

TDT4171 - Assignment 1

E1)

a) Number of atomic events:

cards in deck: 52

cards dealt: 5

atomic events: $\binom{52}{5} = \underline{\underline{2\,598\,960}}$

b) Probability of each atomic event:

$$\frac{\# \text{ favorable}}{\# \text{ possible}} = \frac{1}{\underline{\underline{2\,598\,960}}}$$

c) # different kinds of straight flushes
= 4

$$\frac{\# \text{ favorable}}{\# \text{ possible}} = \frac{4}{2\,598\,960} = \underline{\underline{\frac{1}{649\,740}}}$$

E2)

$$\begin{aligned} \text{a) } E(\text{return}) &= \frac{1}{4^3} \cdot 20 + \frac{1}{4^3} \cdot 15 + \frac{1}{4^3} \cdot 5 + \frac{1}{4^3} \cdot 3 \\ &+ \frac{1}{4^2} \cdot \frac{3}{4} \cdot 2 + \frac{1}{4} \cdot \frac{3}{4} \cdot 1 = \frac{61}{64} = \underline{\underline{0.953125}} \end{aligned}$$

Expected payback percentage: 95.3125%

b) Probability of winning: (assuming
1 coin return is also a win)

$$\begin{aligned} P(\text{win}) &= 1 - P(\text{lose}) \\ &= 1 - \frac{3}{4} \cdot \underbrace{\left(1 - \frac{1}{16}\right)}_1 = \underline{\underline{0.296875}} \end{aligned}$$

$P(\text{last two slots equals the first slot})$

c) Mean: ≈ 210 (Also see python-file)

Median: ≈ 22

E3, 1, a) See python-file for functions

b) Proportion: ≈ 0.6585

Smallest N: ≈ 23

E3, 2, a) Group size: ≈ 2360