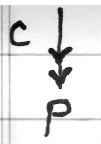
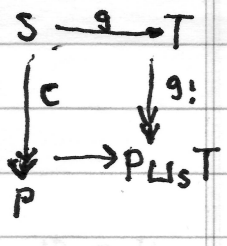
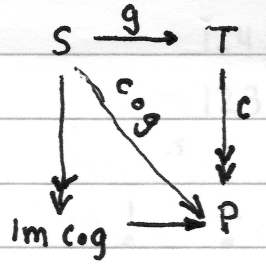






$S = \{1, 2, 3, 4\}$

$T = \{12, 3, 4\}$

$g : S \to T$

$g(1) = g(2) = 12$

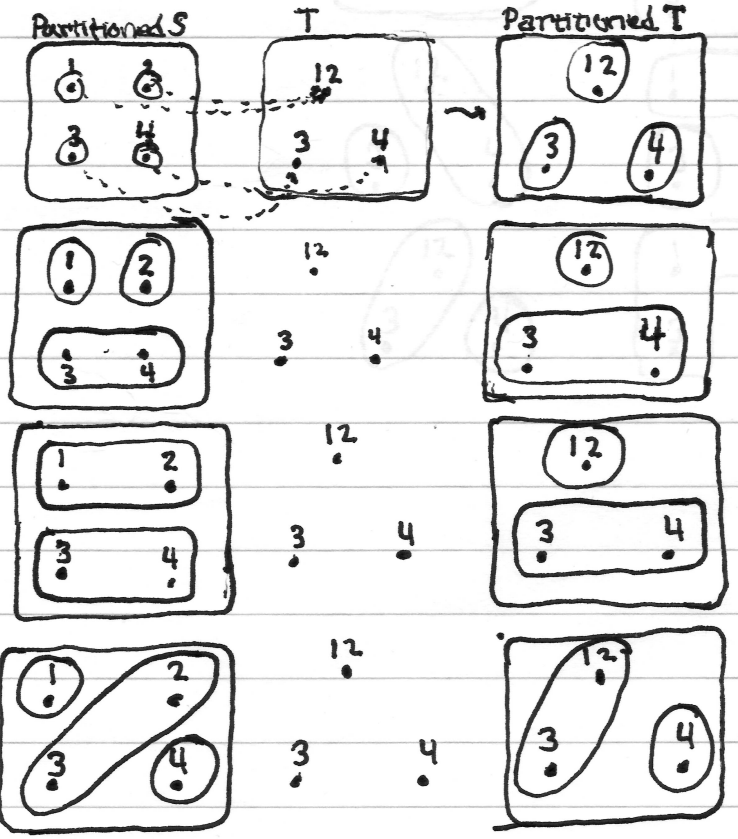
$g(3) = 3 \quad g(4) = 4$

1.97) 15 partitions of a set with 4 elements.

1, 2, 3, 4	$c : S \twoheadrightarrow P$	$g!(c) =$	12, 3, 4
1, 2, 34			12, 34
12, 34			12, 34
1, 23, 4			123, 4

There are Fifteen of these

There are Five of these



In each case $g!$ has the effect of identifying (treating as equivalent) points 1 and 2

This is a sum (colimit)

The S-part that 1 is in merges (union) with the one that 2 is in.

$[\![12]\!] \sim [\![1]\!] \cup [\![2]\!]$

1 2 3
12 3
1 23
2 3
123

$s \leq g!(s)$

1.99) Five partitions on a set of 3 elements {12, 3, 4}

12, 3, 4

1234

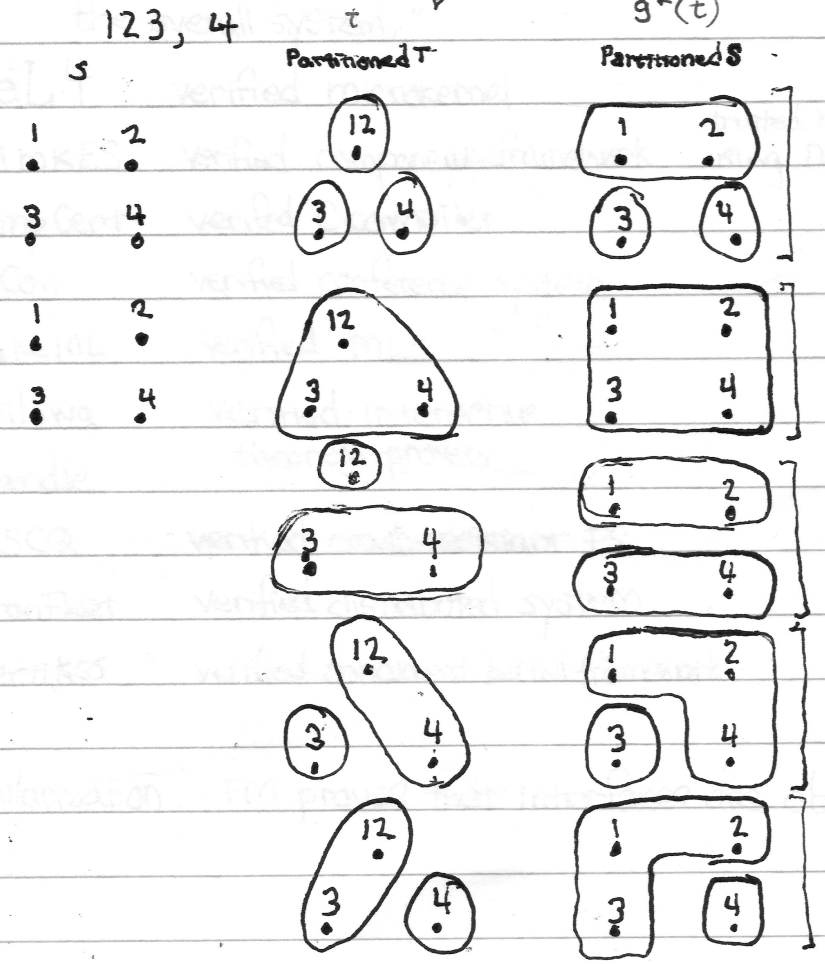
12, 34

124, 3

123, 4

There are exactly five of these.

But there are fifteen of these.



g* has the effect of spreading out single point 12 into two points 1, 2 that are always in the same part (equivalent)