

1. $MI(ER) = W_a E(a) + W_b E(b)$ $E(a) = -[P_1 \log P_1 + P_2 \log P_2]$
 2. $(FH) =$
 3. (S)
 4. (LC)
 5. (IH)

$$MI(ER) = \frac{6}{14} * -\left[\frac{4}{6} \log \frac{4}{6} + \frac{2}{6} \log \frac{2}{6} \right] + \frac{8}{14} * -\left[\frac{4}{8} \log \frac{4}{8} + \frac{4}{8} \log \frac{4}{8} \right]$$

$$= 0.965$$

$$MI(FH) = \frac{7}{14} * -\left[\frac{5}{7} \log \frac{5}{7} + \frac{2}{7} \log \frac{2}{7} \right] + \frac{7}{14} * -\left[\frac{3}{7} \log \frac{3}{7} + \frac{4}{7} \log \frac{4}{7} \right]$$

$$= 0.924$$

$$MI(S) = \frac{8}{14} * -\left[\frac{5}{8} \log \frac{5}{8} + \frac{3}{8} \log \frac{3}{8} \right] + \frac{6}{14} * -\left[\frac{3}{6} \log \frac{3}{6} + \frac{3}{6} \log \frac{3}{6} \right]$$

$$= 0.974$$

$$MI(LC) = \frac{4}{14} * -\left[\frac{3}{4} \log \frac{3}{4} + \frac{1}{4} \log \frac{1}{4} \right] + \frac{10}{14} * -\left[\frac{5}{10} \log \frac{5}{10} + \frac{5}{10} \log \frac{5}{10} \right]$$

$$= 0.946$$

$$MI(IH) = \frac{9}{14} * -\left[\frac{5}{9} \log \frac{5}{9} + \frac{4}{9} \log \frac{4}{9} \right] + \frac{5}{14} * -\left[\frac{3}{5} \log \frac{3}{5} + \frac{2}{5} \log \frac{2}{5} \right]$$

$$= 0.983$$

$$E(\text{data}) = -[P_+ \log P_+ + P_- \log P_-]$$

$$E(\text{data}) = -\left[\frac{8}{14} \log \frac{8}{14} + \frac{6}{14} \log \frac{6}{14}\right] = 0.985$$

$$\text{IFG} = E(\text{data}) - \text{MI}$$

$$\text{IFG(ER)} = 0.985 - 0.965 = 0.02$$

$$\text{IFG(FH)} = 0.985 - 0.924 = 0.061 \quad \text{highest IFG (Root)}$$

$$\text{IFG(S)} = 0.985 - 0.974 = 0.011$$

$$\text{IIFG(EC)} = 0.985 - 0.946 = 0.039$$

$$\text{IFG(LH)} = 0.985 - 0.983 = 0.002$$

~~FH~~ FH → 0

IFG: 1, 2, 4, 5, 8, 11, 12 IIFG: 3, 6, 7, 9, 10, 13, 14

FH ~~I~~

$$\text{MI(ER)} = \frac{3}{7} * -[1 \log 1 + 0] + \frac{4}{7} * -\left[\frac{2}{4} \log \frac{2}{4} + \frac{2}{4} \log \frac{2}{4}\right] = \frac{4}{7}$$

$$\text{MI(S)} = \frac{5}{7} * -\left[\frac{3}{5} \log \frac{3}{5} + \frac{2}{5} \log \frac{2}{5}\right] + \frac{2}{7} * -[1 \log 1 + 0] = 0.6935$$

$$\begin{aligned} \text{MI(EC)} &= \frac{2}{7} * -\left[\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2}\right] + \frac{5}{7} * -\left[\frac{4}{5} \log \frac{4}{5} + \frac{1}{5} \log \frac{1}{5}\right] \\ &= 0.8013 \end{aligned}$$

$$\text{MI(LH)} = \frac{5}{7} * -\left[\frac{3}{5} \log \frac{3}{5} + \frac{2}{5} \log \frac{2}{5}\right] + \frac{2}{7} * -[1 \log 1 + 0] = 0.6935$$

$$E(\text{data}) = - \left[\frac{5}{7} \log \frac{5}{7} + \frac{2}{7} \log \frac{2}{7} \right] = 0.8631$$

$$\text{IFG(ER)} = 0.2916$$

$$\text{IFG(S)} = 0.1696$$

$$\text{IFG(LC)} = 0.0618$$

$$\text{IFG(LH)} = 0.1696$$

FH-ER (%)

$$MI(S) = \frac{2}{3} * - [1 \log 1 + 0] + \frac{1}{3} * - [1 \log 1 + 0] = 0$$

$$MI(LC) = 0 + 1 * - [1 \log 1 + 0] = 0$$

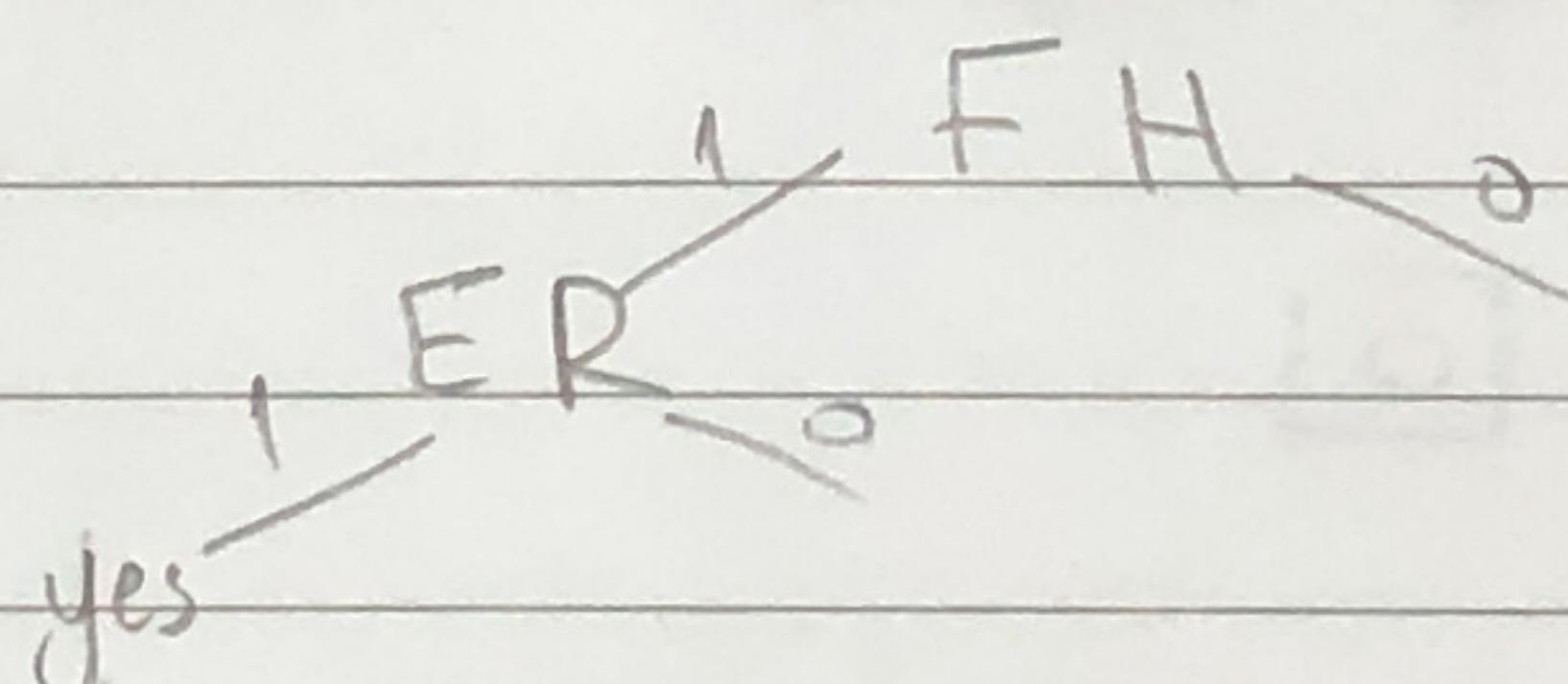
$$MI(LH) = \frac{2}{3} * - [1 \log 1 + 0] + \frac{1}{3} * - [1 \log 1 + 0] = 0$$

$$E(\text{data}) = - [1 \log 1 + 0] = 0$$

$$\text{IFG(S)} = 0$$

$$\text{IFG(LC)} = 0$$

$$\text{IFG(LH)} = 0$$



FH-ER [0]

$$MI(S) = \frac{3}{4}x - \left(\frac{1}{3} \log \frac{1}{3} + \frac{2}{3} \log \frac{2}{3} \right) + \frac{1}{3}x - (1 \log 1 + 0) = 0.689$$

$$MI(LC) = \frac{2}{4}x - \left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2} \right) + \frac{2}{4}x - \left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2} \right) = 1$$

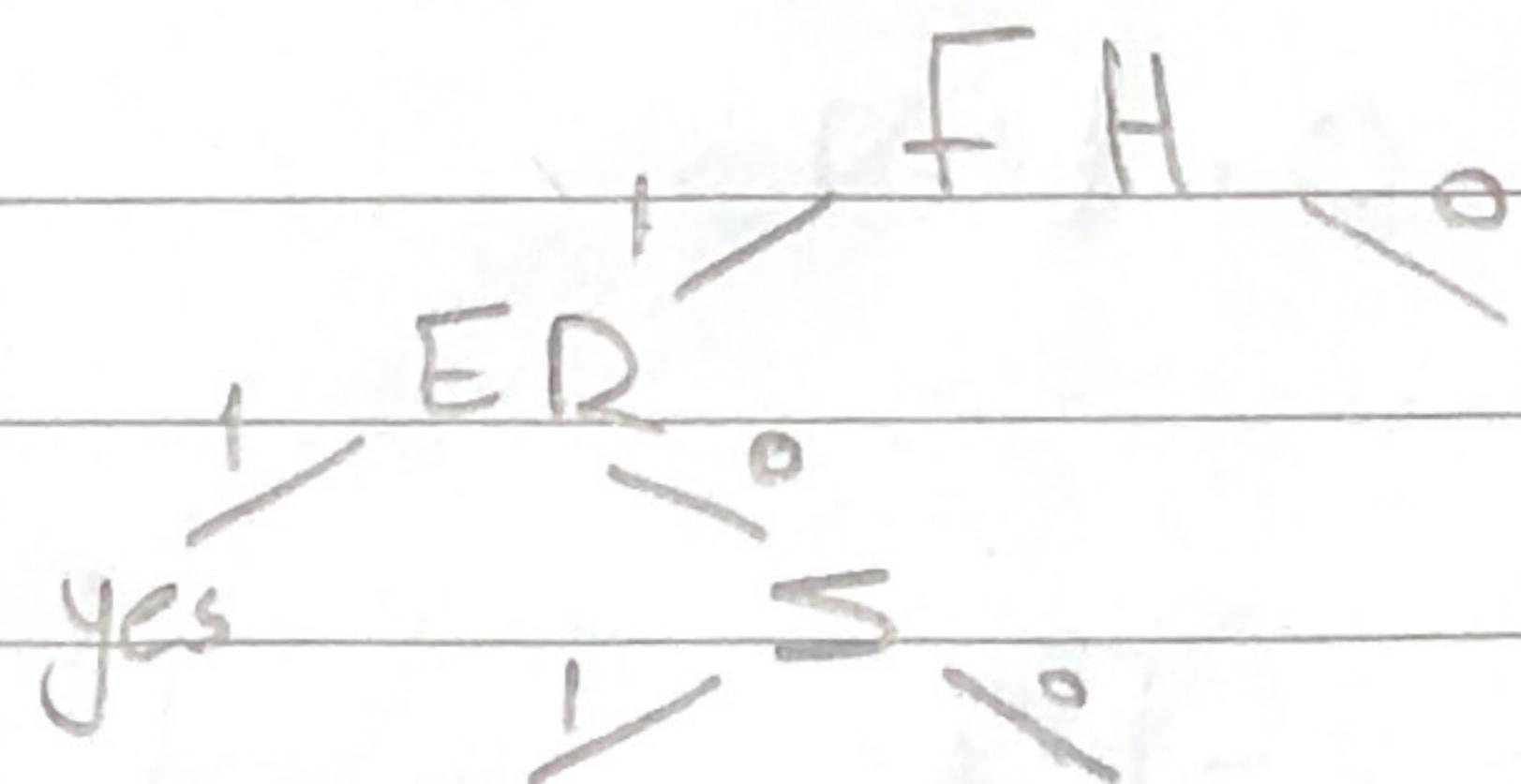
$$MI(LH) = \frac{3}{4}x - \left(\frac{2}{3} \log \frac{2}{3} + \frac{1}{3} \log \frac{1}{3} \right) + \frac{1}{3}x - (1 \log 1 + 0) = 0.689$$

$$E(\text{data}) = - \left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2} \right) = 1$$

$$IFG(S) = 0.311 \quad \swarrow$$

$$IFG(LC) = 0$$

$$IFG(LH) = 0.311$$



FH-ER-S [1]

$$MI(LC) = \frac{1}{3}x - (1 \log 1 + 0) + \frac{2}{3}x - \left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2} \right) = 2/3$$

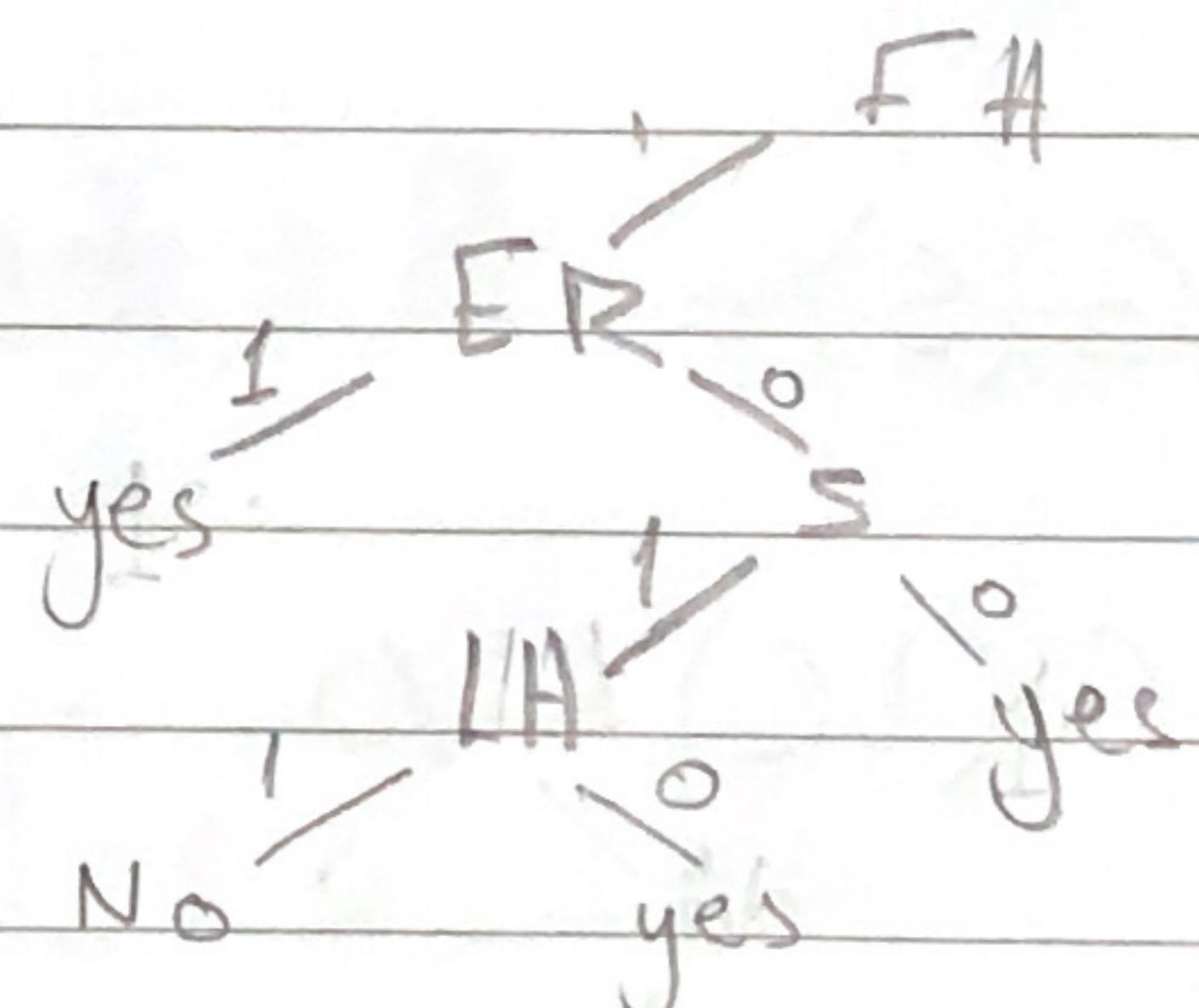
$$MI(LH) = \frac{1}{2}x - (1 \log 1 + 0) + \frac{1}{2}x - (1 \log 1 + 0) = 0$$

$$E(\text{data}) = - \left(\frac{1}{3} \log \frac{1}{3} + \frac{2}{3} \log \frac{2}{3} \right) = 0.918$$

$$IFG(LC) = 0.251$$

$$IFG(LH) = 0.918 \quad \swarrow$$

FH-ER-S [0]



FH [0]

$$E(\text{data}) = -\left(\frac{3}{7} \log \frac{3}{7} + \frac{4}{7} \log \frac{4}{7}\right) = 0.985$$

$$MI(ER) = -\frac{3}{7} \left(\frac{1}{3} \log \frac{1}{3} + \frac{2}{3} \log \frac{2}{3}\right) + -\frac{4}{7} \left(\frac{2}{4} \log \frac{2}{4} + \frac{2}{4} \log \frac{2}{4}\right) = 0.964$$

$$MI(S) = -\frac{3}{7} \left(\frac{2}{3} \log \frac{2}{3} + \frac{1}{3} \log \frac{1}{3}\right) + -\frac{4}{7} \left(\frac{1}{4} \log \frac{1}{4} + \frac{3}{4} \log \frac{3}{4}\right) = 0.857$$

$$MI(LC) = -\frac{2}{7} (1 \log 1) + -\frac{5}{7} \left(\frac{1}{5} \log \frac{1}{5} + \frac{4}{5} \log \frac{4}{5}\right) = 0.52$$

$$MI(LH) = -\frac{4}{7} \left(\frac{2}{4} \log \frac{2}{4} + \frac{2}{4} \log \frac{2}{4}\right) + -\frac{3}{7} \left(\frac{2}{3} \log \frac{2}{3} + \frac{1}{3} \log \frac{1}{3}\right) = 0.965$$

$$IFG(ER) = 0.02$$

$$IFG(S) = 0.128$$

$$IFG(LC) = 0.465$$

$$IFG(LH) = 0.02$$

FH
yes

LC

FH-LC [1]

$$E(\text{data}) = -(1 \log 1) = 0$$

FH
yes
LC
no

FH-LC [0]

$$E(\text{data}) = -\left(\frac{1}{5} \log \frac{1}{5} + \frac{4}{5} \log \frac{4}{5}\right) = 0.721$$

$$MI(ER) = -\frac{2}{5} (0 + 1 \log 1) + -\frac{3}{5} \left(\frac{1}{3} \log \frac{1}{3} + \frac{2}{3} \log \frac{2}{3}\right) = 0.55$$

$$MI(S) = -\frac{2}{5} \left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2}\right) + -\frac{3}{5} (0 + 1 \log 1) = 0.4$$

$$MI(LH) = -\frac{3}{5} \left(\frac{1}{3} \log \frac{1}{3} + \frac{2}{3} \log \frac{2}{3}\right) + -\frac{2}{5} (0 + 1 \log 1) = 0.55$$

$$IFG(ER) = 0.174$$

$$IFG(S) = 0.324$$

$$IFG(LH) = 0.171$$

FH
yes
LC
no
S

FH-ER-S [I]

$$E(\text{data}) = -\left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2}\right) = 1$$

$$MI(ER) = 0 + -1\left(\frac{1}{2} \log \frac{1}{2} + \frac{1}{2} \log \frac{1}{2}\right) = 1$$

$$MI(LH) = -\frac{1}{2}(1 \log 1 + 0) + -\frac{1}{2}(0 + 1 \log 1) = 0$$

$$IFG(ER) = 0$$

$$IFG(LH) = 1 \vee$$

FH-ER-S [II]

$$E(\text{data}) = -(0 + 1 \log 1) = 0$$

FH-ER-S-LH [II]

$$E(\text{data}) = 0$$