Order Statistics

Idea: Consider a collection of independent, continuous random variables $X_1, X_2, \ldots, X_n$. Always assume that the X_j's have the same kind of distribution, when talking about order statistics. Then

$X_{(1)}$ denotes the 1st order statistic, which just means the smallest of $X_1, \ldots, X_n$

$X_{(2)}$ denotes the 2nd order statistic, i.e. 2nd smallest of $X_1, \ldots, X_n$

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$X_{(n-1)}$ denotes the second largest of $X_1, \ldots, X_n$ called the $(n-1)$st order statistic

$X_{(n)}$ denotes the nth order statistic, which is the largest, i.e. the max, of $X_1, \ldots, X_n$

In general, $X_{(j)}$ is the jth smallest of $X_1, \ldots, X_n$ called the jth order statistic.