1 Noiseless Coding

Noiseless coding is the removal of redundancy in sent information. **Compression** is a good example of this. Noisy coding or **error correction coding** adds redundancy to make things better. First result in noiseless coding is that the **entropy** of a memoryless souce gives a lower bound on the length of a code working on the source. The **average word length** is bounded in terms of the entropy.

1.1 3.1 Noiseless Coding

A memoryless source using a set W of source words is anything which throws these words away with prescribed probabilities. ie:

$$w \in W$$

does not depend on what came before it. Formally, it is a sequence: $X_1, X_2, ...$ of **independent adn identically distributed random variables set on a probaility space**. These take values in a set W of source words.
An example,

$$P(X_i = 0) = \frac{1}{2}$$
$$P(X_i = 1) = \frac{1}{2}$$

This is an example of the stream of 0s and 1s and the distribution.
Most general type of source ie. one with no assumptions about interdependence is a **stochastic source**. The other is a **Markov source**. Which I won't expain.
An **alphabet** $\sum$ is just a finite set. The elements fo the set are called **characters** of the alphabet. we denote $\sum^*$ to be the set of all finite strings from characters in $\sum$.