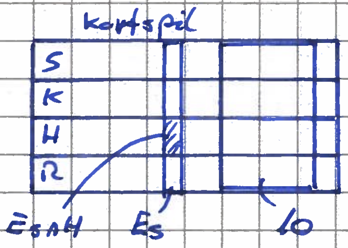
GA01 : Drawing Cards

52 kort : S = Spar, K = Klør, H = Hjerter, R = Ruder

Es = 1, {10; Knægt; Dame; Konge} = 10

1. Venndiagram :



1 kort:

2. $\underline{Pr(S) = Pr(K) = Pr(H) = Pr(R)} = \frac{13}{52} = \frac{1}{4} = \underline{\underline{0.25}}$, $\sum Pr(\text{kulør}) = 1$

3. $\underline{Pr(Es)} = \frac{4}{52} = \frac{1}{13} = \underline{\underline{0.077}}$

4. $\underline{Pr(Es \wedge H)} = \frac{1}{52} = \underline{\underline{0.019}}$

5. $Pr(Es) \cdot Pr(H) = \frac{1}{13} \cdot \frac{1}{4} = \frac{1}{52} = Pr(Es \wedge H) \rightarrow$ Es og H er uafhængige.

2 kort:

6. $\underline{Pr(\text{mindst } 1 \text{ Es})} = Pr(Es, \overline{Es}) + Pr(\overline{Es}, Es) + Pr(Es, Es)$

$$= \frac{1}{13} \cdot \frac{48}{51} + \frac{48}{52} \cdot \frac{4}{51} + \frac{4}{52} \cdot \frac{3}{51} = \frac{192+192+12}{52 \cdot 51} = \frac{396}{2652} = \underline{\underline{\frac{33}{221} = 0.149}}$$

7. $\underline{Pr(2 \text{ esser})} = \frac{4}{52} \cdot \frac{3}{51} = \frac{12}{2652} = \frac{1}{221} = \underline{\underline{0.0045}}$

8. $\underline{Pr(Es \wedge H)} = Pr(Es \wedge H, \cdot) + Pr(\overline{(Es \wedge H)}, Es \wedge H)$

$$= \frac{1}{52} \cdot 1 + \frac{51}{52} \cdot \frac{1}{51} = \frac{2}{52} = \underline{\underline{\frac{1}{26} = 0.038}}$$

9. $\underline{Pr(\overline{Es \wedge H})} = Pr(\overline{Es \wedge H}, \overline{Es \wedge H}) = \frac{51}{52} \cdot \frac{50}{51} = \frac{50}{52} = \underline{\underline{\frac{25}{26} = 0.962}}$

$$= 1 - Pr(Es \wedge H) = 1 - 0.038 = \underline{\underline{0.962}}$$

10. $\underline{Pr(\Sigma = 17)} = Pr(10,7) + Pr(9,8) + Pr(8,9) + Pr(7,10)$

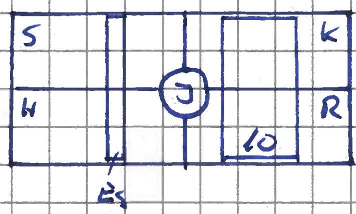
$$= \frac{16}{52} \cdot \frac{4}{51} + \frac{4}{52} \cdot \frac{4}{51} + \frac{4}{52} \cdot \frac{4}{51} + \frac{4}{52} \cdot \frac{16}{51} = \frac{16+4+4+16}{13 \cdot 51} = \underline{\underline{\frac{40}{663} = 0.060}}$$

55 kort: S = Spar, K = Klør, H = Hjerter, R = Ruder, J = Jokere

$S^+ = S \cup J$, $K^+ = K \cup J$, $H^+ = H \cup J$, $R^+ = R \cup J$

Es = 1, {10, Knægt, Dame, Konge} = 10, Joker = alle

1. Venn diagram:



1 kort:

2. $\underline{Pr(S^+) = Pr(K^+) = Pr(H^+) = Pr(R^+)} = \underline{\frac{16}{55} = 0.291}$, $\Sigma\, \text{kulør}^+ = \frac{64}{55} = 1.16 > 1$

3. $\underline{Pr(Es^+) = \frac{7}{55} = 0.127}$

4. $\underline{Pr(Es^+ \cap H^+) = \frac{4}{55} = 0.073}$

5. $Pr(Es^+) \cdot Pr(H^+) = \frac{7}{55} \cdot \frac{16}{55} = \frac{112}{3025} = 0.037 \neq 0.073 = Pr(Es^+ \cap H^+)$

$\rightarrow$ Es^+ og H^+ er ikke uafhængige.

2 kort:

6. $\underline{Pr(\text{mindst 1 es})} = Pr(Es^+, \cdot) + Pr(\overline{Es^+}, Es^+)$

$= \frac{7}{55} \cdot 1 + \frac{48}{55} \cdot \frac{7}{54} = \frac{378 + 336}{2970} = \frac{714}{2970} = \underline{\frac{119}{495} = 0.240}$

7. $\underline{Pr(2\,\text{esser})} = Pr(Es^+, Es^+) = \frac{7}{55} \cdot \frac{6}{54} = \frac{42}{2970} = \underline{\frac{7}{495} = 0.014}$

8. $\underline{Pr(Es^+ \cap H^+)} = Pr(Es^+ \cap H^+, \cdot) + Pr(\overline{(Es^+ \cap H^+)}, Es^+ \cap H^+)$

$= \frac{4}{55} \cdot 1 + \frac{51}{55} \cdot \frac{4}{54} = \frac{216 + 204}{2970} = \frac{420}{2970} = \underline{\frac{14}{99} = 0.141}$

9. $\underline{Pr(\overline{Es^+ \cap H^+})} = Pr(\overline{Es^+ \cap H^+}, \overline{Es^+ \cap H^+}) = \frac{51}{55} \cdot \frac{50}{54} = \frac{2550}{2970} = \underline{\frac{85}{99} = 0.859}$

$= 1 - Pr(Es^+ \cap H^+) = 1 - \frac{14}{99} = 1 - 0.141 = \underline{0.859}$

10. $\underline{Pr(\Sigma = 17)} = Pr(10^+, 7^+) + Pr(9^+, 8^+) + Pr(8^+, 9^+) + Pr(7^+, 10^+) - 3 \cdot Pr(J, J)$

$= Pr(10, 7^+) + Pr(J, 7) + Pr(9, 8^+) + Pr(J, 8) + Pr(8, 9^+) + Pr(J, 9)$

$+ Pr(7, 10^+) + Pr(J, 10) + Pr(J, J)$

$= \frac{16}{55} \cdot \frac{7}{54} + \frac{3}{55} \cdot \frac{4}{54} + \frac{4}{55} \cdot \frac{7}{54} + \frac{3}{55} \cdot \frac{4}{54} + \frac{4}{55} \cdot \frac{7}{54} + \frac{3}{55} \cdot \frac{4}{54} + \frac{4}{55} \cdot \frac{19}{54} + \frac{3}{55} \cdot \frac{16}{54} + \frac{3}{55} \cdot \frac{2}{54}$

$= \frac{112 + 12 + 28 + 12 + 28 + 12 + 76 + 48 + 6}{2970} = \frac{334}{2970} = \underline{\frac{167}{1485} = 0.112}$