



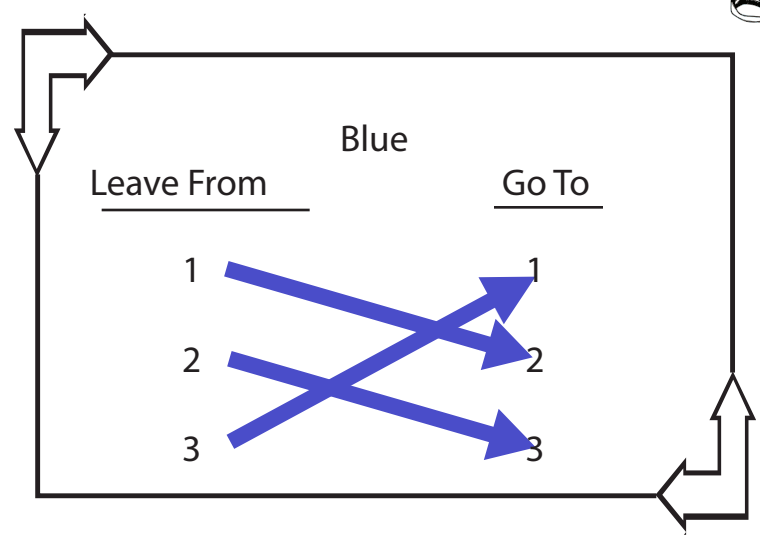
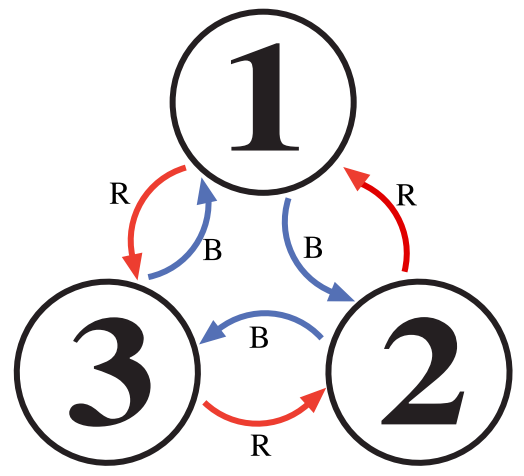
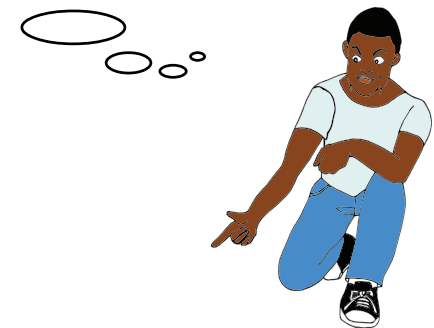
Section 9: Arrow Diagrams and Ordered Pairs

We'll continue our analysis of the problem by finding another representation for the functions of the red and blue roads. Just as each of the representations you and your classmates created emphasized different aspects of the experience, the representations mathematicians use also have different characteristics.


An arrow diagram has different parts. There are numbers for the "Leave From" buildings and the "Go To" buildings. There are also the arrows connecting the building numbers and the name of the command that you say to move the people. Let's focus on one arrow of an arrow diagram



Remember, each arrow in a arrow diagram has a "leave from" part and a "go to" part. Look at the arrow in the "Blue" arrow diagram that leaves from building 2 and goes to building 3. If you were in building 2 when someone called out "Blue", you would **start** in building 2 and **finish** in building 3. In other words, your movement would have an **order** to it. **First** you are in building 2 and **second** you are in building 3.



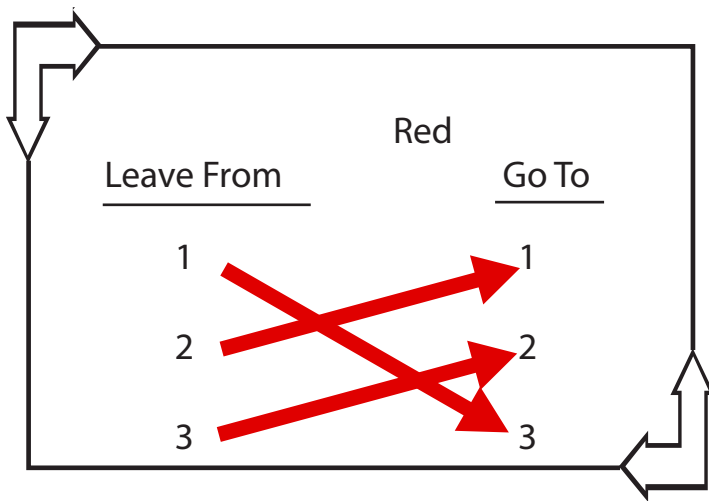
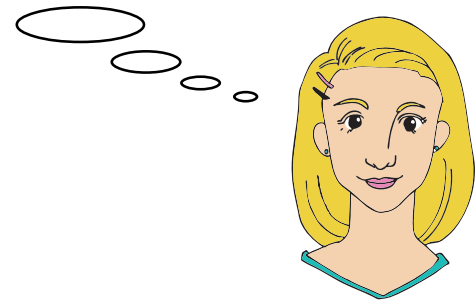


An easy way to represent this ordered movement is by putting the numbers in an **ordered pair** , (2,3). The number 2 is called the **first coordinate** and the number 3 is called the **second coordinate**. (The word coordinate comes from Latin where "co" means "with". In other words, a coordinate is "something we order with".) We can represent each of the arrows of the blue arrow diagram as an ordered pair. If we put all of the ordered pairs together in a collection, we would get something like this:

Blue
(1,2)
(2,3)
(3,1)

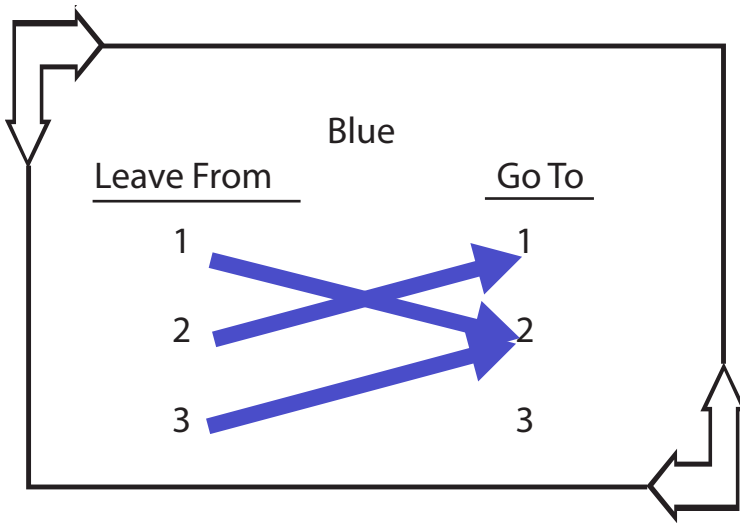
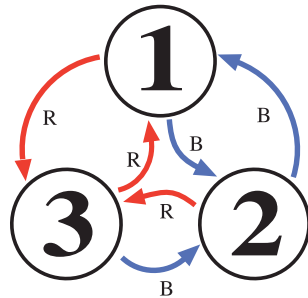


We say that the function of the blue roads is represented by this collection of **ordered pairs**. Here are the ordered pairs for the function of the red roads.



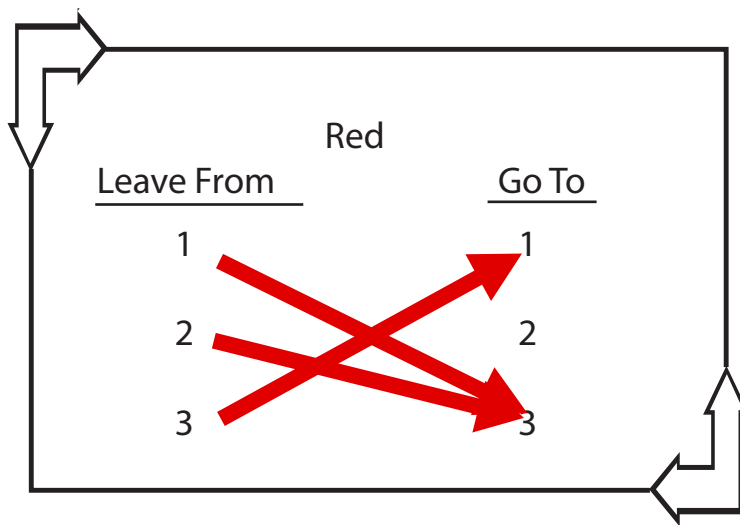
Red
(1,2)
(2,3)
(3,1)

Just as another example, let's represent the arrow diagrams from the coloring below as a collection of ordered pairs.



Blue

- (1,2)
- (2,1)
- (3,2)



Red

- (1,3)
- (2,3)
- (3,1)



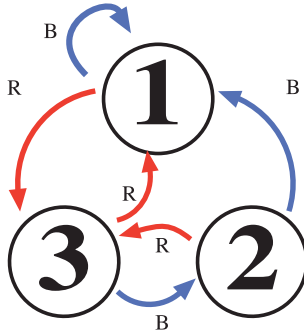
Individual Work

Exercise 9.1 Ordered pairs

Directions: For each city below, draw the arrow diagrams, and list the ordered pairs for the functions of the blue and red roads

Name _____ Teacher _____ Date _____

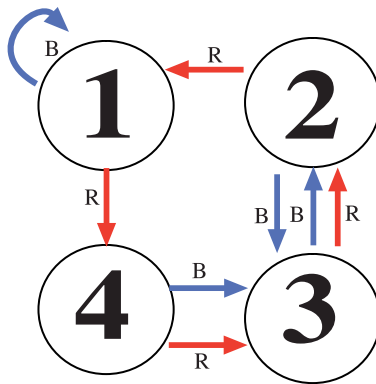
(a)



Blue		Ordered pairs for B
Leave From	Go To	
1	1	
2	2	
3	3	

Red		Ordered pairs for R
Leave From	Go To	
1	1	
2	2	
3	3	

(b)



Blue		Ordered pairs for B
Leave From	Go To	
1	1	
2	2	
3	3	
4	4	

Red		Ordered pairs for R
Leave From	Go To	
1	1	
2	2	
3	3	
4	4	



Individual Work

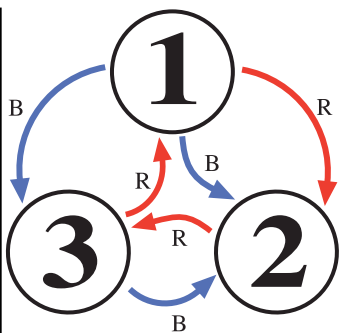
Exercise 9.2 Ordered pairs

Directions: For each city below, draw the arrow diagrams, and list the ordered pairs for the functions of the blue and red roads

Name _____ Teacher _____ Date _____

(a)

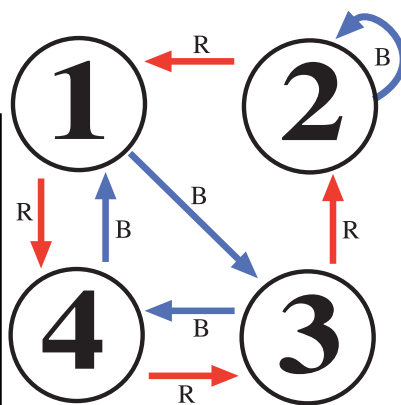
Blue		Ordered pairs for B
Leave From	Go To	
1	1	
2	2	
3	3	



Red		Ordered pairs for R
Leave From	Go To	
1	1	
2	2	
3	3	

(b)

Blue		Ordered pairs for B
Leave From	Go To	
1	1	
2	2	
3	3	
4	4	



Red		Ordered pairs for R
Leave From	Go To	
1	1	
2	2	
3	3	
4	4	



Individual Work Exercise 9.3 Ordered pairs

Directions: Given the collections of ordered pair below, draw the associated arrow diagrams for the red and blue roads, then produce the directed graph for the city.

Blue

(1,2)
(2,1)
(3,4)
(4,3)

Red

(1,2)
(2,3)
(3,1)
(4,4)

Blue

Red

1	1
2	2
3	3
4	4

1	1
2	2
3	3
4	4

1

2

4

3

