

1.

$$1. P(\text{프랑스} \mid \text{Covid} - 19 \text{ 사망}) = \frac{P(\text{프랑스} \cap \text{Covid}-19 \text{ 사망})}{P(\text{Covid}-19 \text{ 사망})} = \frac{117082}{254845}$$

$$2. P(\text{UK} \mid \text{Covid} - 19 \text{ 생존}) = \frac{P(\text{UK} \cap \text{Covid}-19 \text{ 생존})}{P(\text{Covid}-19 \text{ 생존})} = \frac{4203973}{8672276}$$

$$3. P(\text{Covid} - 19 \text{ 사망} \mid \text{UK}) = \frac{P(\text{Covid}-19 \text{ 생존} \cap \text{UK})}{P(\text{UK})} = \frac{137763}{4341736}$$

$$4. P(\text{Covid} - 19 \text{ 생존} \mid \text{프랑스}) = \frac{P(\text{Covid}-19 \text{ 생존} \cap \text{프랑스})}{P(\text{프랑스})} = \frac{4468303}{4585385}$$

2.

P(신호전달 안됨)

$$= P(\text{위로 전달안됨} \cap \text{아래로 전달안됨})$$

$$= P(\text{위로 전달안됨})P(\text{아래로 전달안됨}) \quad (\text{독립})$$

$$= P(R_1 \cup R_2) P(R_3)$$

$$= P(R_3) (P(R_1) + P(R_2) - P(R_1 \cap R_2)) \quad (\text{합의 법칙})$$

$$= P(R_3) (P(R_1) + P(R_2) - P(R_1) P(R_2)) \quad (\text{독립})$$

$$= (0.01)(0.02 + 0.02 - (0.02)^2)$$

$$= 0.000396$$

$$A \text{와 } B \text{ 독립} \leftrightarrow P(A \cap B) = P(A) P(B)$$

,

3.

$$P(S0) = 0.6$$

$$P(S1) = 0.4$$

$$P(R0 | S0) = P(R1 | S1) = 0.98$$

$$P(R1 | S0) = P(R0 | S1) = 0.02$$

$$P(R0) = P(S0 \cap R0) + P(S1 \cap R0) \quad (\text{확률공리 3})$$

$$= P(S0) P(R0 | S0) + P(S1) P(R0 | S1) \quad (\text{배반사건})$$

$$P(S0 | R0)$$

$$= \frac{P(S0 \cap R0)}{P(R0)}$$

$$= \frac{P(S0 \cap R0)}{P(S0 \cap R0) + P(S1 \cap R0)} \quad (\text{베이즈 공식})$$

$$= \frac{P(S0)P(R0 | S0)}{P(S0)P(R0 | S0) + P(S1)P(R0 | S1)}$$

$$= \frac{(0.6)(0.98)}{(0.6)(0.98) + (0.4)(0.02)} = 0.9865771812080537$$

$$P(A \cap B) = P(B)P(A | B)$$

$$A \text{와 } B \text{는 독립} \iff P(A \cap B) = P(A)P(B)$$