1. Formulate the dual of the following linear program.
2. Suppose we convert a linear program (A, b, c) in standard form to slack form. Show that the basic solution is feasible if and only if for.

That is,

where .

3. A permutation p of length n is a sequence of integers , where each integer from 1 to n appears in it exactly once.

A permutation p is good if

1. Given a positive integer n such that a good permutation of length n exists, please devise an efficient algorithm to find a good permutation of length n.
2. Prove the correctness of the above algorithm, and explain the time complexity and space complexity of it.
3. Given a positive integer n, please devise a method to check whether a good permutation of length n exists, in constant time
4. Prove the correctness of the above method.