MA111: Contemporary mathematics

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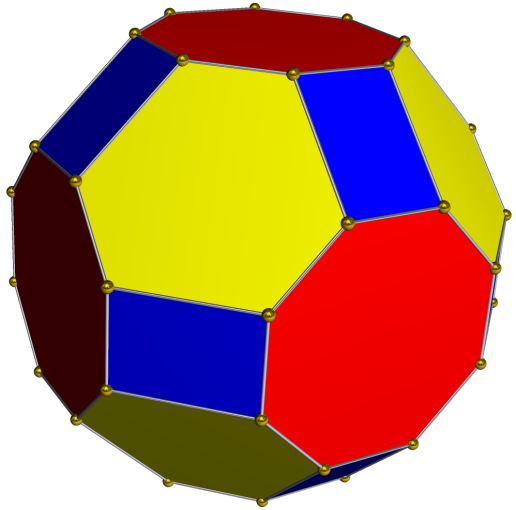


Entrance Slip (due 5 min past the hour):

- How many red faces does the figure have?
- How many blue faces?
- How many yellow faces?
- How many vertices (corners)?

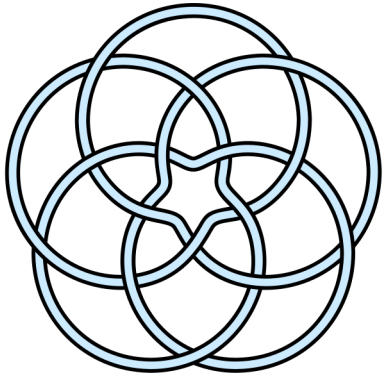
Today: An overview of symmetry; then return exams

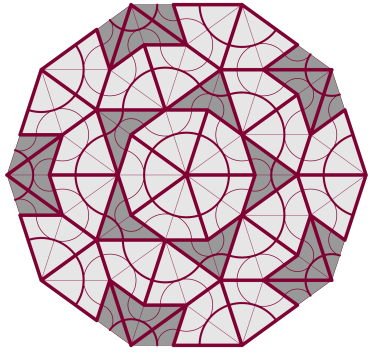
Context: How do we organize visual data?

- The entrance slip required imagination
- 6 red, 8 yellow, 12 blue, and $6 \times 8 = 8 \times 6 = 12 \times 4 = 48$ corners
- Each corner is on exactly one red, yellow, and blue face
- How many faces and how many corners per face?
- Each of the faces is repeated in a regular pattern
- We want to classify pictures based on how they repeat

Activity: Organize these pictures

- Group these pictures in a way that you can explain to us

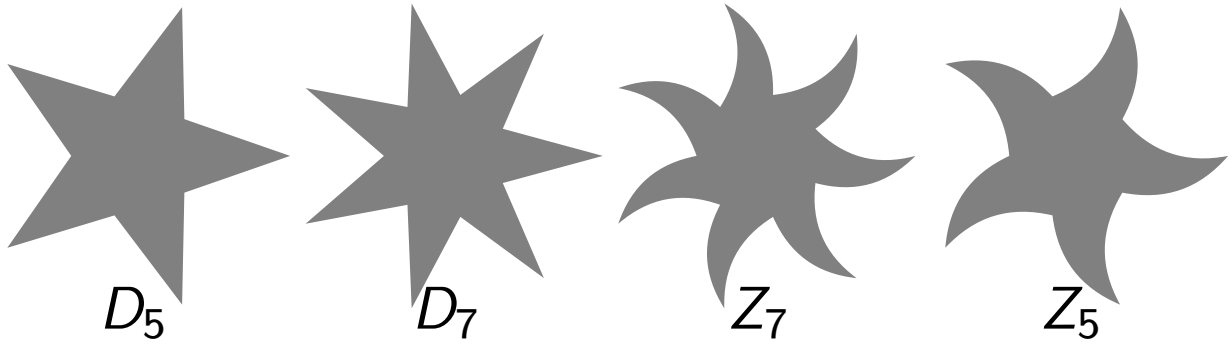




Fast: Symmetry

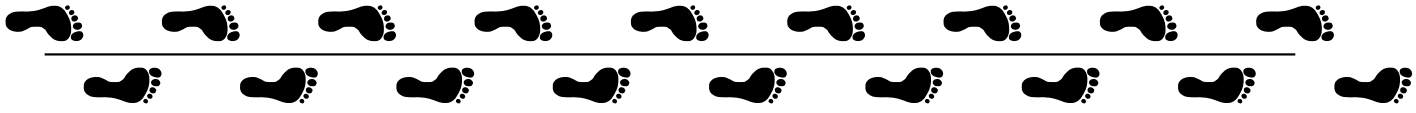
Four topics over four days

- Rosette groups



- Rigid motions fixing a point (Rotations and reflections)
- Frieze groups

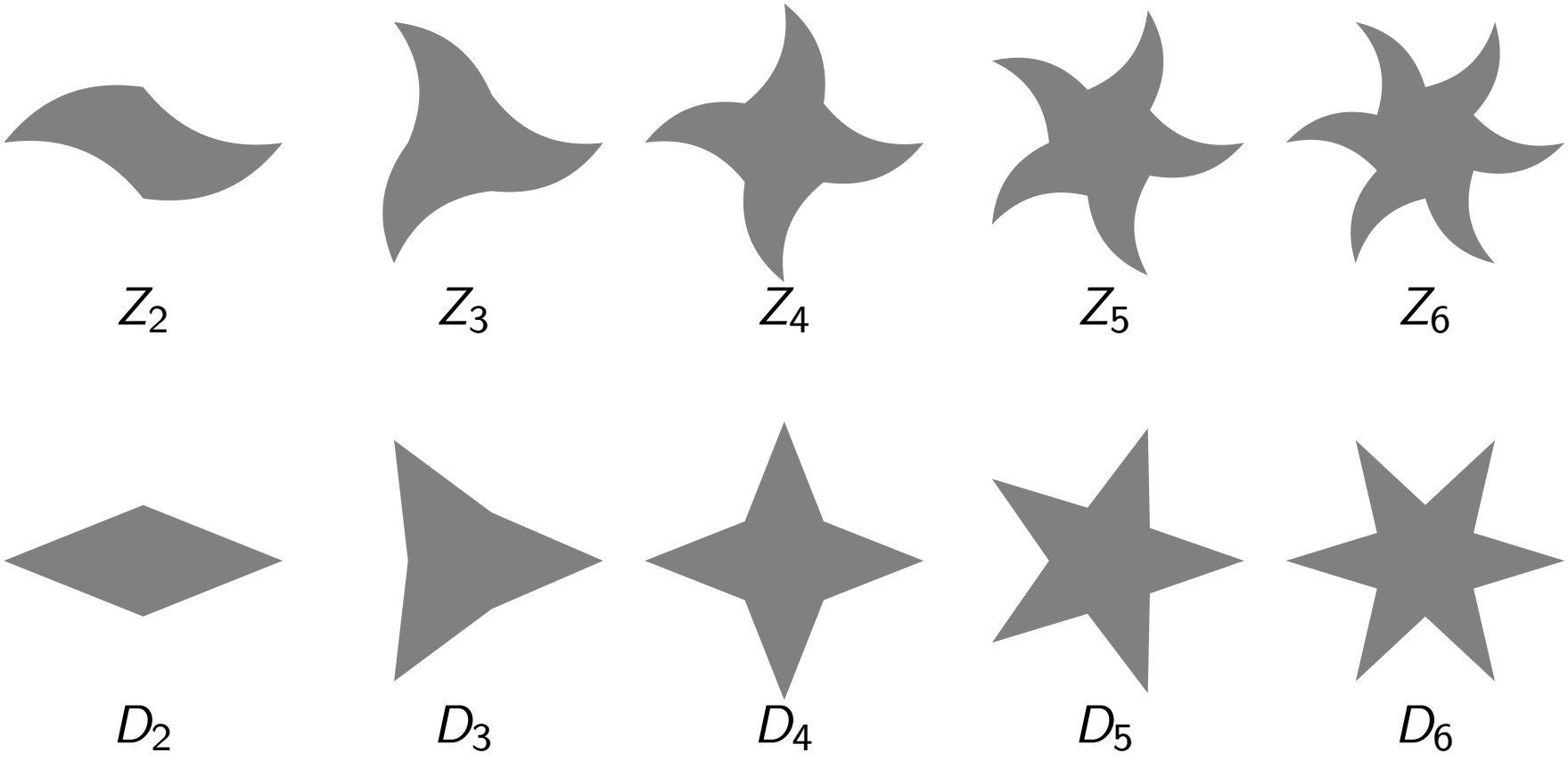
Walk



- Rigid motions fixing no point (translations and glide reflections)

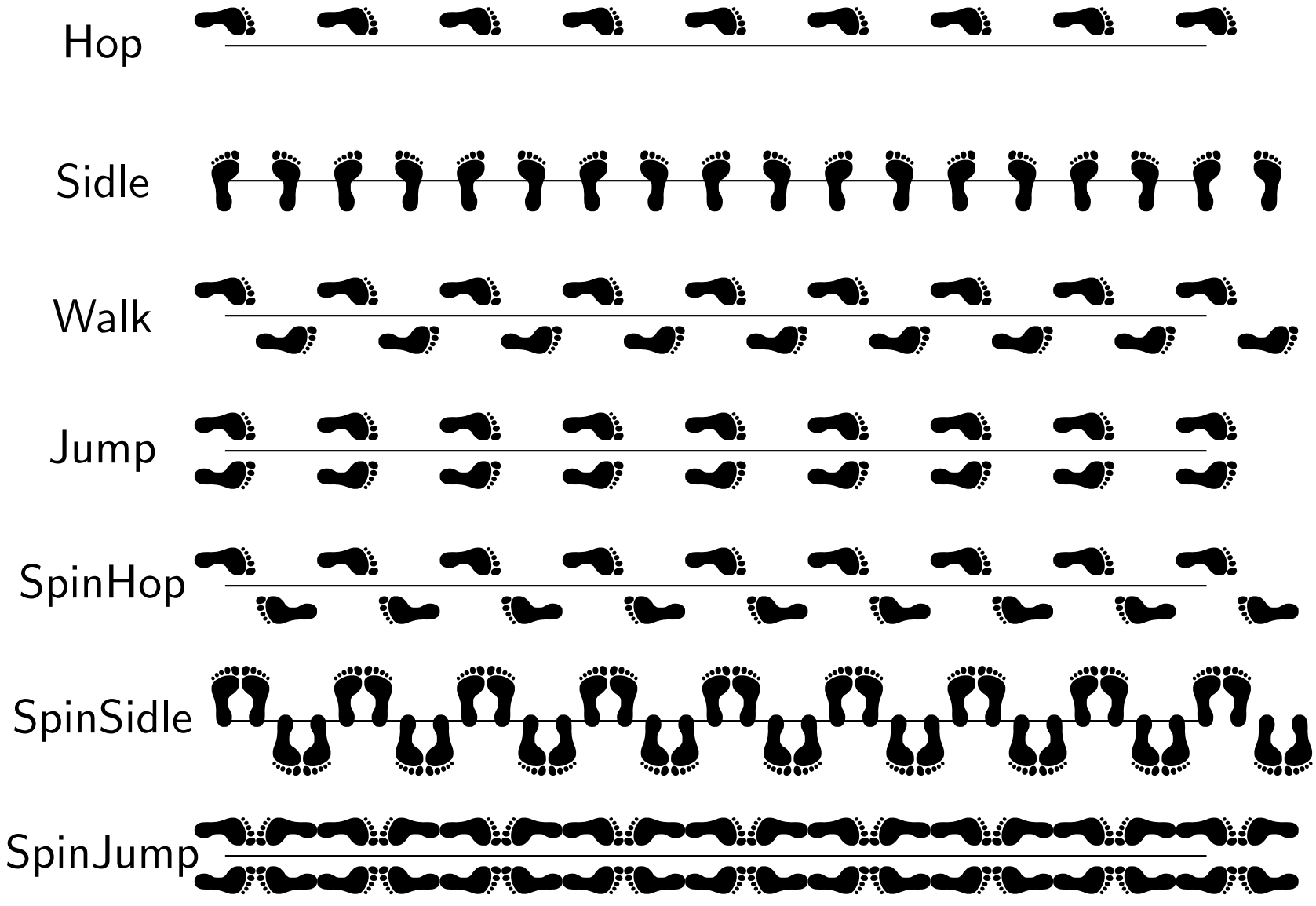
Fast: Rosette groups

- Two families: Z (swirl) and D (star)
- Each determined by how many rotations



Fast: Frieze groups

- Exactly 7 groups: symmetries of an infinite strip



Fast: Rigid motions

- Four families of rigid motions:
- Rotations: have a center (fixed point) and an angle
- Reflections: have a fixed line
- Translations: have a direction (fixed line) and a distance
- Glide reflection: translation+reflection with same fixed line

Assignment and exit slip

- Skim the chapter
- Take a picture of something with star or swirl symmetry for Wednesday's activity
- **Exit slip:** Draw a (cool) shape with Z_3 (3-swirl) symmetry
- Hang out to get your exams