

Practice Second Exam 1

MATH V1010: Groups and Symmetry, Fall, 2003

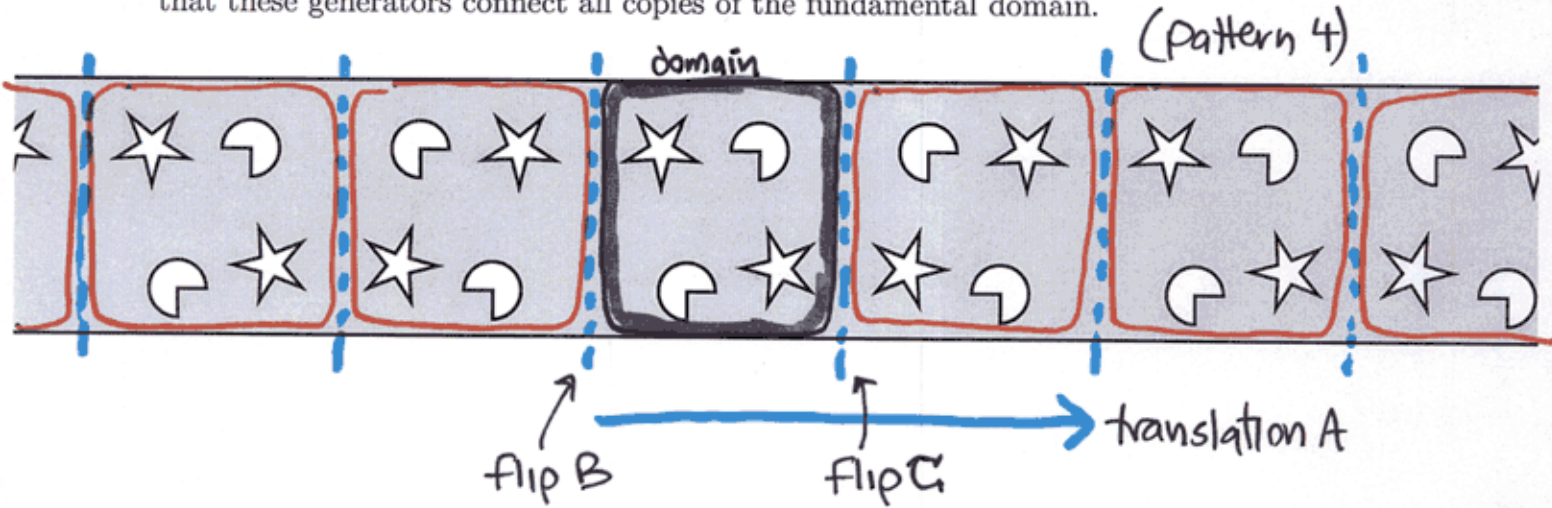
problem 1
 problem 2
 problem 3
 problem 4
 what pattern type?

Name: Solutions School: _____

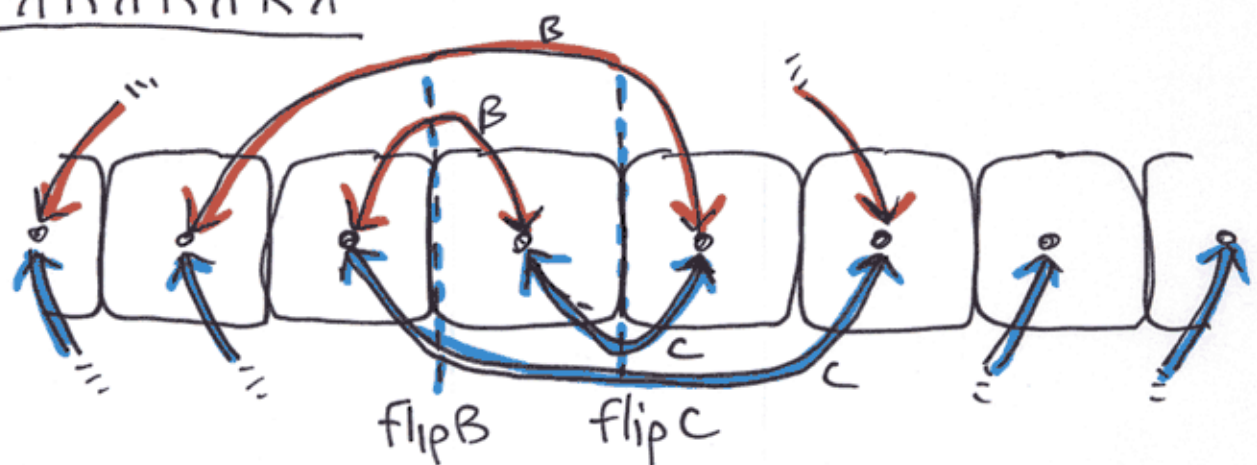
[1]	[2]	[3]	[4]	TOTAL

You may use scratch paper, but only these pages will be graded. Do not hand in your scratch paper.

For each strip pattern, find a fundamental domain. Find the symmetries of the pattern. Draw another strip pattern with the same symmetries, using just the letter R. Choose a set of generators for the group of symmetries. Draw enough of a Cayley diagram to show that these generators connect all copies of the fundamental domain.



RRRRRRRR



flip B and flip C generate group

1.3

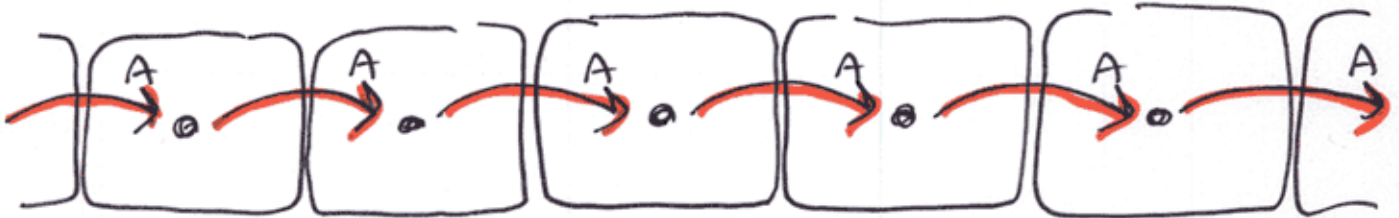
domain

(pattern 1)



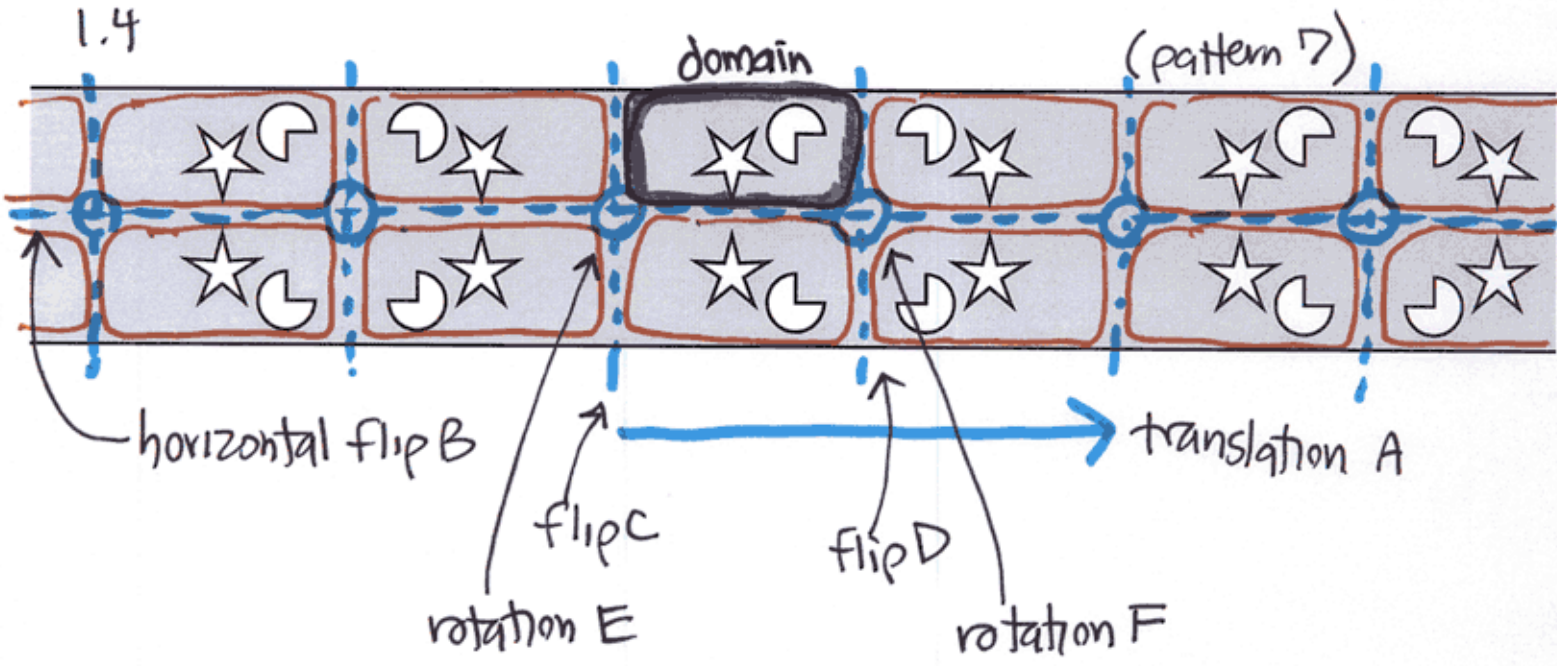
→ translation A

RRR RRRR

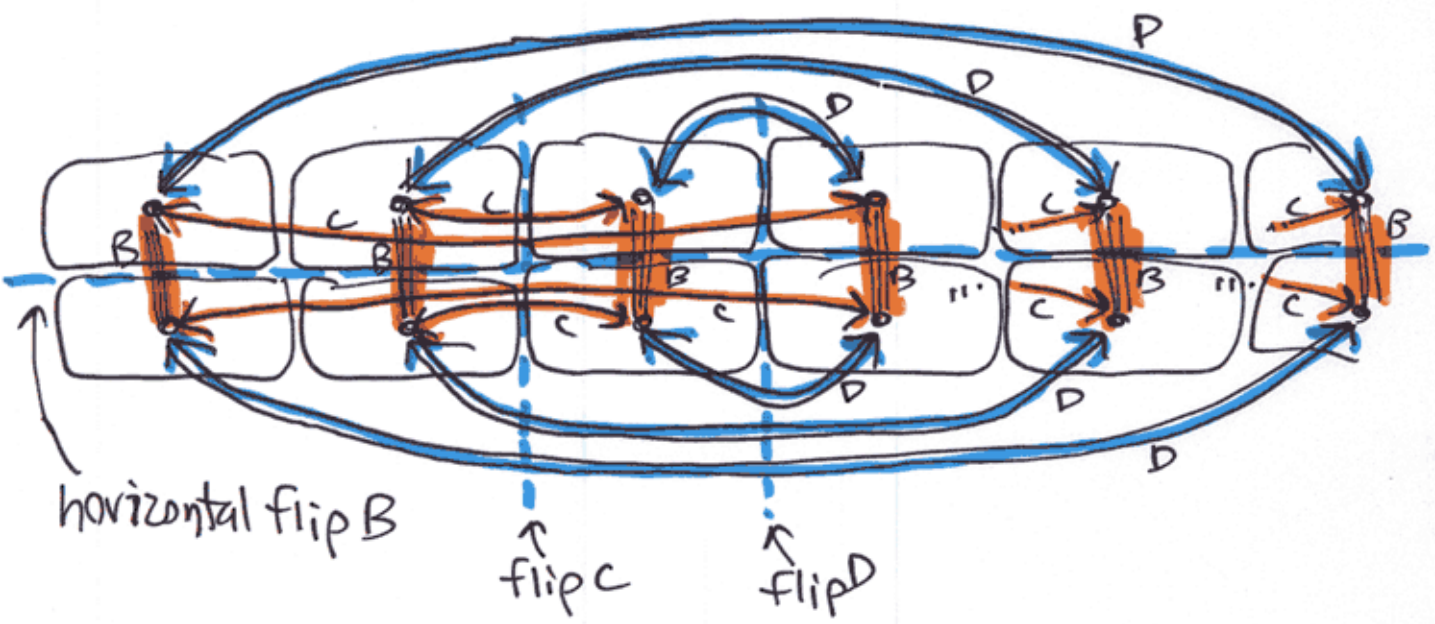


Translation A generates group

1.4



R R R R R R R R R R
R R R R R R R R R R



flips B, C, and D generate group

2.1

Practice Second Exam 2

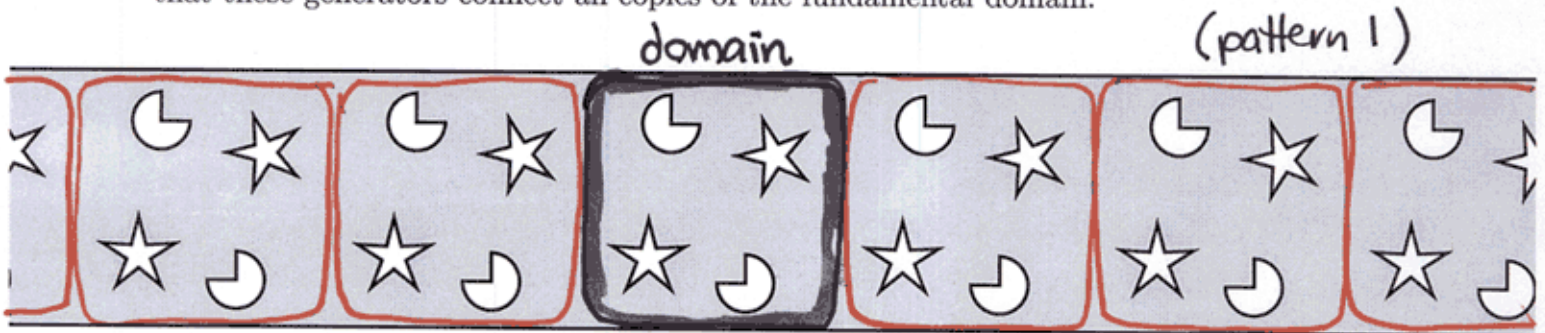
MATH V1010: Groups and Symmetry, Fall, 2003 (1, 4, 5, 2)

Name: Solutions School: _____

[1]	[2]	[3]	[4]	TOTAL

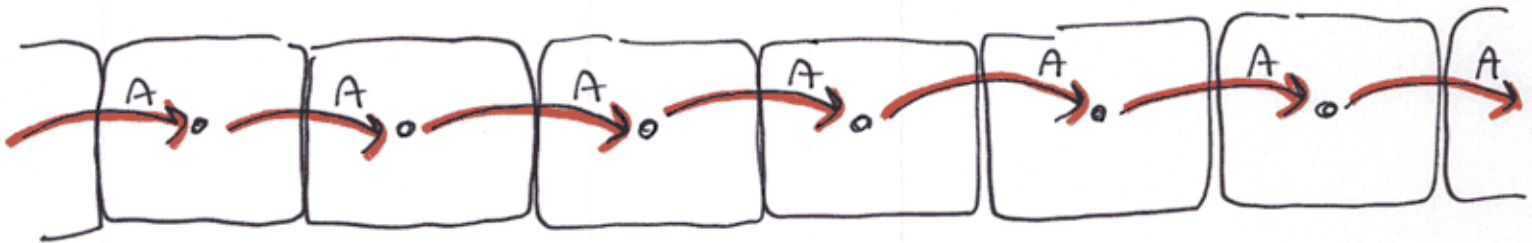
You may use scratch paper, but only these pages will be graded. Do not hand in your scratch paper.

For each strip pattern, find a fundamental domain. Find the symmetries of the pattern. Draw another strip pattern with the same symmetries, using just the letter R. Choose a set of generators for the group of symmetries. Draw enough of a Cayley diagram to show that these generators connect all copies of the fundamental domain.



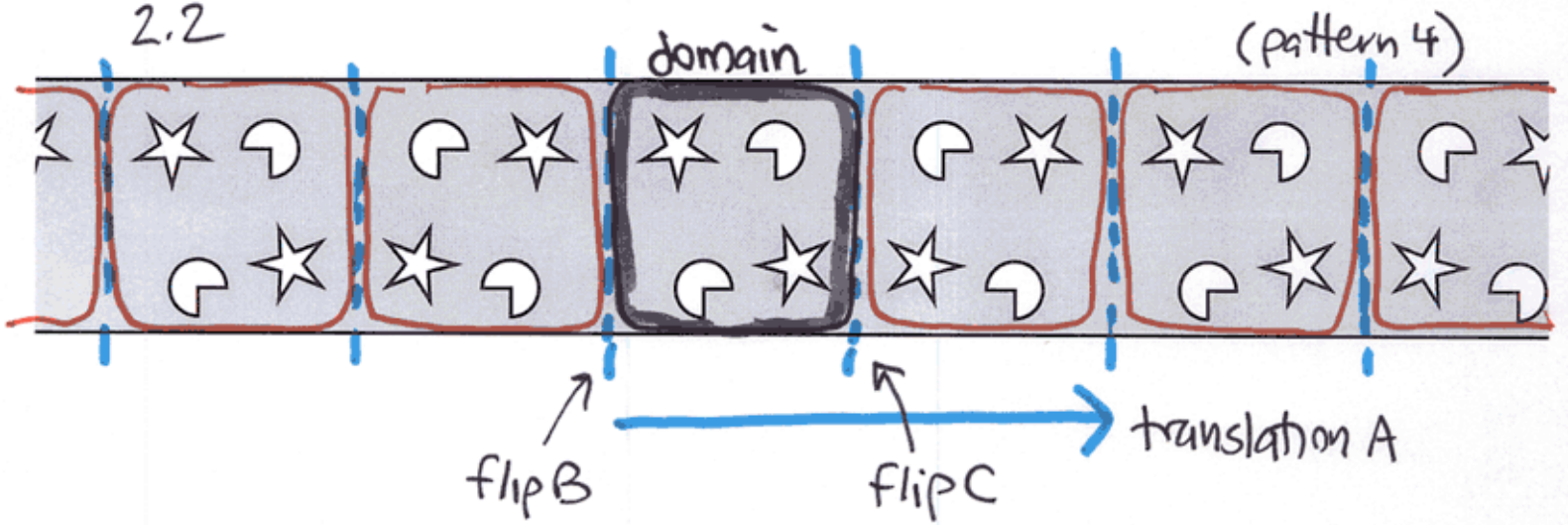
→ translation A

RRRRRRRR

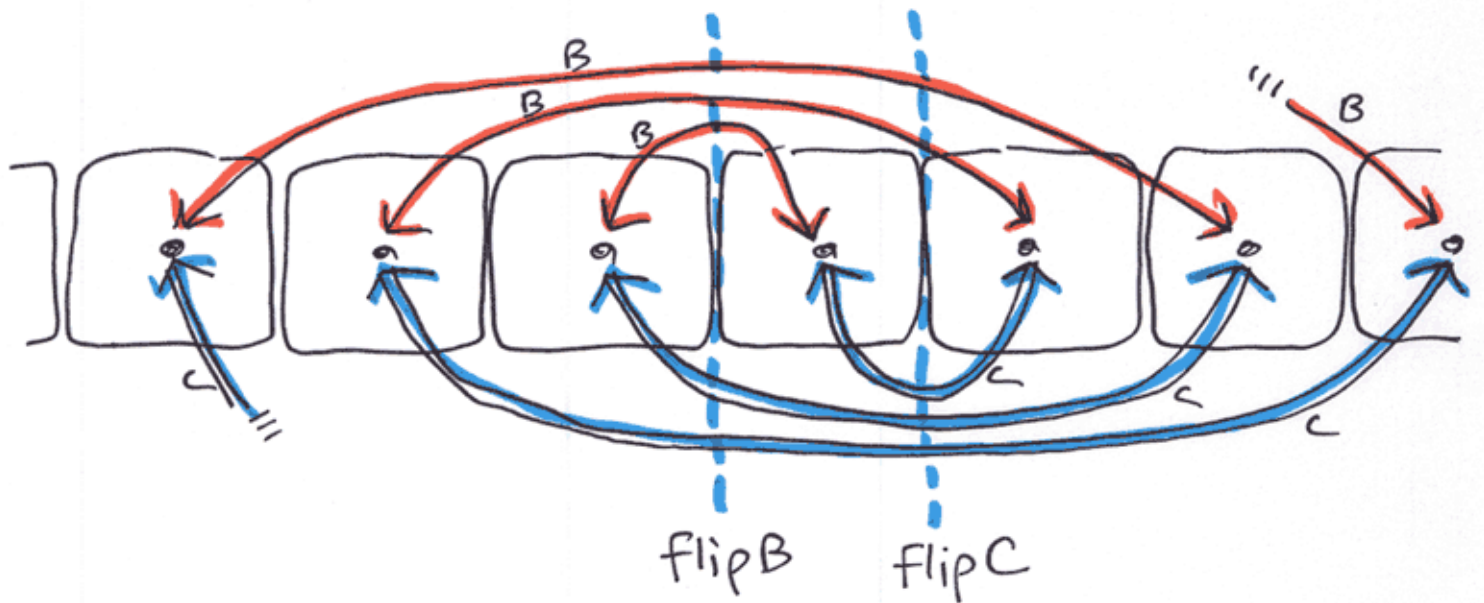


translation A generates group

2.2



R R R R R R R R

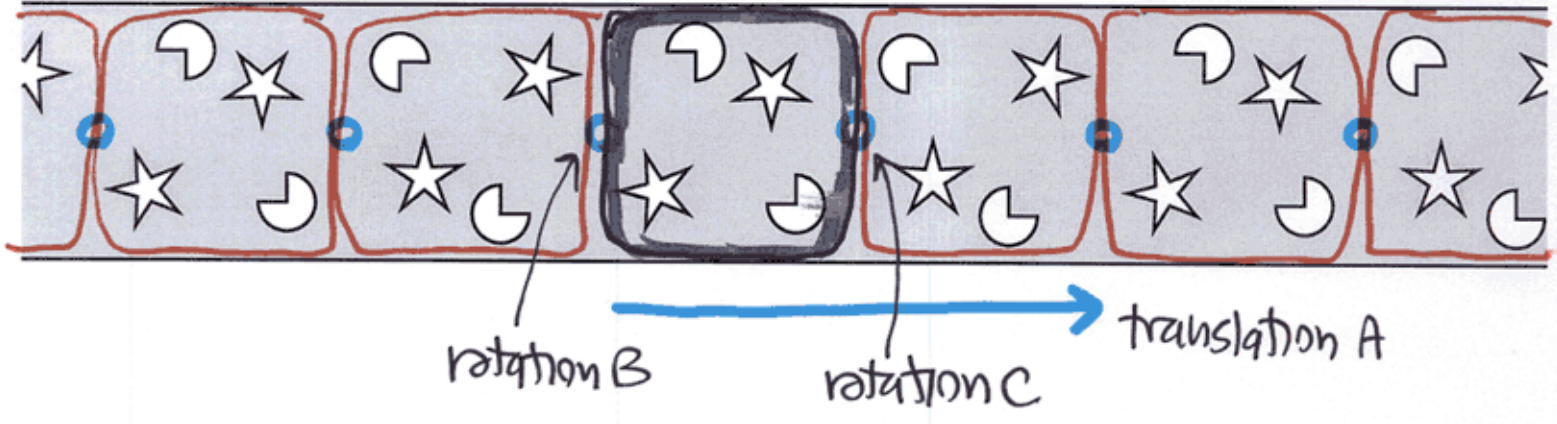


flips B and C generate group

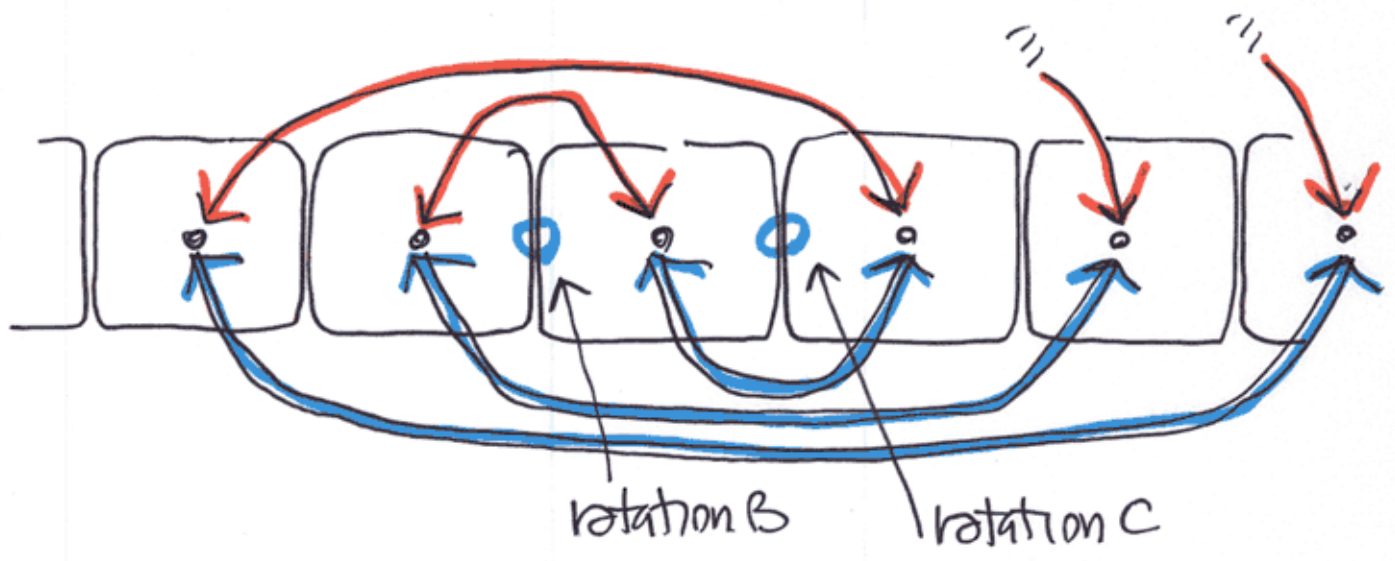
2.3

domain

(pattern S)



RRRBRBR

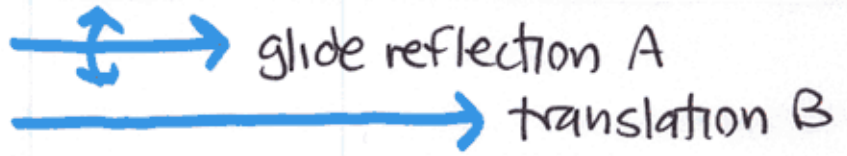
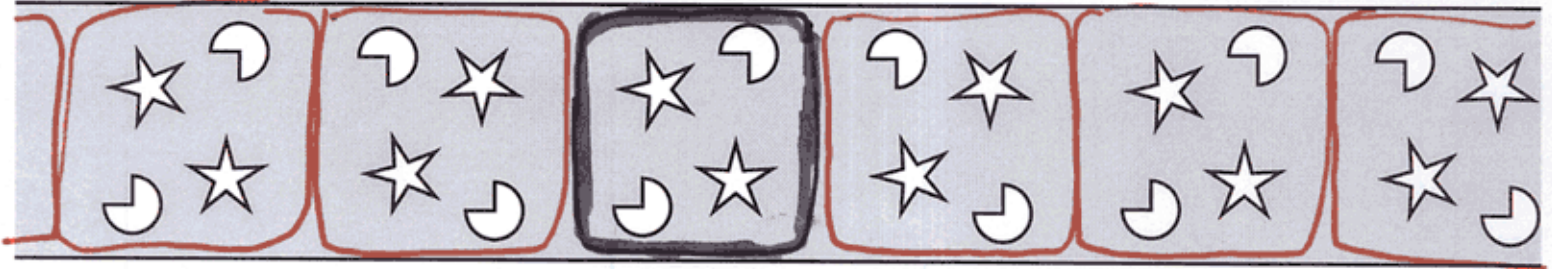


rotations B and C generate group

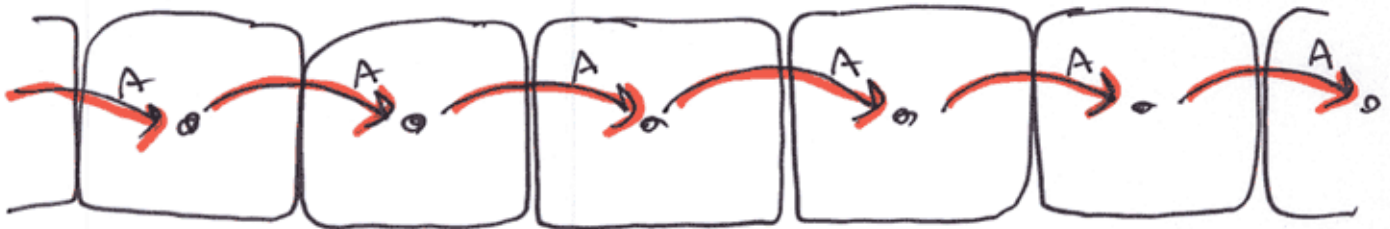
2.4

domain

(pattern 2)



RB RB RB RB RB



glide reflection A generates group

3.1

Practice Second Exam 3

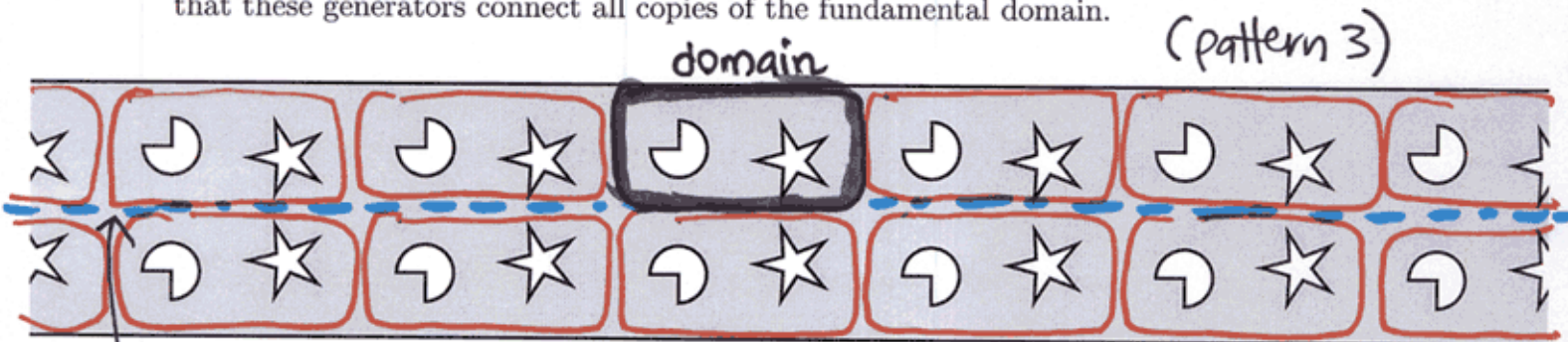
MATH V1010: Groups and Symmetry, Fall, 2003 (3, 4, 6, 1)

Name: Solutions School: _____

1	2	3	4	TOTAL

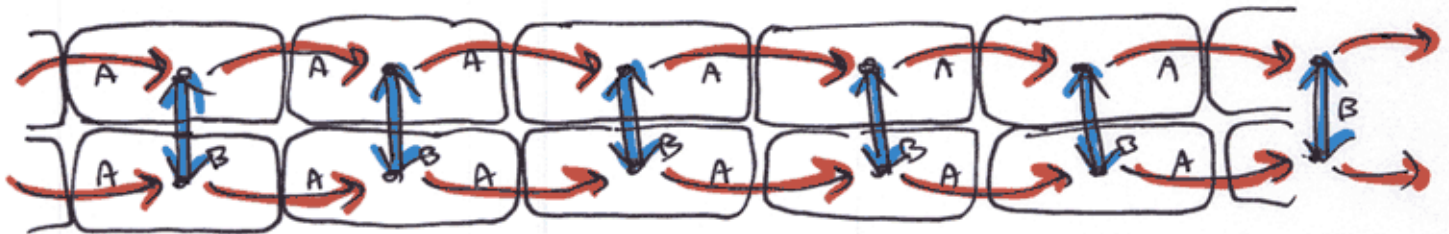
You may use scratch paper, but only these pages will be graded. Do not hand in your scratch paper.

For each strip pattern, find a fundamental domain. Find the symmetries of the pattern. Draw another strip pattern with the same symmetries, using just the letter R. Choose a set of generators for the group of symmetries. Draw enough of a Cayley diagram to show that these generators connect all copies of the fundamental domain.

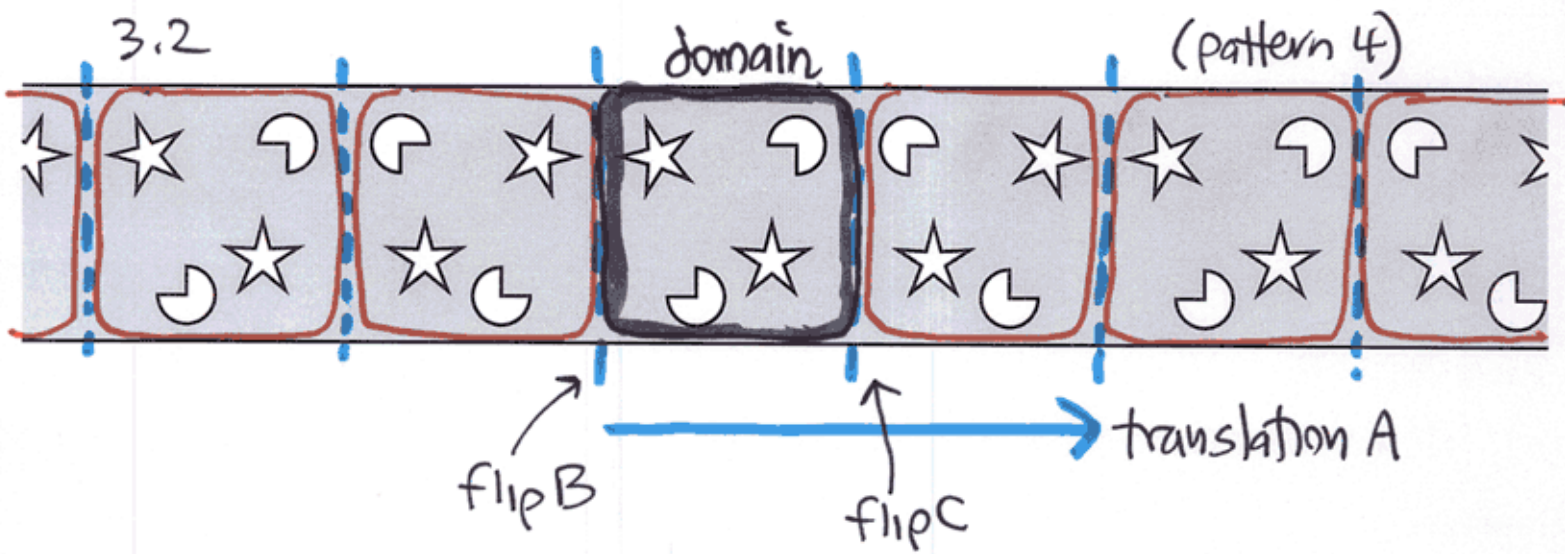


horizontal flip B → translation A

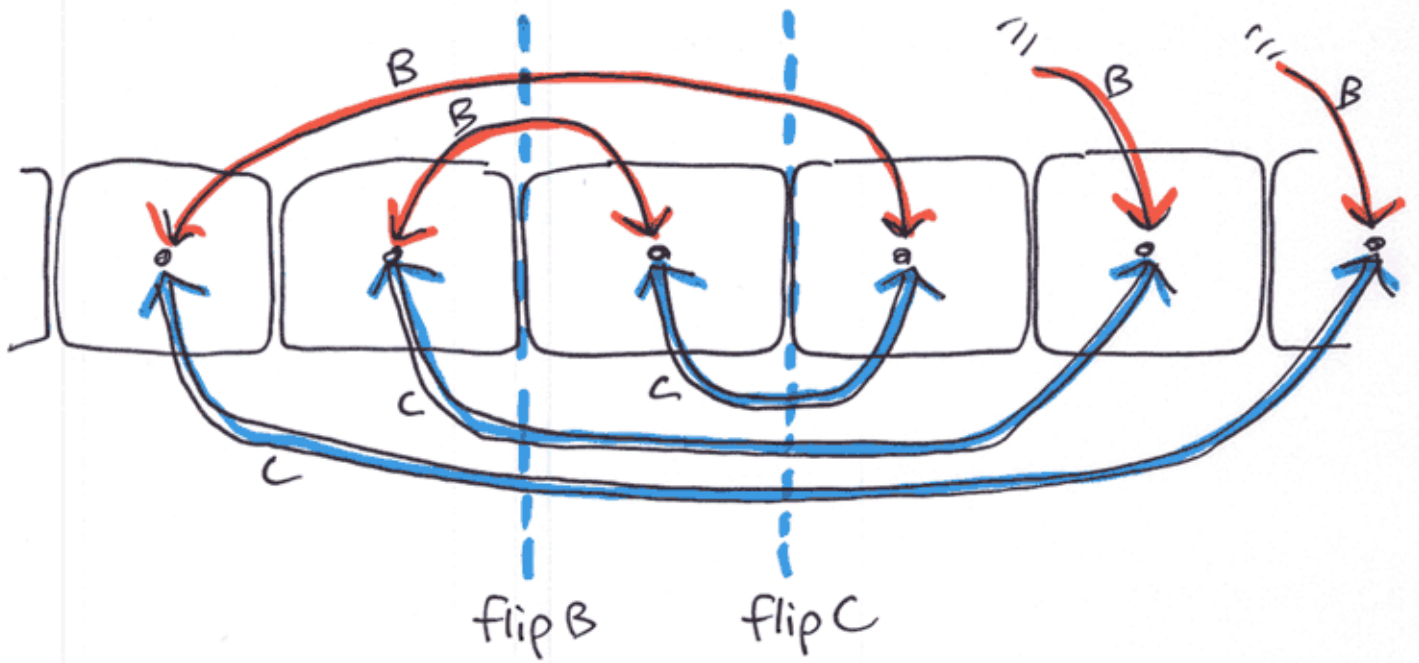
RRRRRRRR
BBBBBBBB



translation A and horizontal flip B generate group



R R R R R R R R

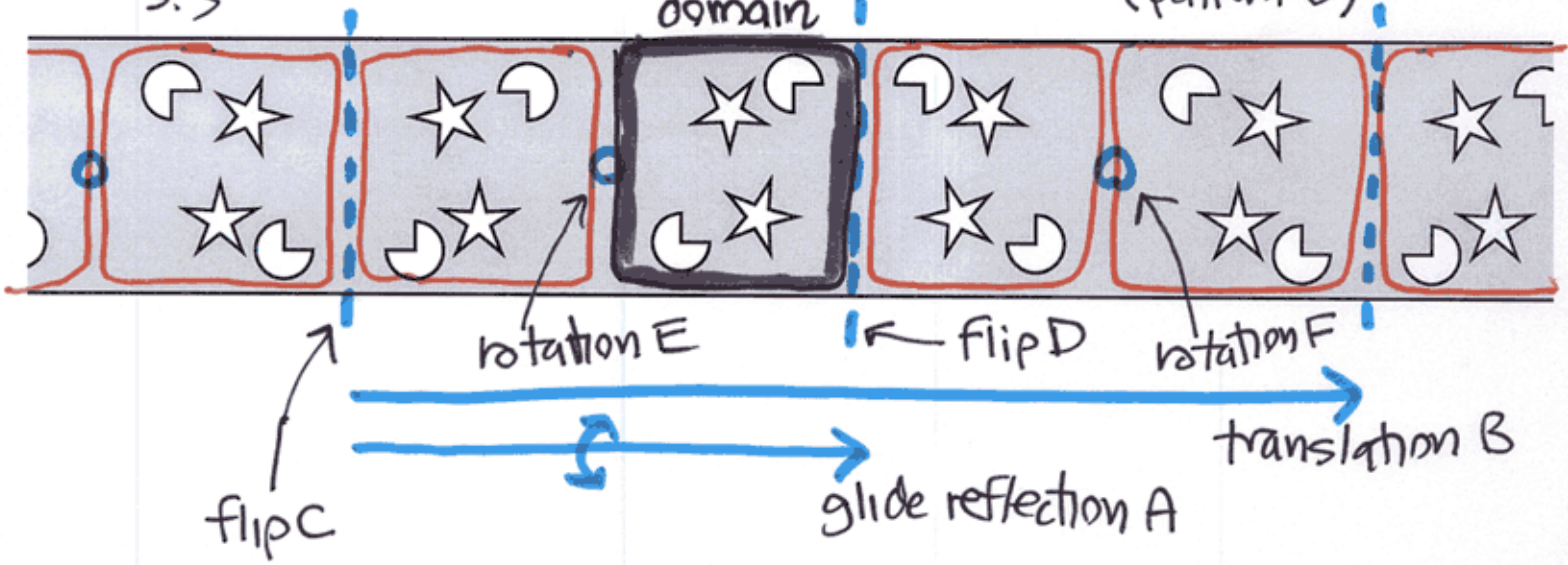


flips B and C generate group

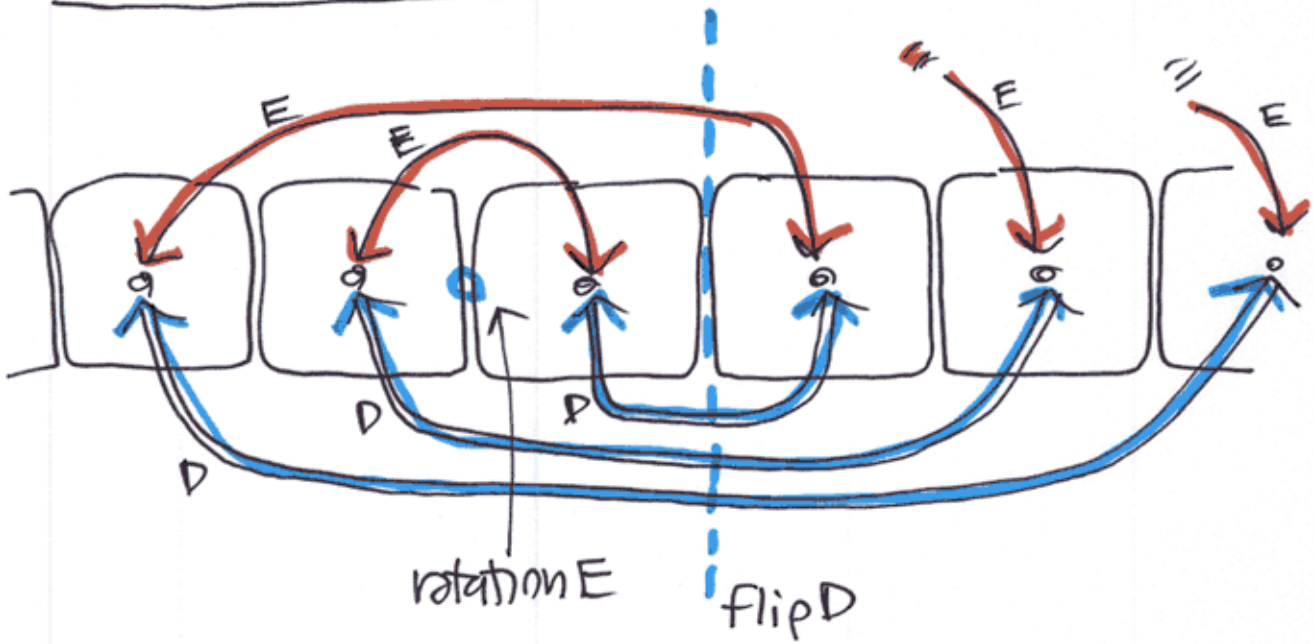
3.3

domain

(pattern 6)



R R B R B R

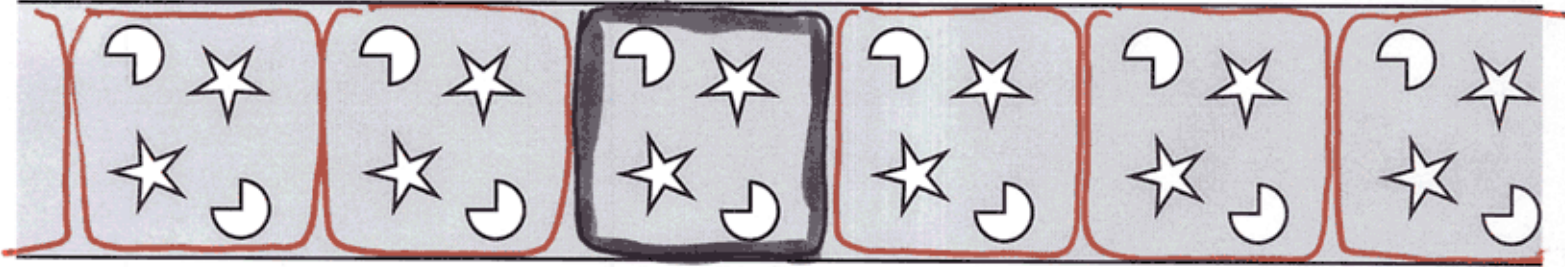


flip D and rotation E generate group

3.4

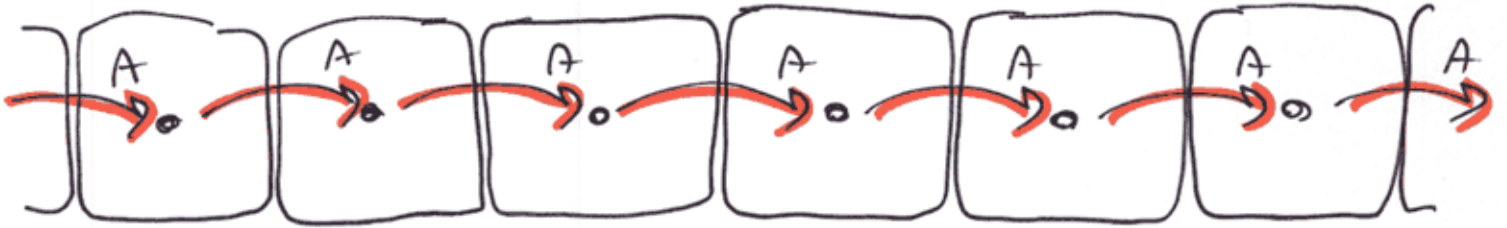
domain

(pattern 1)



translation A

RRRRRRRR



translation A generates group