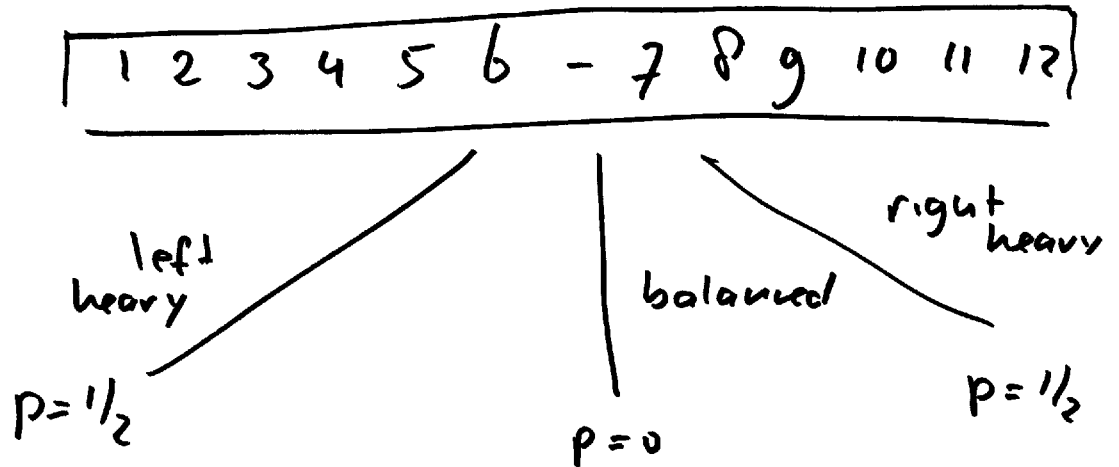


Telecommunications Network Systems

False coin

1)



The entropy before measurement is

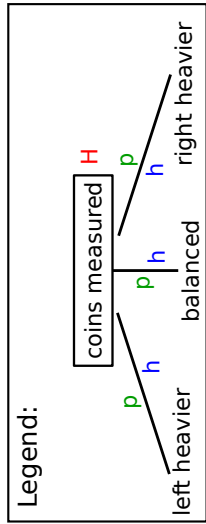
$$H = - \sum_{i=1}^3 p_i \log(p_i) = -\frac{1}{2} \log\left(\frac{1}{2}\right) + 0 \log(0) - \frac{1}{2} \log\left(\frac{1}{2}\right) = 1$$

The maximum we can get is

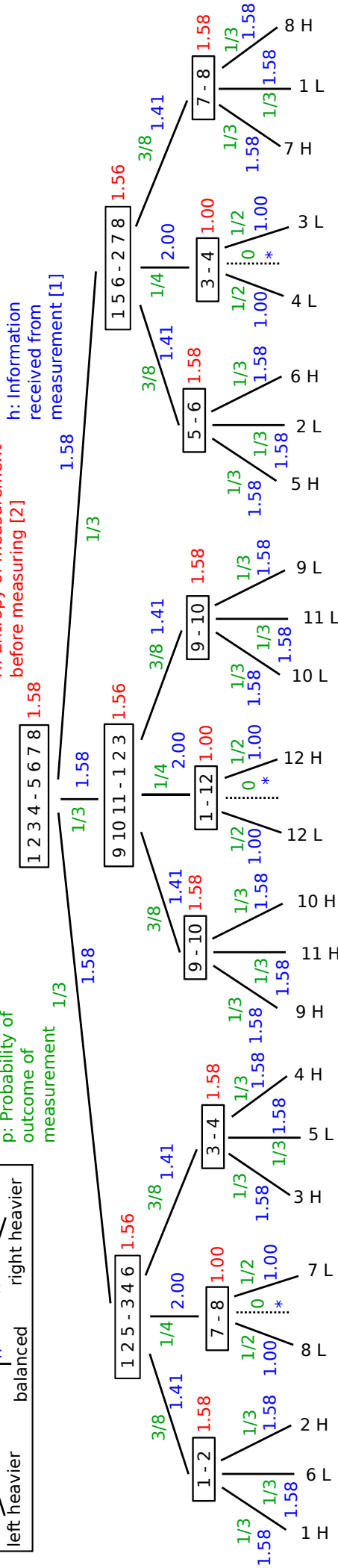
$$\forall i: p_i = \frac{1}{N} = \frac{1}{3}$$

$$H = \left[-\frac{1}{3} \log\left(\frac{1}{3}\right) \right] \times 3 = 1.58$$

Total entropy (uncertainty) of system
 24 equal probabilities:
 $\text{Log}(24) = 4.58$ bits



p: Probability of outcome of measurement
 H: Entropy of measurement before measuring [2]



[1]: $h = -\text{Log}(p)$
 Following a path, sum of information must be 4.58 bits because, knowing the coin, all entropy (uncertainty) is then gone

[2]: $H = \sum p h = - \sum p \text{Log}(p)$