Robot game winning probability

$$P(W_H) = P(B_1)*P(W_H|B_1)+P(B_2)*P(W_H|B_2)+P(B_3)*P(W_H|B_3)+P(B_4)*P(W_H|B_4) \quad (1)$$

$$P(W_A) = \frac{(1-s_A)(s_B)(B_2) + (s_A)(1-s_B)(B_3) + (s_A)(s_B)(B_4)}{s_A + s_B - (s_A)(s_B)} \quad (2)$$

$P(B_1) * P(W_H|B_1)$