Gus the Goose

Gus the Goose went out to play

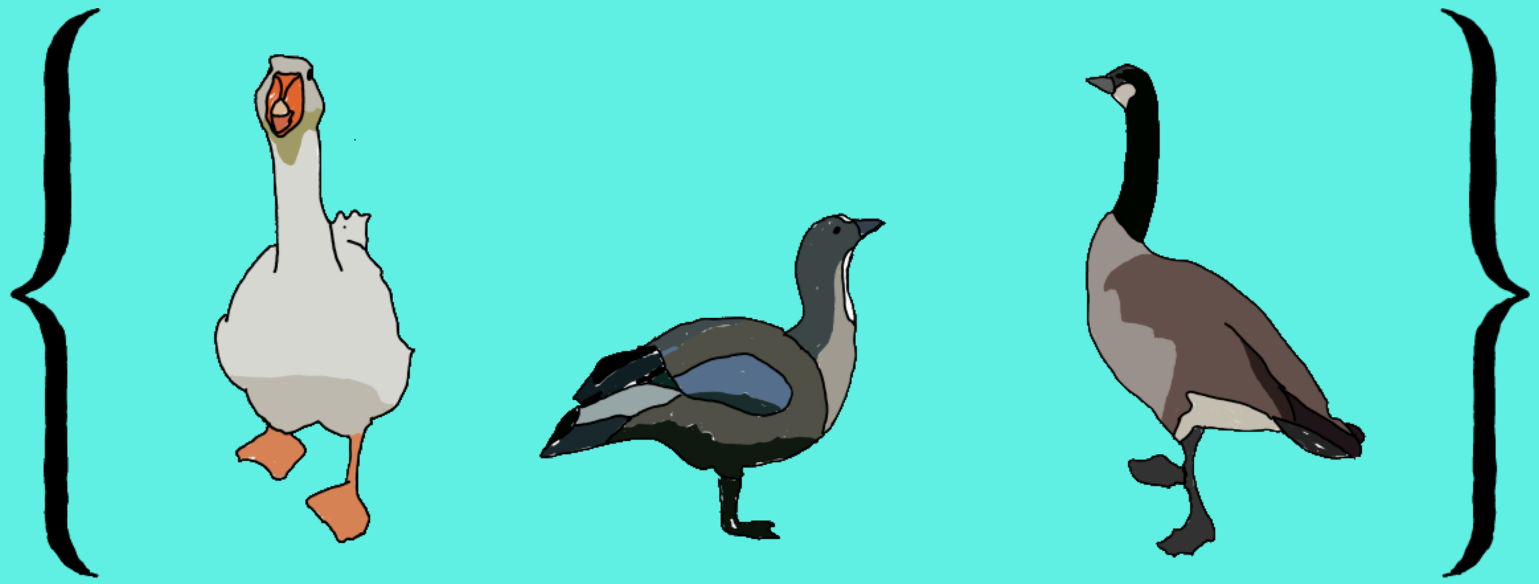
Out with friends one sunny day

How many? You may wish to ask?

The **set** of friends with whom Gus basked?

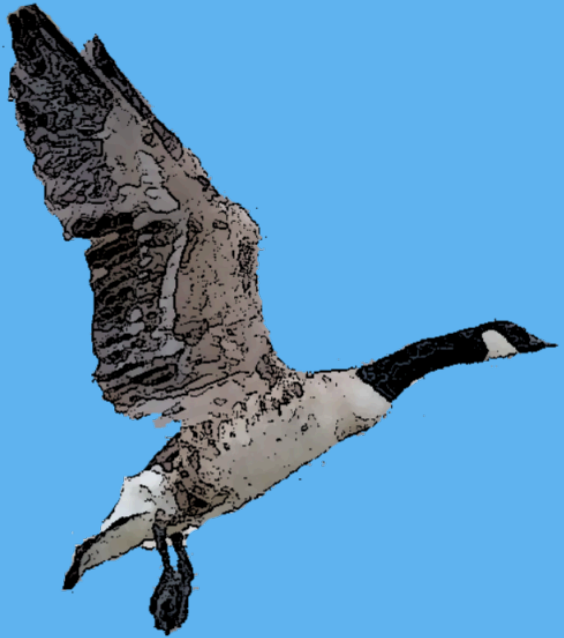
He began to count them $|(1, 2, 3)|$

And found out the **cardinality**!



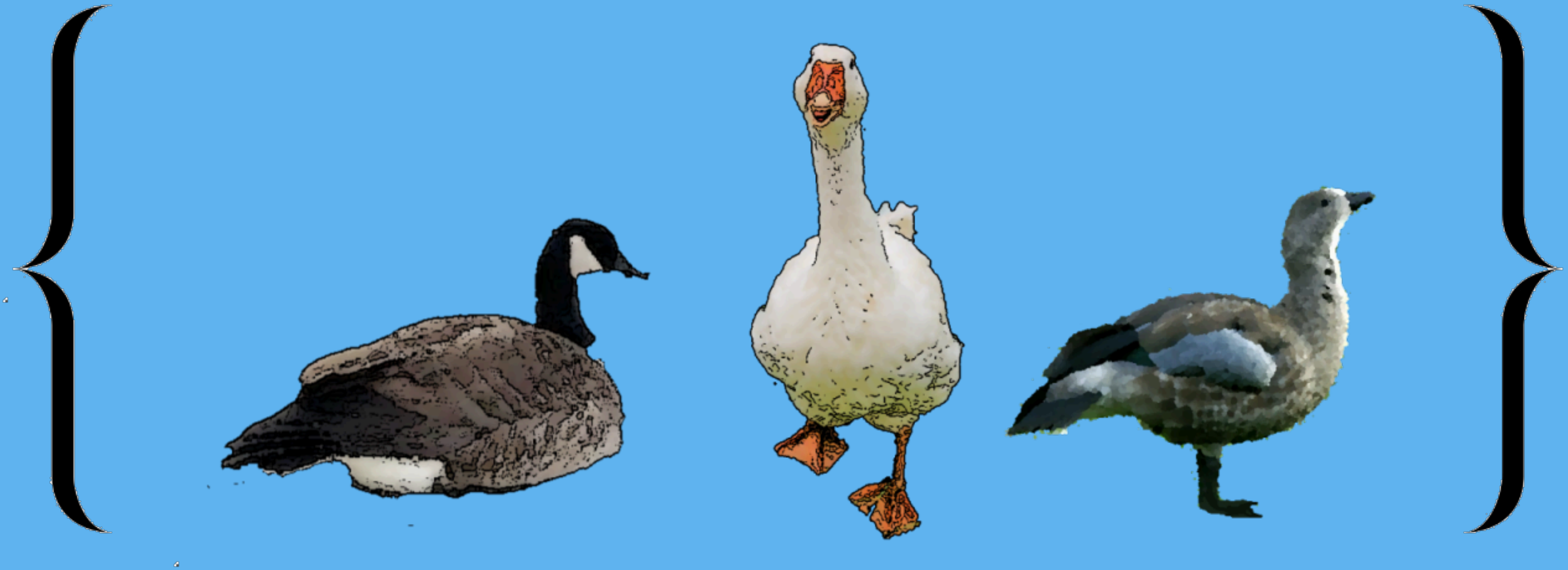
Tomorrow new friends came to play

And some friends had to go away



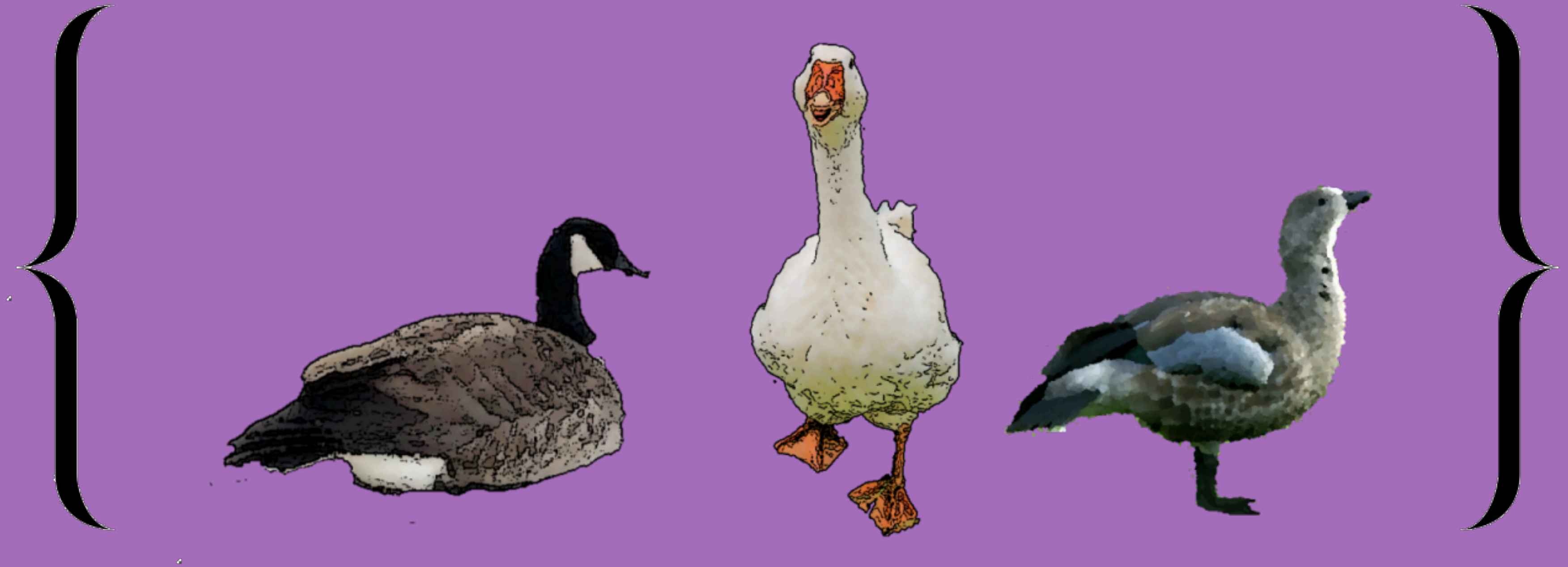
This gave a new set: {2, 3, 4}

Looks like Gus has friends galore!



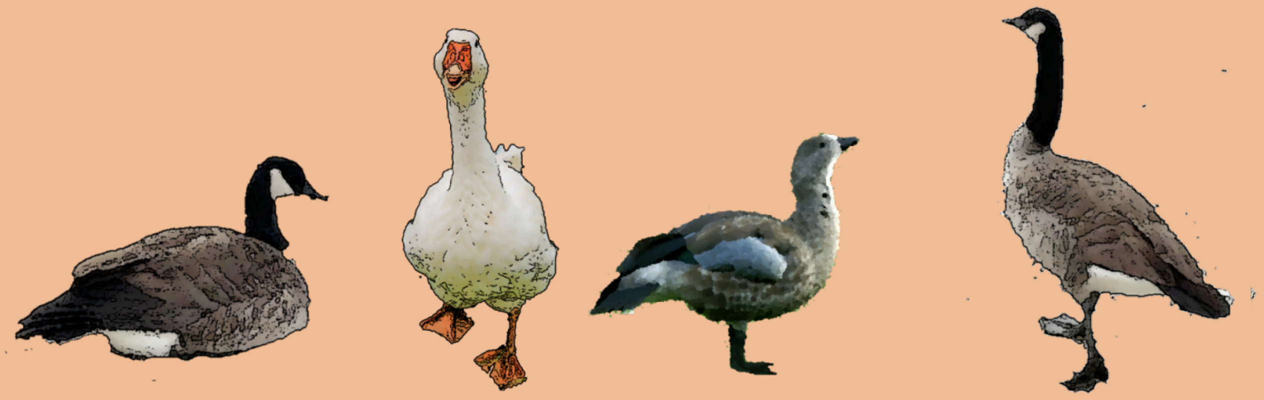
Yesterday, we called friends “A”

Today Gus plays with friends called “J”



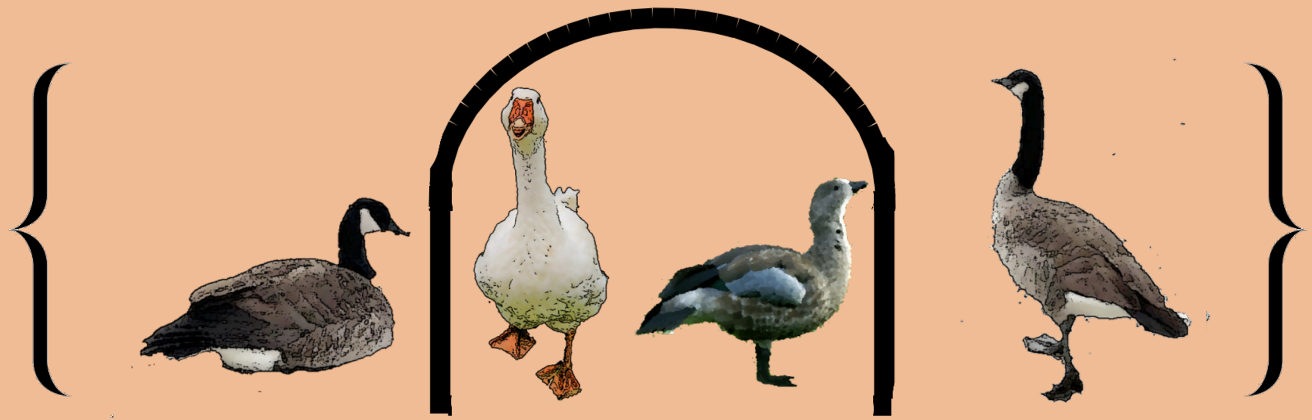
What are these two sets put together?

The **union** of these friends forever?

$K = \{$  $\}$

We get set K with all of them!

For Gus, the games have just begun.

$K=$ 

What about the geese who stayed?

The **intersection** of both days?

We get {2, 3} as you can see,

Its got "2" cardinality!

Just be careful ‘bout the count,

The sum of both may be large amounts!

Soon the geese began to play

Dodgeball would make it a great day!

Lets make teams, two sets, P and T

Each one a **subset** of the big group G

After they recorded the game

The

This **relation** between them shows us the game

Who hit who and who stayed the same

A relation like this is also a set

The **cartesian product** is the biggest one yet

After the question, losing team had their doubts

When in the game did each person get out?

They made a **relation** of each person and times

To find when each person had gone behind.

Each person could only have once been outed

So there is only one pair (player, time) per player who pouted

Because at the end, every player was outed

This **function** took inputs and then outputted

The time that each goose got knocked out

So that they could see without a doubt

That they had lost and the others had won

But that's OK, they had lots of fun!

Gus was happy

He had had a great day

He wanted to go home

but couldn’t find a way

He needed to get from house to house

But he wanted to travel, as quick as a mouse

He had a list of all the streets

A relation on all the places to eat!

This **graph** he drew as quickly as he could

Carving a tangle of **vertices** and **edges** on wood

How could he get from house A to house Z?

Could he make unique paths for each pair (c, d)?

Once he made it back home he had an idea

How could he connect all the houses together?

He didn’t want to have to become absentee

So the new acyclic graph he called it a tree!

Gus was exhausted, but had had a great day

He went back to bed, and drifted away

When he woke up, refreshed the very next morning

He wondered and wondered what to do with these?

He knew that the graphs had different properties

But how could he know, and be sure as could be?

“I can argue directly ‘A leads to B’

But it may not be easy, its clear to see“

What if I went through another direction?

I start with the opposite and find a contradiction?

That means that the opposite cannot be true

So the statement is done, and we know, woo-hoo!