

Discrete Mathematics – Day 8 – 9/15/03

1	2	3	4	5	6	7	8
3	4	2	7	8	1	5	6

3 ended up in 1st position
 4 ended up in 2nd position

(3 → 1 → 6 → 8 → 5 → 7 → 4 → 2)

- Any permutation can be written in cycle notation.

(.....) (.....) (.) (....) (.....)

|
fixed point

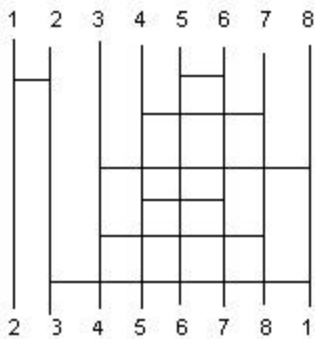
- Fact: every permutation is just a bunch of cycles. (every permutation is a product of cycles)
- Thm:-** A web diagram for an n -cycle must have at least $n-1$ lines

0, 1, 2, 3, 4, 5, 6, 7

* 7 is the most lines we need to go to home position

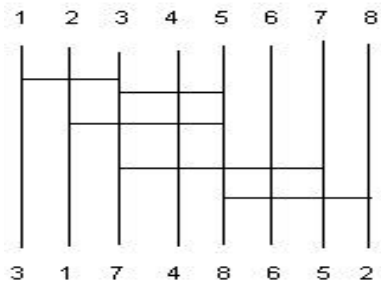
* even #s is out

* 1,3 is too small.



(1-8-7-6-5-4-3-2-) ===== this is the cycle notation for that permutation

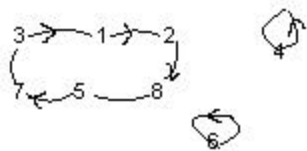
- What does adding a single line at the bottom of a web diagram do to the permutation diagram?



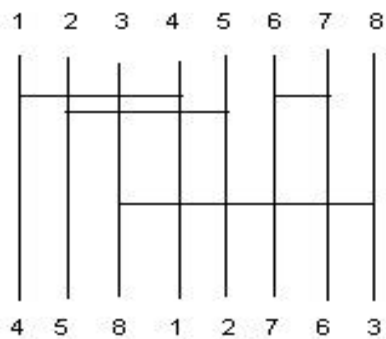
The cycle notation for 3174652 is

$(4)(6)(3-1-2-8-5-7)$

The permutation digraph for that permutation is



- There are many ways to write a given permutation in a cycle notation.



the diagram needs 4 lines and it has 4 cycles.

$(1-4)(2-5)(3-8)(6-7)$