## Errata list for Bayesian Networks and Decision Graphs (second edition)\*

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## Semantic corrections

Page 8:  $P(A, B) = \dots$  should be  $\sum_{A} \sum_{B} P(A, B) = \dots$ 

Page 12:

- The caption of Table 1.8 contains a self-reference. The table reference should be Table 1.7.
- Bottom: Table 1.2 should be Table 1.9.

Page 13:

- In the caption of Table 1.8, the reference should be to Table 1.7 and not a self-reference to Table 1.8.
- In the caption for Table 1.9, the reference should be to Table 1.8 and not Table 1.1.

Page 17, Exercise 1.6: The union should be an intersection.

Page  $25_5$ : negative should be positive.

Page 30, second condition on d-separation: "have recieved evidence" may be misunderstood as "have received evidence through propagation". Instead: "have been updated with direct evidence".

Page 49, Exercise 2.19: Switch A and B in DAG (a) so that we get  $B \leftarrow A \rightarrow C$ .

Page 70: Table 3.10 should be replaced by Table 1.

aaa aab aba abb baa bab bba bbb

Page 79:  $5^{11} \approx 50,000,000$  and not 5,000,000.

Page 81, bottom: "P(B) and P(C | A)" should be "P(C) and P(B | A)".

Page 96, Table 3.20: The entry (0.834, 0.165, 0.01) should be (0.834, 0.165, 0.001).

Page 107, Exercise 3.28: The evidence that you receive should be A = y and B = n.

Page 114<sub>6</sub>: The elimination order should be  $A_6, A_5, A_3, A_1, A_4$  instead of  $A_6, A_5, A_3, A_1, A_2$ . The same holds in Figure 4.7.

<sup>\*</sup>If you have further corrections, please send a mail to tdn@cs.aau.dk

First 2	Last 3 letters							
letters	aaa	aab	aba	abb	baa	bab	bba	bbb
aa	0.009126	0.011154	0.031746	0.025974	0.073926	0.090354	0.031746	0.025974
ab	0.017316	0.021164	0.060236	0.049284	0.017316	0.021164	0.007436	0.006084
ba	0.006084	0.007436	0.021164	0.017316	0.049284	0.060236	0.021164	0.017316
bb	0.025974	0.031746	0.090354	0.073926	0.025974	0.031746	0.011154	0.009126

Table 1: Frequencies of five-letter words in L. The word **abaab**, for example, has frequency 0.040.

Page 134, Fig. 4.28: clique BCF should be BDF.

Page 134, remark just above Example 4.4: Disregard sentence referencing Section 4.5.2 (the domain graph is triangulated).

Pages 142, 143: The elimination sequences should go from leaf to root, rather than in the opposite direction. That is, BAECD should be DCEAB and DCEBA should be ABECD?

Page 144<sup>7</sup>: the a-cutset for the node labelled  $\sum_A$  is  $\{B, C, D\}$ .

Page 149: Replace E with X in the expression for  $w(\mathbf{x}, \mathbf{e})$ .

Page 155: Replace E with X in the expression for  $w(\mathbf{x}, \mathbf{e})$ .

Page 161, Figure 4.48: The moral graph is not triangulated. Instead, add the arc  $F \rightarrow D$  to the original graph.

Page 162, Exercise 4.25: Unfortunately, this exercise is not well formulated. We assume that we have the following potentials:

 $\phi_1(A, B, C, D), \phi_3(D, E, F, I), \phi_5(C, G, H, J), \phi_6(B, C, D, G), \phi_{10}(B, C, D, E).$ The formulation is not clear on what to collect to. Take the rather unconventional task to collect to the *separator CG*.

Page 196<sub>12</sub>: "Given that 80 out of 100 landed *pin up*.

Page 199<sup>8</sup>: maximum posterior parameters or posterior means.

Page 212<sub>1</sub>: these numbers can be given more accurately. With  $\sigma = \frac{0.1}{6}$  you find  $\mu = 0.35$  (exact), s = 818 and  $n_1 = 286.3$ .

Page 227, Exercise 6.12: Disregard the references to parameter u (i.e.,  $s_u$ ); it doesn't appear in Example 6.4.1.

Page 227, Exercise 6.14: Assume that in example 6.4.1 we require P(A | c) = (0.5, 0.5). Use the technique from Example 6.4.1 to tune the parameters t and s.

Page 234, Theorem 7.1: The conditions should be " $I(A, B, pa(A) \setminus B)$  or  $I(B, A, pa(B) \setminus A)$ 

Page  $235^{1}2$ : "Let the oracle answer in correspondence with the d-separation properties of the network in Figure 7.6 (a). We start ...".

Page 2357: The querries I(B, C, D), I(B, C, E) should not be asked as the link B-C is removed already.

Page 236, Property 1: If the oracle reflects the d-separation properties of N, then ...".

Page 240: In Equation 7.3,  $|\operatorname{pa}(X)|$  should be  $|\operatorname{sp}(\operatorname{pa}(X))|$ . Also, let  $|\operatorname{sp}(\operatorname{pa}(X))| =$ 

1 if  $pa(X) = \emptyset$ .

Page 245: In the calculation of the BIC score, it should be  $4 \cdot \log\left(\frac{4}{6+4}\right)$  rather than  $6 \cdot \log\left(\frac{4}{6+4}\right)$ .

Page 254: In Equation 7.9,  $r_1$  should be  $r_i$  (similarly in the example on the page 255).

Page 256:  $\rho(X_i, \operatorname{pa}(X_i)) = \kappa^{\sum_{i=1}^n \delta_i}$  should be  $\rho(S) = \kappa^{\sum_{i=1}^n \delta_i}$ . I.e., substitute  $X_i, \operatorname{pa}(X_i)$  with S.

Page 257<sup>11</sup>:  $\delta_2^{B_3}$  should equal 0. As a result  $P(B_3) = c \cdot \kappa^1$  and the order of  $B_1$  and  $B_3$  in the subsequent sentence should be reversed.

Page 294, Fig. 9.11: two probabilities are missing in the SP-T strategy: p(ok) = 0.71 and  $p(\neg ok) = 0.29$ .

Page 307<sub>6</sub>: MSC should be added to the statespace of  $\delta_D$ .

Page 319, Fig. 9.34: all  $D_i$  should be  $O_i$ , i = 1, 2.

Page 326, Table 9.5: The table shall include a sink (with no reward), which can only be reached from (3, 1), and this with probability 1 regardless of the move.

Page 392, Figure 10.35: There should also be links  $FV_i \rightarrow FV_{i+1}$ .

Page 409: In the formula for EV(T) the factor is P(t) and not P(t | d). The formula only makes sense when the distribution of T does not depend on d.

## Typos, misspellings, etc.

Page 13, Tables 1.8 and 1.9, bottom row:  $c_2$  should be  $c_3$ .

Page 36, Table 2.1: Sp should be SP.

Page 51<sub>5</sub>: "hypothesis variables" rather than "hypothesis variable".

Page 57, Fig 3.9: "(a), (b), (c), and (d)" are missing below the figures.

Page 77, caption of Fig. 3.24(b): "represents" rather than "represent".

Page 79, caption of Fig. 3.26: "a logical-or".

Page  $87_{15}$ : add ')' after exercise.

Page 94: The square-root should also cover  $\sigma^2$ .

Page 94, Fig. 3.48:  $\mu$  and  $\sigma$  should be switched for the first distribution.

Page  $95_{13}$ : 0, 87(n) should be 0.87(n).

Page 96<sup>1</sup>: "discrete variables" rather than "discrete variable".

Page 99: Example 3.9 should be Exercise 3.9.

Page 105, Exercise 3.15: FC1 should be FC and FC2 should be SC.

Page  $106^1$ : "on the basis of" rather than "in the basis of".

Page 110, third paragraph: ... before you marginalize  $A_5$  out (rather than  $A_3$ ).

Page 125<sub>4</sub>: "A junction tree" rather than "The junction tree".

Page 128<sup>10</sup>: Example 5.3 should be Example 4.3.

Page 142<sup>5</sup>: "condition on" rather than "condition in".

Page 143, caption of Figure 4.38: the sequence should be B,A,E,C,D.

Page  $155_{10}$ : "random configurations" rather than "random configuration".

Page 161<sup>2</sup>: "nodes, where".

Page 161<sup>9</sup>: "an incomplete".

Page 163: Too much space after Exercise 4.30.

Page 166, Exercise 4.42: Table 4.41 should be Table 4.6, Figure 4.46 should be Figure 4.40.

Page 175<sup>2</sup>: Add ')'.

Page 178<sub>1</sub>: Exercise 5.8 should be Exercise 5.13.

Page 181, Table 5.4: e should be e'.

Page 183<sup>8</sup>: "H-saturated" should be "h-saturated".

Page 188, 5.7.2, line 1: "Let s and r be two parameters" rather than "Let s and u be two parameters".

Page 197<sup>13</sup>: "deemed impossible".

Page 197, last equation: 1 up should be pin up.

Page 221, line above Fig. 6.10: t should be **t**.

Page 221, Fig. 6.10:  $t_0$  should be  $\mathbf{t}_0$ .

Page 222: replace t with t in grad x(t), in grad  $x(t_0)$ , and in grad  $x(t_1)$ .

Page 227, Exercise 6.11: It should be Exercise 6.10 (ii) and not Exercise 6.10 (iii).

Page 229: Equation 7.1 should be

$$f(n) = \sum_{i=1}^{n} (-1)^{i+1} \frac{n!}{(n-i)!i!} 2^{i(n-i)} f(n-i),$$

for  $n \ge 2$  and f(0) = f(1) = 1.

Page 240, legend of figure 7.12: double ':'.

Page 287 throughout: "prize/prizes" rather than "price/prices".

Page  $289_{17}$ : "It turns out ...".

Page 291, Figure 9.8: The arc from  $T_A$  to  $D_2$  should be labeled 'neg' (similar from  $T_B$  to  $D_2$  in Figure 9.9). The values of  $(D_1 = T_A, T_A = \cdot, D_2 = \text{pour}, Inf = \text{clean})$  should be 99.94 (not 99.74) and the values of  $(D_1 = T_A, T_A = \cdot, D_2 = \text{pour}, Inf = \text{infected})$  should be -0.06 (not -0.26).

Page 428, Exercise 11.3: The reference should be Figure 9.4 instead of 9.3.