HOMEWORK 1 (18.314, FALL 2006)

1) Recall the product of permutations.
a) Compute $(2,7,4,3,6,1,5) \cdot (3,5,1,2,4,7,6)$.
b) Find two permutations $\alpha, \beta \in S_6$ which do not commute (i.e. $\alpha \cdot \beta \neq \beta \cdot \alpha$)
c) Find three permutations $\alpha, \beta, \gamma \in S_6$ which do not pairwise commute.

2) Prove that

$$\binom{n}{0} < \binom{n}{1} < \cdots < \binom{n}{k},$$

where $k = \lfloor \frac{n}{2} \rfloor$, and $n > 1$.

3) Find the recurrence relation for the number of permutations $\sigma \in S_n$ such that $\sigma^3 = I$.

Exercises from the **MN** book:
3 in §2.3 (p. 54)
3, 8 in §2.3 (p. 62)
22, 23 in §2.3 (p. 65)

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This Homework is due Wednesday Sep 20 at 13:05 am.

Remember the collaboration policy: groups of at most four, write names on the solutions, only discussions are allowed, no copying.

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