# LICENSE PLATES

## # L L L # # #

$$\text{prob (all distinct)} = P(\text{no repeats})$$

$$\frac{1}{N} \cdot \frac{1}{L} \cdot \frac{\frac{25}{26}}{L} \cdot \frac{\frac{24}{26}}{L} \cdot \frac{\frac{9}{10}}{N} \cdot \frac{\frac{8}{10}}{N} \cdot \frac{\frac{7}{10}}{N}$$

$$= \frac{10}{10} \cdot \frac{26}{26} \cdot \frac{25}{26} \cdot \frac{24}{26} \cdot \frac{9}{10} \cdot \frac{8}{10} \cdot \frac{7}{10}$$

$$= \frac{P(26,3) \; P(10,4)}{10^4 \cdot 26^3}$$

$$P\left(\text{exactly one duplicate letter or number}\right)$$

ex.)  $\underline{7}\ \underline{G}\ \underline{C}\ \underline{R}\ \underline{O}\ \underline{7}\ \underline{9}$

$$P\left(\begin{array}{c}\text{exactly one} \\ \text{duplicate letter AND} \\ \text{distinct \#s}\end{array}\right)$$

$$+ P\left(\begin{array}{c}\text{exactly one} \\ \text{duplicate \# AND distinct} \\ \text{letters}\end{array}\right)$$

$$\frac{26\cdot25\cdot24\ (=P(26,3))}{26^3}$$

$$\frac{C(4,2)\cdot10\cdot9\cdot8}{10^4} \underbrace{\qquad}_{=P(10,3)}$$

$$\frac{C(3,2) * 26 * 25 * \dfrac{P(10,4)}{10^4}}{26^3}$$

$$+ \frac{C(4,2) * P(10,3) * \dfrac{P(26,3)}{26^3}}{10^4}$$