**Theorem** If $X_1, X_2, \ldots, X_n$ are mutually independent and identically distributed $U(0,1)$ random variables, then $Y = \max\{X_1, X_2, \ldots, X_n\}$ has the standard power distribution.

**Proof** Let the mutually independent random variables $X_1, X_2, \ldots, X_n$ each have the $U(0,1)$ distribution. Let $Y = \max\{X_1, X_2, \ldots, X_n\}$. Using an order statistic result, the probability density function of $Y$ is

$$\begin{aligned} f_Y(y) &= \frac{n!}{(n-1)!(n-n)!} F(y)^{n-1} f(y) [1 - F(y)]^{n-n} \\ &= \frac{n!}{(n-1)!} y^{n-1} \\ &= n y^{n-1} \qquad\qquad 0 < y < 1. \end{aligned}$$

which is the probability density function of the standard power distribution with $\beta = n$.

**APPL verification:** The APPL statements

```
X := StandardUniformRV();
Y := OrderStat(X, n, n);
```

yield the probability density function of a standard power($n$) random variable.