

Please submit one assignment per group.

1. Suppose the runtime of an algorithm is  $T(n)$ . Indicate which of the expressions below for  $T(n)$  would make the algorithm polytime.
  - a)  $3^{n^2}$
  - b)  $3^{\log_2 n}$
  - c)  $n^{1/n}$
  - d)  $1000n^{17} + n^2 \log_2 n$
  - e)  $n!$
  - f)  $2^{(\log_2 n)^2}$
  - g)  $2^{\sqrt{n}}$
  - h)  $(0.5)^n$
  - i)  $2^{1000n}$
2. Problem 1.15 in the textbook.
3. In section 1.2.3 in the textbook we discuss the *Pairwise Comparisons method*. Design an algorithm, and implement it in Python, which on input  $M$ , where  $M$  is a matrix of rational numbers (i.e., fractions), verifies that the matrix is both:
  - (a) *reciprocal*, and
  - (b) *consistent*.