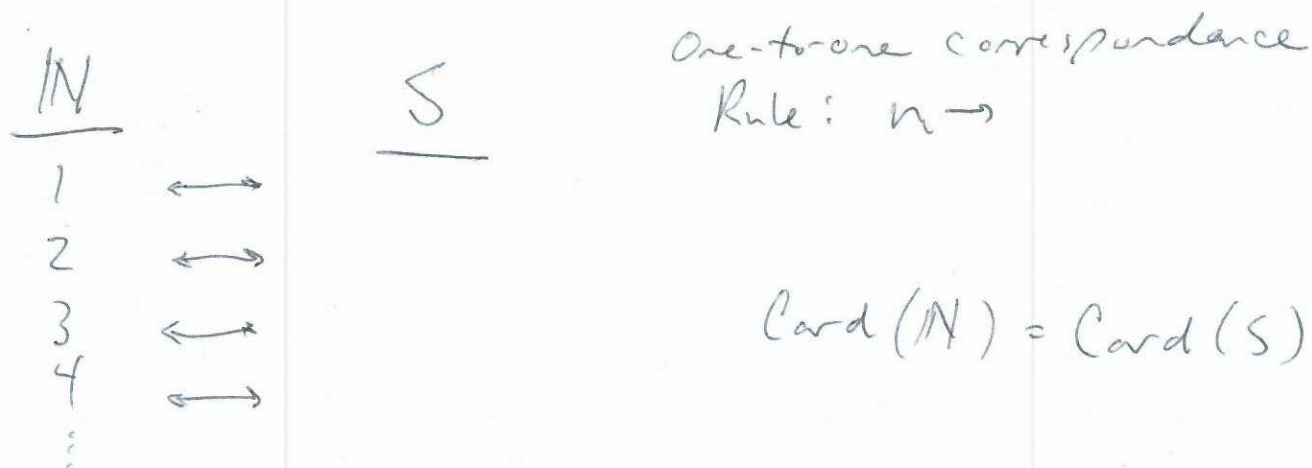


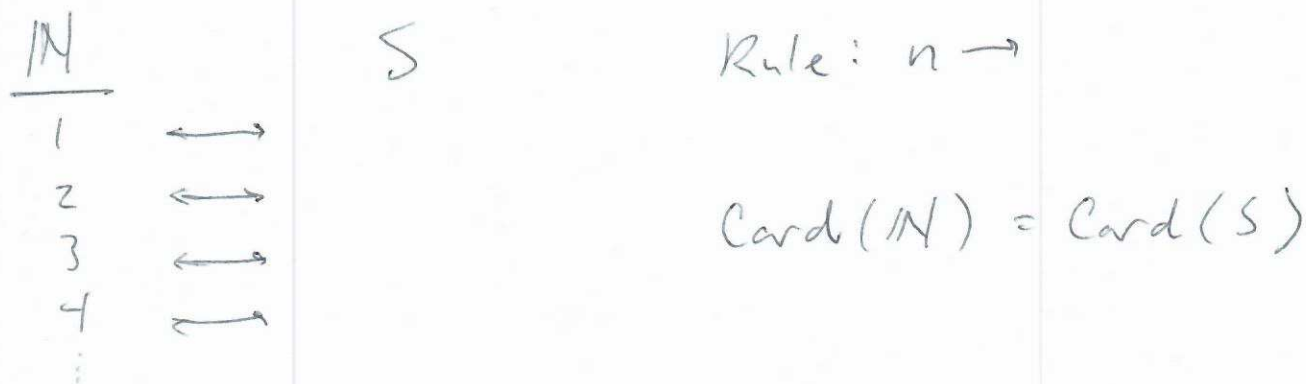
Hilbert's Hotel

Where did the guests go?

One couple shows up, + we found them a room.



Infinite school bus shows up:



Infinitely many infinite school buses show up:



Power sets are bigger!

<u>Set S</u>	# of elements	<u>Power set P(S)</u>	# of elements
{ }	0		
{ 1 }	1		
{ 1, 2 }	2		
{ 1, 2, 3 }	3		

Imagine that there is a one-to-one correspondence between the set $S = \{1, 2\}$ & its power set $P(S)$. Here it is:

<u>S</u>	<u>P(S)</u>
1	\leftrightarrow { 1 }
2	\leftrightarrow { }

Oops! $A = \{2\}$ is not on the list:

If $1 \in \{1\}$, $1 \notin A$; otherwise $1 \in A$.

If $2 \in \{ \}$, $2 \notin A$; otherwise $2 \in A$.

We can disprove this supposed one-to-one correspondence by producing an element of $P(S)$ that is not on the list above; that isn't at the dance. This is called "proof by contradiction".