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Hw 5 Probability problems

(SCJ 104)

1. 8% 15 students % not > 19

total possible ways = 158

$$\frac{15!}{7!} \approx 10.12\%$$

2. 00000 - 99999

all unique
all odd all even
all odd all even
all odd all even
all odd all even

total possible all = 105

$$\frac{5}{\text{odd}} \cdot \frac{4}{\text{odd}} \cdot \frac{5}{\text{even}} + \frac{5}{\text{odd}} \cdot \frac{4}{\text{odd}} \cdot \frac{7}{\text{even}} + \frac{5}{\text{odd}} \cdot \frac{4}{\text{odd}} \cdot \frac{7}{\text{even}} + \frac{5}{\text{odd}} \cdot \frac{4}{\text{odd}} \cdot \frac{7}{\text{even}}$$

$$= 100 + 700 + 4200 = 5000$$

3. 000 A = > 2 = 47 B = 913 =

(Independent) - probability of one happening does not affect the other

$$P(A) = \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = \left(\frac{1}{6}\right)^3 + \left(\frac{1}{6}\right)^3$$

$$P(B) = \frac{6}{6^3} = \frac{1}{36} \quad P(A \cap B) = \frac{1}{6^3} = \frac{1}{216} = P(A) \cdot P(B) = \frac{1}{6} \cdot \frac{1}{36} = \frac{1}{216}$$

4. Flush = all 5 cards same suit

Expected # hands to guarantee flush

$$\text{hands} = \binom{52}{5} \quad \text{suit} = \binom{13}{5} \quad \text{flush} = \frac{4 \cdot \binom{13}{5}}{\binom{52}{5}} \approx 0.0019 \rightarrow \frac{1}{0.0019} = 50485$$

5. Superstar 70% none 50%
5 games injury % to play next 5 = 75%
P(star played 5) = $\frac{P(\text{win } 4/5 | \text{star})}{P(4/5 | \text{no star}) + P(V)}$

$$\approx 0.8737 = 87.37\%$$