studend	smokes	tie	cape	class
Batman	no	no	yes	good
Robin	no	no	yes	good
Catwoman	no	no	no	bad
Joker	no	no	no	bad
Alfred	no	yes	no	good
Penguin	yes	yes	no	bad

$$E(class) = 1$$

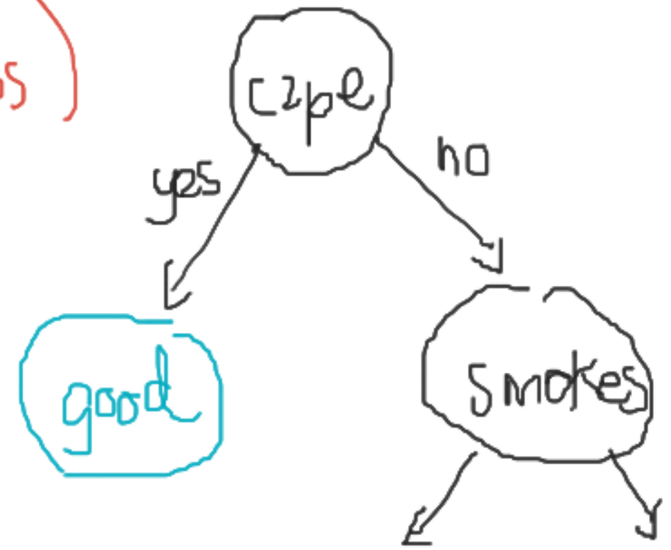
$$E(S) = -\sum p_i \log p_i$$

$$E(cte) = 1 \log 1 = 0$$

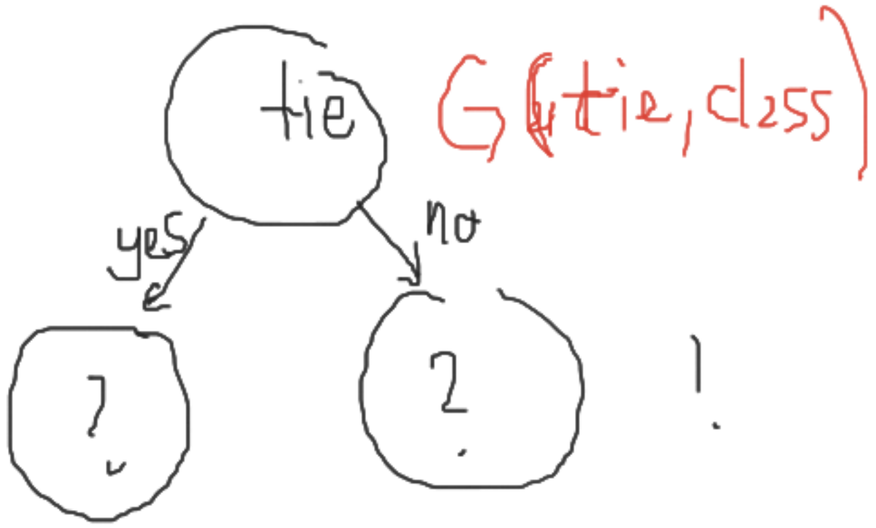
$$E(bit) = \underbrace{-1/2 \log 1/2}_{-1} \quad \underbrace{-1/2 \log 1/2}_{1} = 1$$

studend	smokes	tie	cape	class
Batman	no	no	yes	good
Robin	no	no	yes	good
Catwoman	no	no	no	bad
Joker	no	no	no	bad
Alfred	no	yes	no	good
Penguin	yes	yes	no	bad

G(cape, class)



>



G(tie, class)

!

Hello	Spam
n	y
n	y
n	n
n	n
y	y
y	n

$$E(Spam) = \sum -p_i \log p_i$$

$$E(Spam) = -p(Spam = y)\log(Spam = y) - p(Spam = n)\log(Spam = n)$$

$$-3/6\log 3/6 - 3/6\log 3/6 = 1$$

Entropia
E(Spam)

Hello	Spam
n	y
n	y
n	n
n	n
y	y
y	n

Hello	Spam
n	y
n	y
n	n
n	n
y	y
y	n

Ganho de Informação
$G_{Spam}(Hello)$

$$G_{\text{Spam}}(Hello) = E(Spam) - \sum p_i E(Spam|Hello_i) =$$

$$E(Spam) - p(Hello = y)E(Spam|Hello = y) - p(Hello = n)E(Spam|Hello = n) =$$

$$E(Spam) - p(Hello = y).1 - p(Hello = n).1 =$$

$$E(Spam) - 4/6.1 - 2/6.1 = 1 - 1 = 0$$