Lab 05

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5.2

(a) $P(C \mid t_1 \cap t_2) = \alpha \sum_a P(C, t_1, t_2)$
$= \alpha \sum_a P(C) \cdot P(t_1 \mid C) \cdot P(t_2 \mid C)$
$= \alpha \langle (0.01 \cdot 0.9 \cdot 0.9), (0.99 \cdot 0.2 \cdot 0.2) \rangle$
$= \alpha \langle 0.0081, 0.0396 \rangle$
$0.0477 \quad 0.0477$
$= \boxed{\langle 0.17, 0.83 \rangle}$

(b) $P(C \mid t_1 \cap \neg t_2) = \alpha \sum_a P(C, t_1, \neg t_2)$
$= \alpha \sum_a P(C) \cdot P(t_1 \mid C) \cdot P(\neg t_2 \mid C)$
$= \alpha \langle (0.01 \cdot 0.9 \cdot 0.1), (0.99 \cdot 0.2 \cdot 0.8) \rangle$
$= \alpha \langle 0.0009, 0.1584 \rangle$
$0.1593 \quad 0.1593$
$= \boxed{\langle 0.00565, 0.9944 \rangle}$

5.3 a

(i) $P(R \mid S) = \boxed{\langle 0.01, 0.99 \rangle}$ (from the table)

(ii) $P(R \mid h \cap s) = \alpha \sum_a P(R, h, s)$
$= \alpha \sum_a P(R) \cdot P(h \cap s \mid R)$
$= \alpha \langle (0.01 \cdot 1.0), (0.99 \cdot 0.7) \rangle$
$= \alpha \langle 0.01, 0.693 \rangle$
$0.703 \quad 0.703$
$= \boxed{\langle 0.0142, 0.9858 \rangle}$