Formulas

CIS 160 Fall 2014

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Here are the formulas for counting in various ways:

	No Repetition	Repetition Allowed
Not Sensitive to Order	$\binom{n}{r}$	$\left(\!\binom{n}{r}\!\right) = \binom{n+r-1}{r}$
Sensitive to Order	$P(n,r)$	n^r

Here are examples to demonstrate:

	No Repetition	Repetition Allowed
Not Sensitive to Order	5 distinct books choose 3 books to take home $\binom{5}{3}$	unlimited copies of 5 books choose 3 copies to take home $\left(\!\binom{5}{3}\!\right) = \binom{5+3-1}{3}$
Sensitive to Order	5 distinct books give one to person A, B, and C $P(5,3)$	unlimited copies of 5 books give one to person A, B, and C 5^3

And here are some more formulas:

$$\binom{n}{r} = \frac{n!}{(n-r)!\,r!}$$

$$\binom{n}{r} = \binom{n}{n-r}$$

$$\binom{n}{r} = \binom{n-1}{r-1} + \binom{n-1}{r}$$