[10-10-15-T]

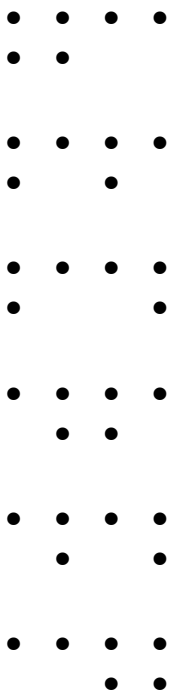
Indistinguishable objects

How many ways may 2 objects be selected from 4 identical objects?

It may seem that this selection may be made in only one way, since the 4 objects are indistinguishable. But this is not the case.

As Plato would put it, the objects are four in number, but one in kind. Even though the 4 objects are indistinguishable, they are not one object, but 4 objects. If you do not believe this, imagine you are asked to bring 4 identical lego blocks to school. Of course you can do this. And, unless you miscount the number of blocks, there is no doubt you will produce 4 lego blocks in class, even though the blocks are indistinguishable.

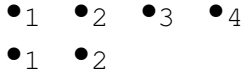
In the table below, the first row consists of four identical balls. The second row shows a selection of two of those four balls.



There is no doubt that there are 6 ways to select 2 from 4 identical balls.

So, where does the part about the balls being identical come into play?

Well, if the balls were distinguishable, then each selection of two could be arranged in two ways. For example, the first selection of two balls produces two arrangements.



$\bullet_1$ $\bullet_2$ $\bullet_3$ $\bullet_4$
$\bullet_2$ $\bullet_1$

But, since the balls are indistinguishable, each selection of two does *not* give rise to two arrangements.

Question: How is taking 2 of 4 distinguishable lego blocks at the same time different from taking from four distinguishable blocks first one block and then a second block?