Assignment 1
AI1110: Probability and Random Variables

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Problem:12.13.5.12: .
Find the probability of throwing at most 2 sixes in
6 throws of a single die.

Solution:

Let $\underline{X}$ be the random variable,which denotes
the $\underline{Number}$ $\underline{of}$ $\underline{sixes}$ in 6 throws of a single die.

$Pr_X(0) =$ Probability that 0 sixes are thrown after 6 throws $= 5^6/6^6 = \frac{15625}{46656}$

$Pr_X(1) =$ Probability that 1 sixes are thrown after 6 throws $= (C_1^6.5^5)/6^6 = \frac{18750}{46656}$

$Pr_X(2) =$ Probability that 1 sixes are thrown after 6 throws $= (C_2^6.5^4)/6^6 = \frac{9375}{46656}$

So,from the given equations;

$Pr_X(<=2) =$ Probability that at most 2 sixes are
thrown after 6 throws

$$Pr_X(<=2) = Pr_X(0)+Pr_X(1)+Pr_X(2) = \frac{21875}{23328}$$

Hence,**The probability of throwing at most 2
sixes in 6 throws of a single die = $\frac{21875}{23328}$.**