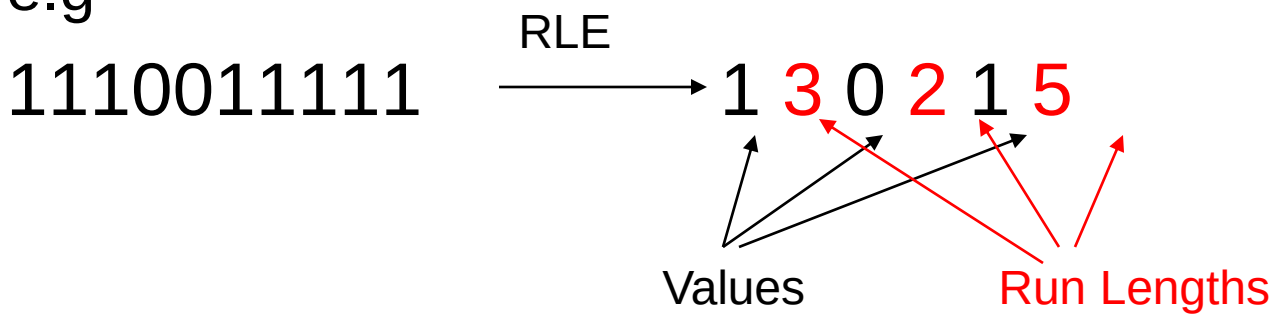
Run Length Encoder/Decoder

What is RLE?

- Compression technique
  - Represents data using value and run length
  - Run length defined as number of consecutive equal values

e.g



Applications

- Useful for compressing data that contains repeated values
  - e.g. output from a filter, many consecutive values are 0.
- Very simple compared with other compression techniques
- Reversible (Lossless) compression
  - decompression is just as easy

Arithmetic Coding

Encoder

- Example: low=0.33184, high=0.33220
- Code=0, k=1
- While (value(code)<low)

  { Assign 1 to the k-th binary fraction bit:
  - Decimal value(code)=value(0.1)=0.5>high (NOT Accepted)

    ➔Assign 0 to the k-th binary fraction bit

    k=k+1

  }
- The while loop continues if

  Decimal value(code)=value(0.0)=0<low.
- The binary codeword generated is 0.01010101 (= $2^{-2}+2^{-4}+2^{-6}+2^{-8}=0.33203125$)

Decoder

- Value=0.33203125
- Range_low(C)=0.3<=0.33203125<0.5= Range_high(C)

  ➔ The first output symbol is C
- This yields value = [0.33203125-0.3]/0.2=0.16015625

  ➔ second output symbol A