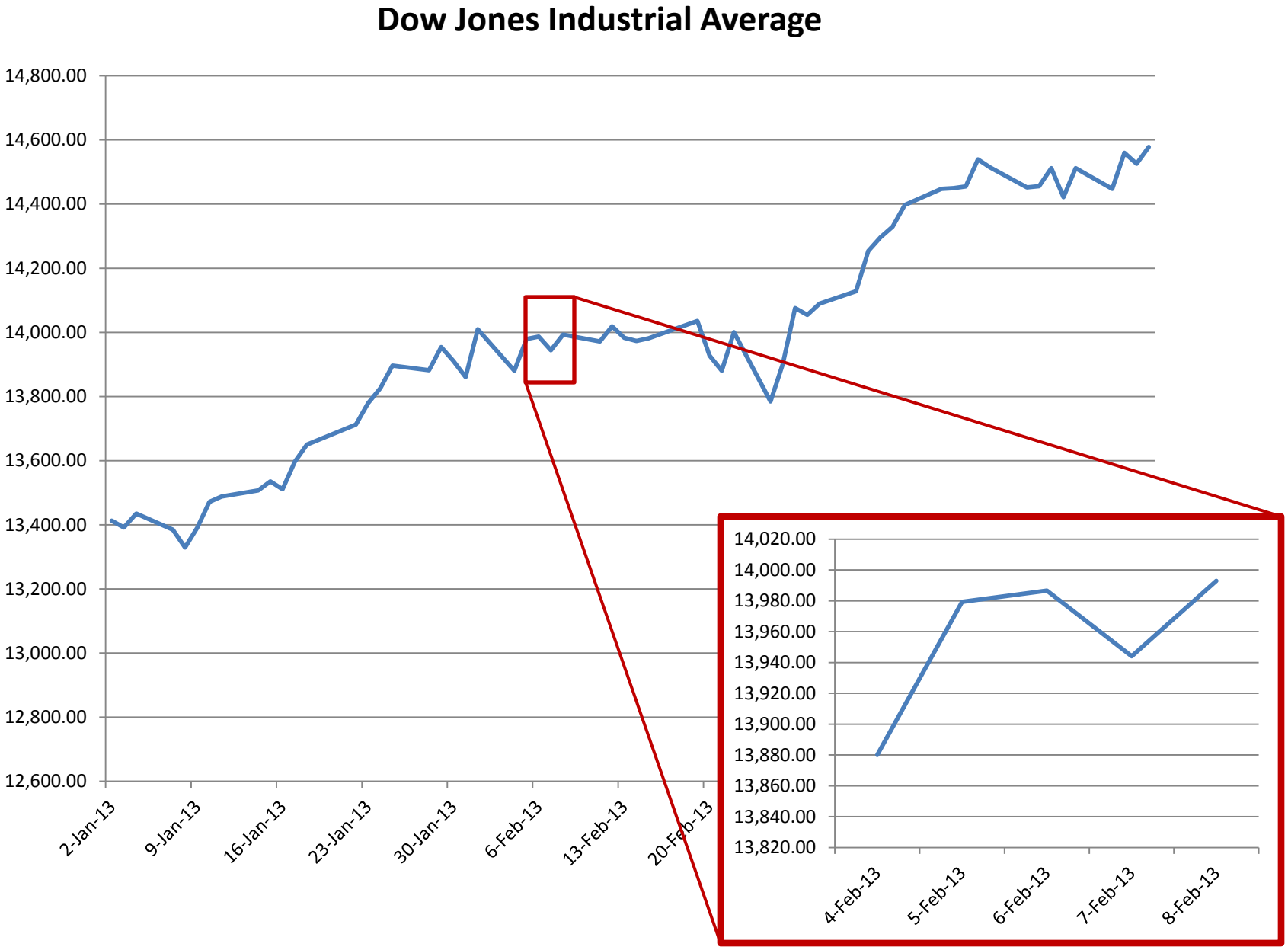
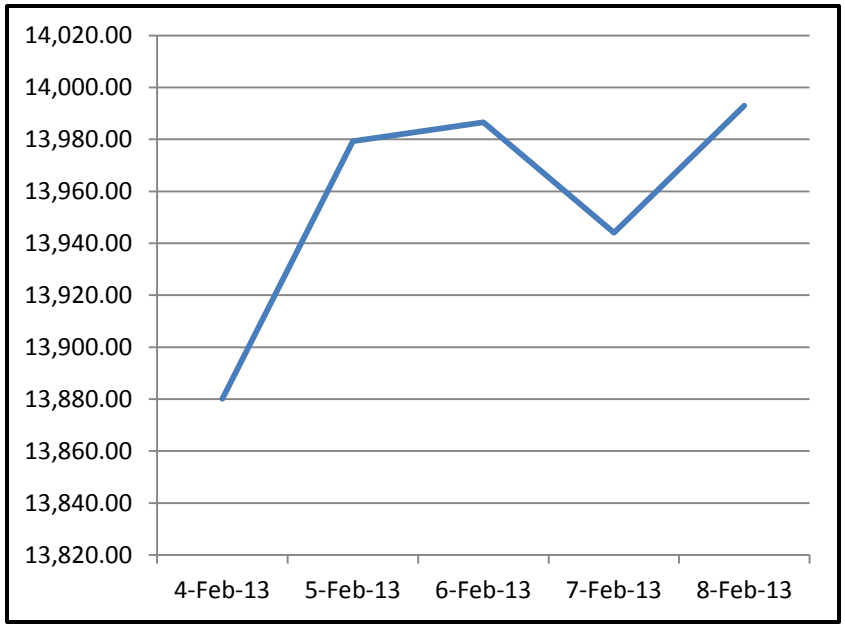
The “Fair” Stock Market and Probabilities of Pattern Occurrence

Megan Martinez, Dartmouth College


Dow Jones Industrial Average
14,800.00
14,600.00
14,400.00
14,200.00
14,000.00
13,800.00
13,600.00
13,400.00
13,200.00
13,000.00
12,800.00
12,600.00
2-Jan-13
9-Jan-13
16-Jan-13
23-Jan-13
30-Jan-13
6-Feb-13
13-Feb-13
20-Feb-13
14,020.00
14,000.00
13,980.00
13,960.00
13,940.00
13,920.00
13,900.00
13,880.00
13,860.00
13,840.00
13,820.00
4-Feb-13
5-Feb-13
6-Feb-13
7-Feb-13
8-Feb-13



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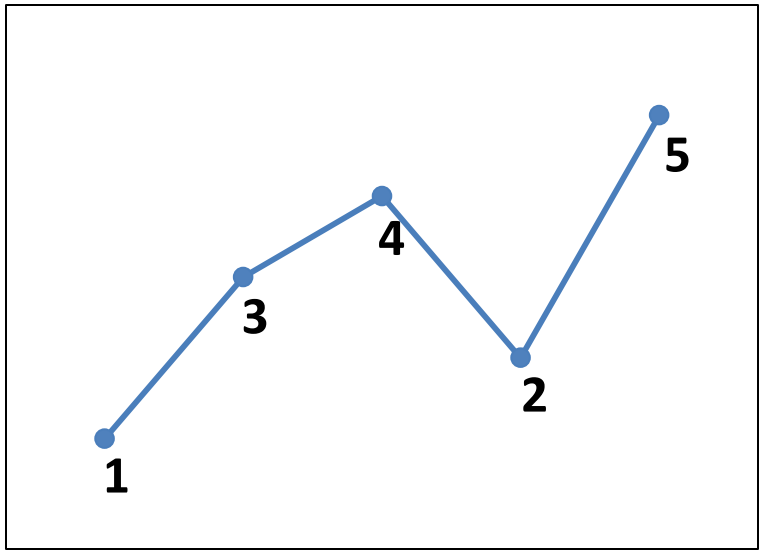
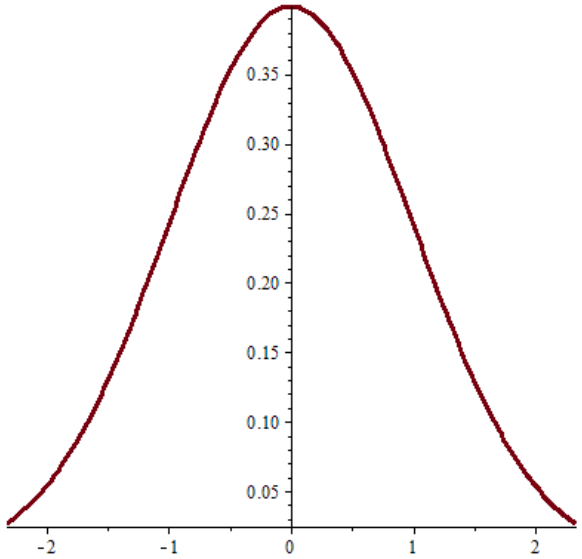
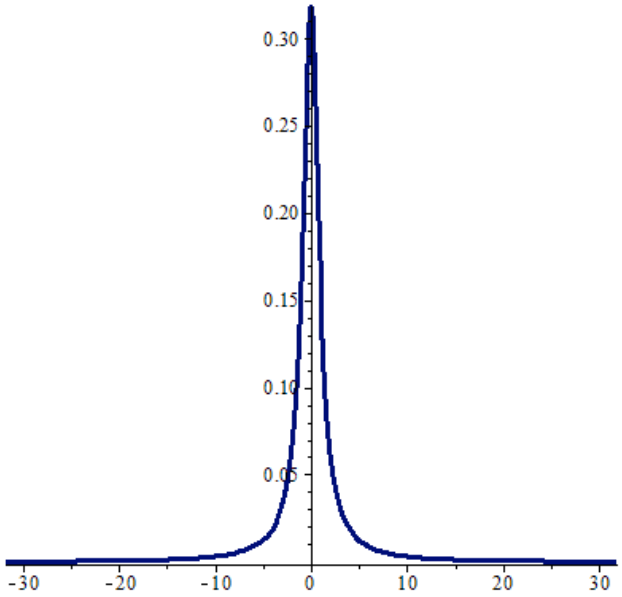


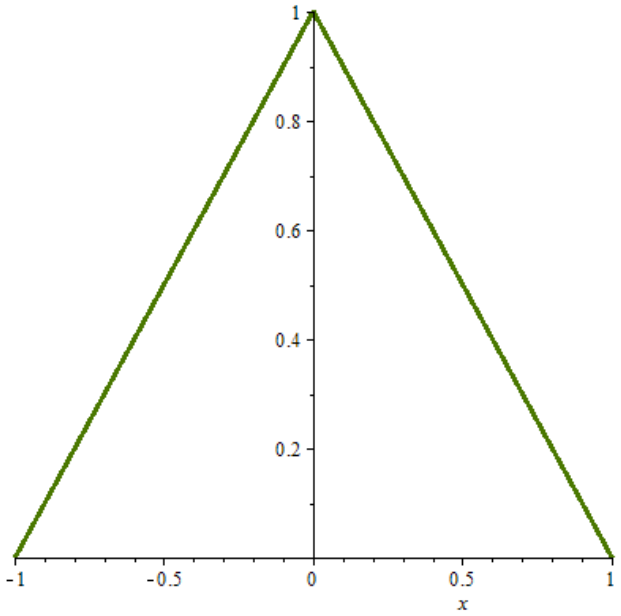
13425

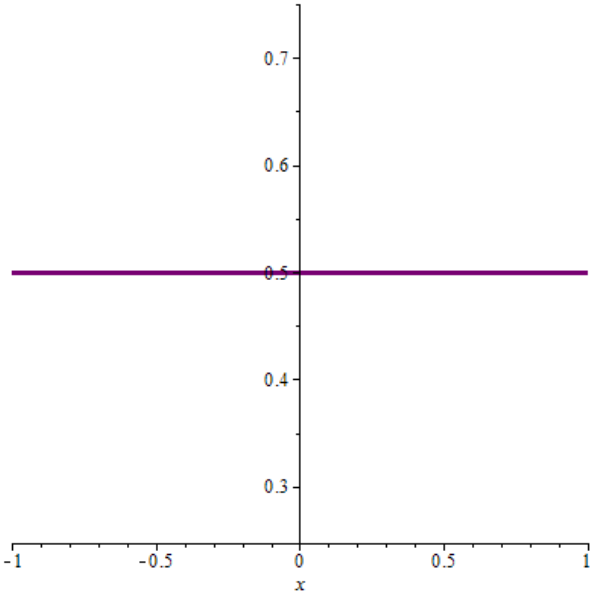
Patterns in the Stock Market can be described with **permutations**.

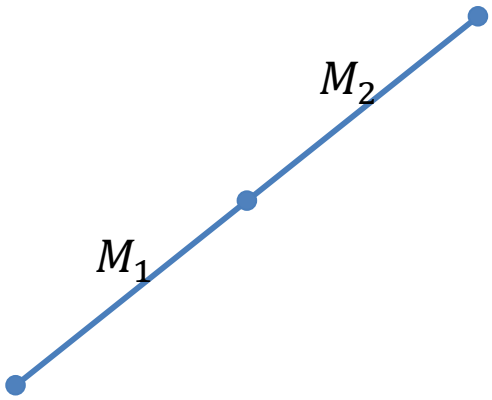
The “Fair” Part





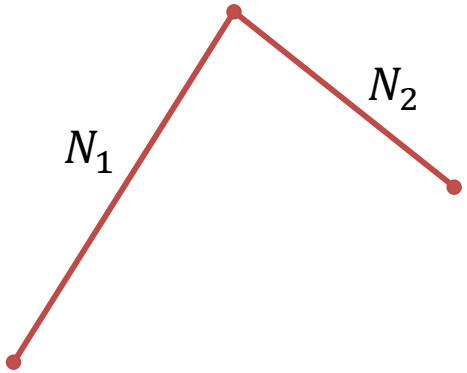






123

$$Prob(123) = \left(\frac{1}{2}\right) \times \left(\frac{1}{2}\right)$$



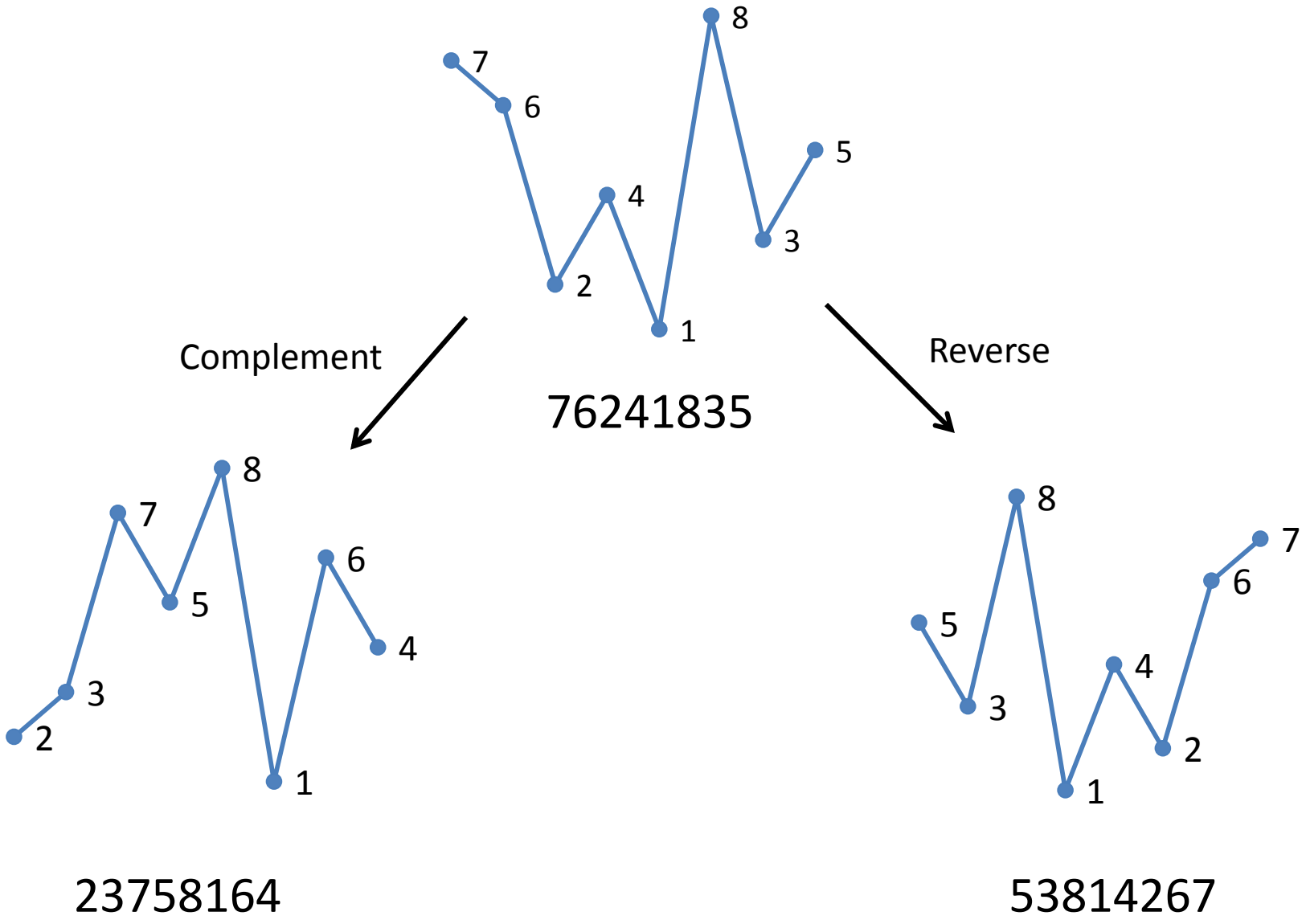
132

$$Prob(132) = \left(\frac{1}{2}\right) \times \left(\frac{1}{2}\right) \times Prob(N_2 < N_1)$$

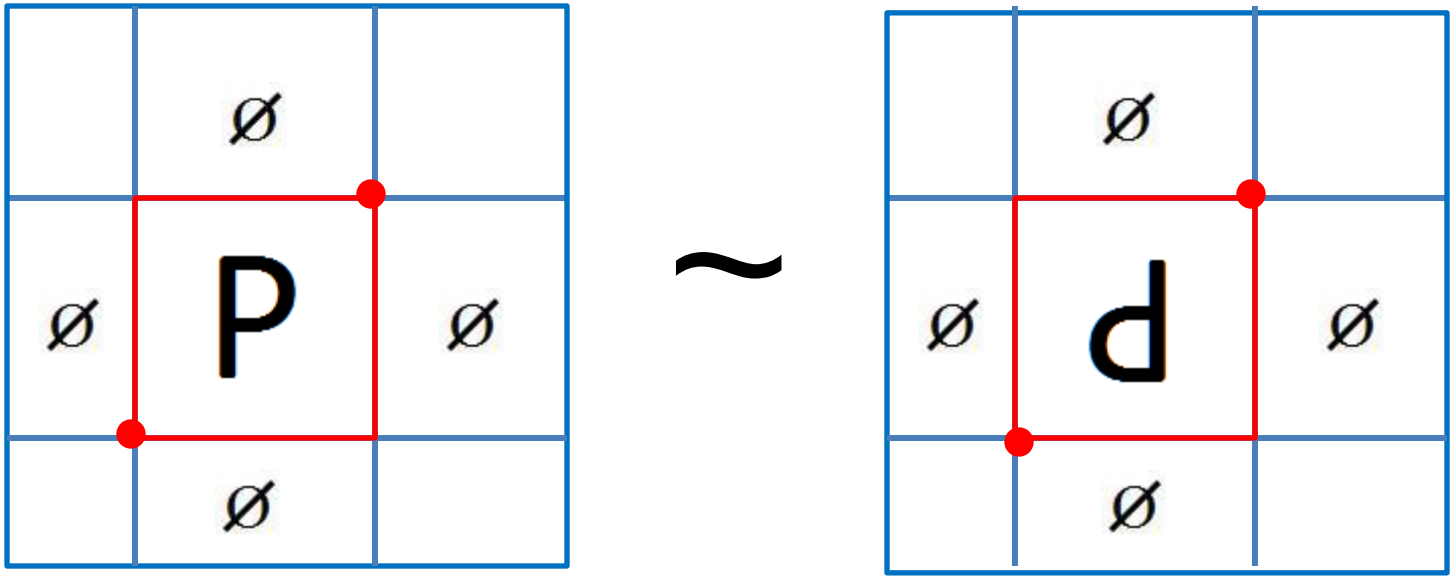
$$< Prob(123)$$

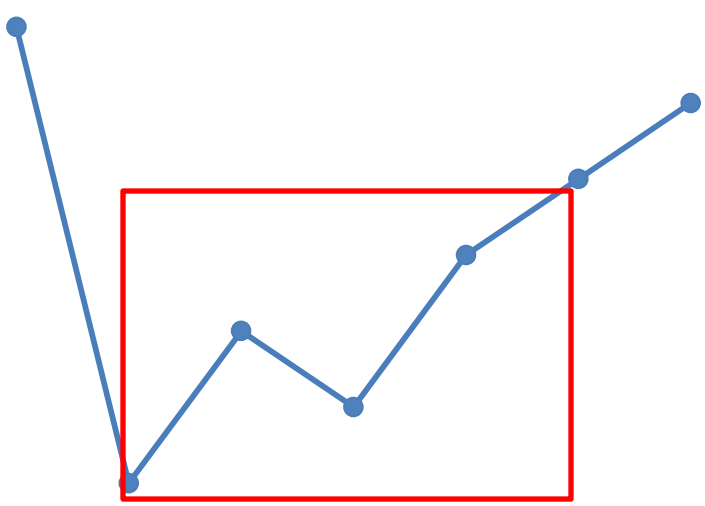
The **Big** Question

Which permutations always have the same probability of occurring in this “fair” model?


7
6
8
5
4
3
2
1
76241835
Complement
Reverse
8
7
6
5
4
3
2
1
23758164
8
7
6
5
4
3
2
1
53814267

A Valid Flip





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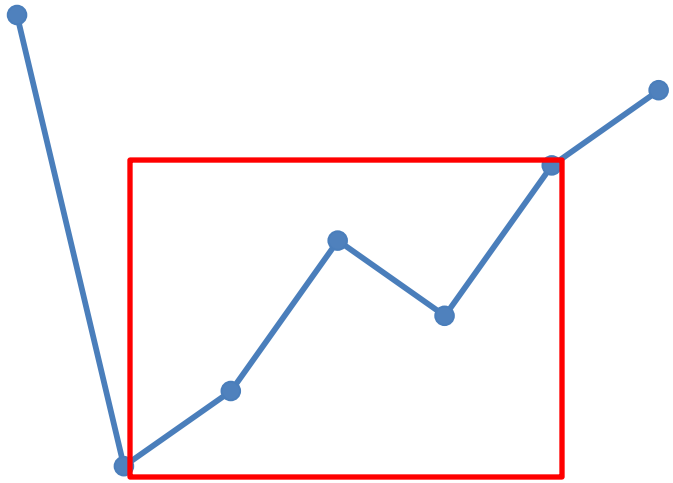

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Conjecture

If two permutations $\pi, \tau \in S_n$ have the same probability of occurring under any symmetric distribution centered at 0, then τ can be obtained from π through a sequence of valid flips.