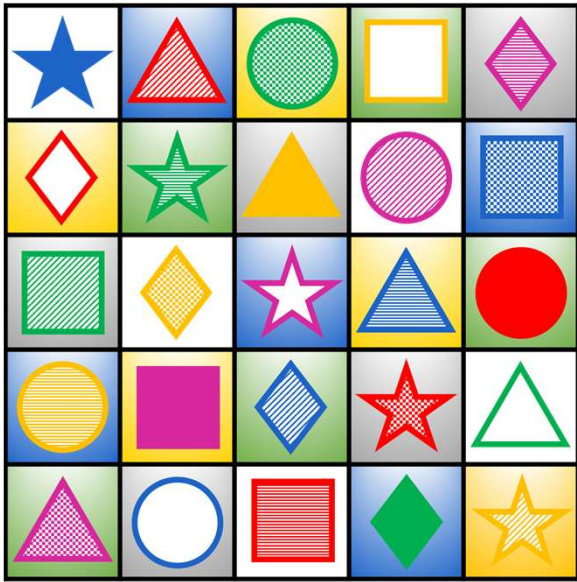
- Simpel Dobble = ‘Somple’



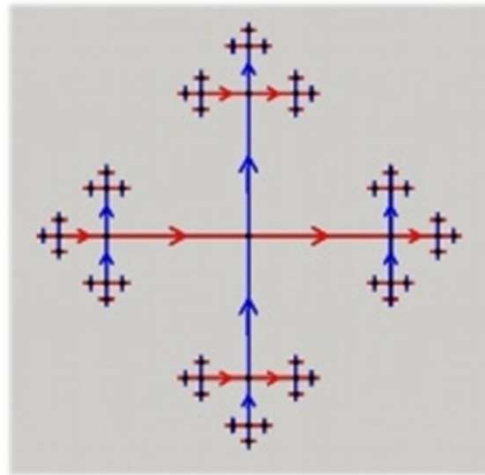
- 7 kaarten ($= 2^2 + 2 + 1$)
- Elk drie symbolen ($= 2+1$)

‘Fano’-vlak

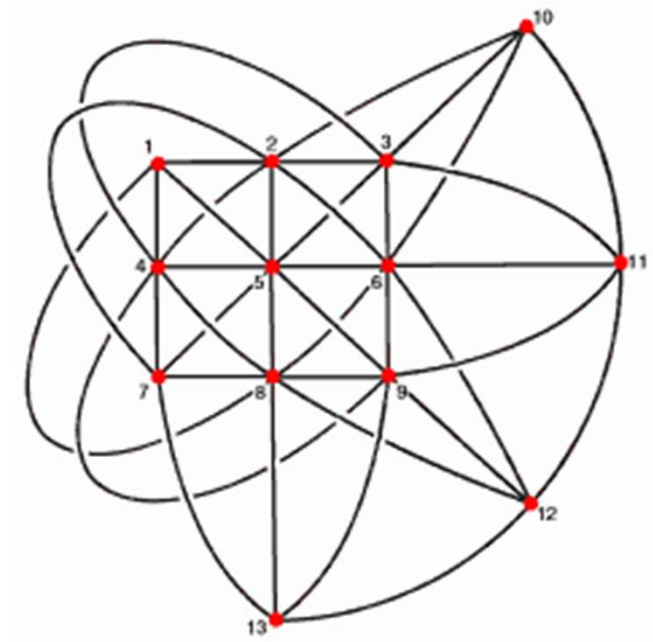




Onderling orthogonale
Latijnse vierkanten



Groepen



Projectieve vlakken