Homework 4 UG

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Jose Carlos Munoz

4.6)a)

$$\begin{aligned} P(\text{S}|\text{UG}) &= .15 \\ P(S|G) &= .23 \\ P(G) &= .2 \\ P(UG) &= .8 \end{aligned} \tag{1}$$

These are the known probabilites. From this we can find $P(G|\text{S}$.
Because of Bayes Theroem $P(\text{G}|\text{S})$ is the same as the following

$$P(\text{G}|\text{S}) = \frac{P(\text{S}|\text{G}) * P(\text{G})}{P(\text{S})} \tag{1}$$

$P(\text{S})$ can be found as

$$\begin{aligned} P(\text{S}) &= P(\text{S}|\text{G}) * P(\text{G}) + P(\text{S}|\text{UG}) * P(\text{UG}) \\ P(\text{S}) &= .23 * .2 + .15 * .8 \\ P(\text{S}) &= .166 \end{aligned} \tag{2}$$

Therefore

$$\begin{aligned} P(\text{G}|\text{S}) &= \frac{.23 * .2}{.166} \\ P(\text{G}|\text{S}) &= .277 \end{aligned} \tag{3}$$