

1**1.1**

$$A = \{(2, 6), (3, 5), (4, 4), (5, 3), (6, 2)\}$$

$$A \cap B = \{(2, 6), (6, 2)\}$$

$$\rightarrow P(B|A) = \frac{2}{5}$$

1.2

$$A = \{(1, 6), \dots, (6, 6), \dots, (6, 1)\} \rightarrow 11$$

$$B = \{(1, 6), \dots\}$$

$$\rightarrow P(B|A) = \frac{6}{11}$$

2**2.1**

	spam	nspam
tag spam	90%	15%
tag nspam	10%	85%

$$P(\text{spam}) = 80\%, P(\text{nspam}) = 20\%$$

$$P(\text{tag spam}) = P(\text{tag spam}|\text{spam}) \cdot P(\text{spam}) + P(\text{tag spam}|\text{nspam}) \cdot P(\text{nspam}) = 0.8 \cdot 0.9 + 0.15 \cdot 0.2 = 0.75$$

2.2

Z nudy si občas čtu i ty spamy. :-)

$$P(\text{nspam}|\text{tag spam}) = \frac{P(\text{tag spam}|\text{nspam}) \cdot P(\text{nspam})}{P(\text{tag spam}|\text{nspam}) \cdot P(\text{nspam}) + P(\text{tag spam}|\text{spam}) \cdot P(\text{spam})} = 0.04$$

2.3

$$P(\text{spam}|\text{tag nspam}) = \frac{P(\text{tag nspam}|\text{spam}) \cdot P(\text{spam})}{P(\text{tag nspam}|\text{spam}) \cdot P(\text{spam}) + P(\text{tag nspam}|\text{nspam}) \cdot P(\text{nspam})} = 0.34$$

3**3.1**

$$P(1|i0) = 0.25, P(0|i1) = 0.17, P(i0) = 0.57, P(i1) = 0.43$$

$$P(1|i0) \cdot P(i0) + P(0|i1) \cdot P(i1) = 0.21$$

3.2

$$P(i0|0) = \frac{P(0|i0) \cdot P(i0)}{P(0|i0) \cdot P(i0) + P(0|i1) \cdot P(i1)} = 0.51$$

4

$$P(2z|1z) = \frac{P(2z \wedge 1z)}{P(1z)} = \frac{1/3}{1/2} = \frac{2}{3}$$

5

5.1

$$P(vyhra) = \frac{2}{3} \cdot \left(\frac{1}{2}\right) + \frac{2}{3^2} \cdot \left(\frac{1}{2}\right)^2 + \dots = 2 \cdot \sum_1^{\infty} \frac{1}{6^i} = 2 \cdot \sum_0^{\infty} \frac{1}{6^i} - 2 = 2 \cdot \frac{1}{5/6} - 2 = \frac{12-10}{5} = \frac{2}{5}$$

5.2

$$P(n|prohra) = \frac{P(prohra|n) \cdot P(n)}{1 - P(vyhra)} = \frac{(1 - 1/2^n)2/3^n}{3/5}$$

6

6.1

$$P(1b) = \frac{b}{a+b}, P(2b) = P(2b|1b) \cdot P(1b) + P(2b|1a) \cdot P(1a) = \frac{b}{a+b} \cdot \frac{b-1}{a+b-1} + \frac{a}{a+b} \cdot \frac{b}{a+b-1}$$

6.2

TODO

7

$$P(5) \cdot \sum_0^{\infty} P(7)^i = \frac{P(5)}{1 - P(7)} \quad ???$$