

Exame 18/2/2015

Problema 1 8 punti

$$a) \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4}{17 \cdot 16 \cdot 15 \cdot 14 \cdot 13}$$

$$b) \frac{9 \cdot 8 \cdot 7 \cdot 6 \cdot 5}{17 \cdot 16 \cdot 15 \cdot 14 \cdot 13}$$

$$c) \frac{\binom{4}{3} \binom{8}{7} \binom{5}{4}}{\binom{17}{14}}$$

$$d) \frac{4! \cdot 13}{17 \cdot 16 \cdot 15 \cdot 14}$$

Problema 2 8 punti

a) V evento vince mantenendo la scelta fatta

$$P(V) = P(V|A)P(A) + P(V|B)P(B)$$

Con A evento l'auto ritrova dietro le 2 porte rimanenti.

B complementare

$$P(V) = 0 \cdot \frac{2}{3} + 1 \cdot \frac{1}{3} = \frac{1}{3}$$

b) V_1 evento vince cambiando porta

$$P(V_1) = P(V_1|A)P(A) + P(V_1|B)P(B) = 1 \cdot \frac{2}{3} + 0 \cdot \frac{1}{3} = \frac{2}{3}$$

Problema 3 10 punti

$P(i, j) = P\{M=i, F=j\}$, F_i V.A. che conta il nodi pigliati

$$P(0,0) = 0.15, \quad P(1,0) = P\{M=1, F=0\} = P\{M=1, F=0 | F_1=1\} P\{F_1=1\} \\ = \frac{1}{2} \cdot 0.2 = 0.1 = P(0,1) = P\{M=0, F=1\}$$

$$P(2,0) = P(0,2) = P\{M=2, F=0\} = P\{M=2, F=0 | F_1=2\} P\{F_1=2\} = \\ = 0.35 \cdot \frac{1}{2} \cdot \frac{1}{2} = 0.0875$$

$$P(3,0) = P(0,3) = P\{M=3, F=0\} = P\{M=3, F=0 | F_1=3\} P\{F_1=3\} = \\ = 0.3 \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$$

$$\begin{aligned}
 P(1,1) &= P\{M=1, F=1\} = P\{M=1, F=1 \mid F_i=2\} P\{F_i=2\} = \\
 &= 0.35 \left(1 - \frac{1}{4} - \frac{1}{4}\right) = 0.35 \left(1 - \text{probabilità di avere 2 Maximi-} \right. \\
 &\quad \left. \text{le probabilità di avere 2 femmine}\right)
 \end{aligned}$$

$$\begin{aligned}
 P(1,2) &= P(2,1) = P\{M=2, F=1\} = P\{M=2, F=1 \mid F_i=3\} P\{F_i=3\} = \\
 &= 0.3 \cdot \left(\frac{1}{2}\right)^3 \cdot 3
 \end{aligned}$$

$i \setminus j$	0	1	2	3	$P\{M=i\}$
0	0.15	0.1	0.0875	0.0375	0.3750
1	0.1	0.175	0.1125	0	0.3875
2	0.0875	0.1125	0	0	0.2
3	0.0375	0	0	0	0.0375
$P\{F=j\}$	0.375	0.3875	0.2	0.0375	