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 $X_1, \ldots, X_n$.

$X_{(n-1)}$ 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 $j$th smallest of $X_1, \ldots, X_n$ called the $j$th order statistic.