



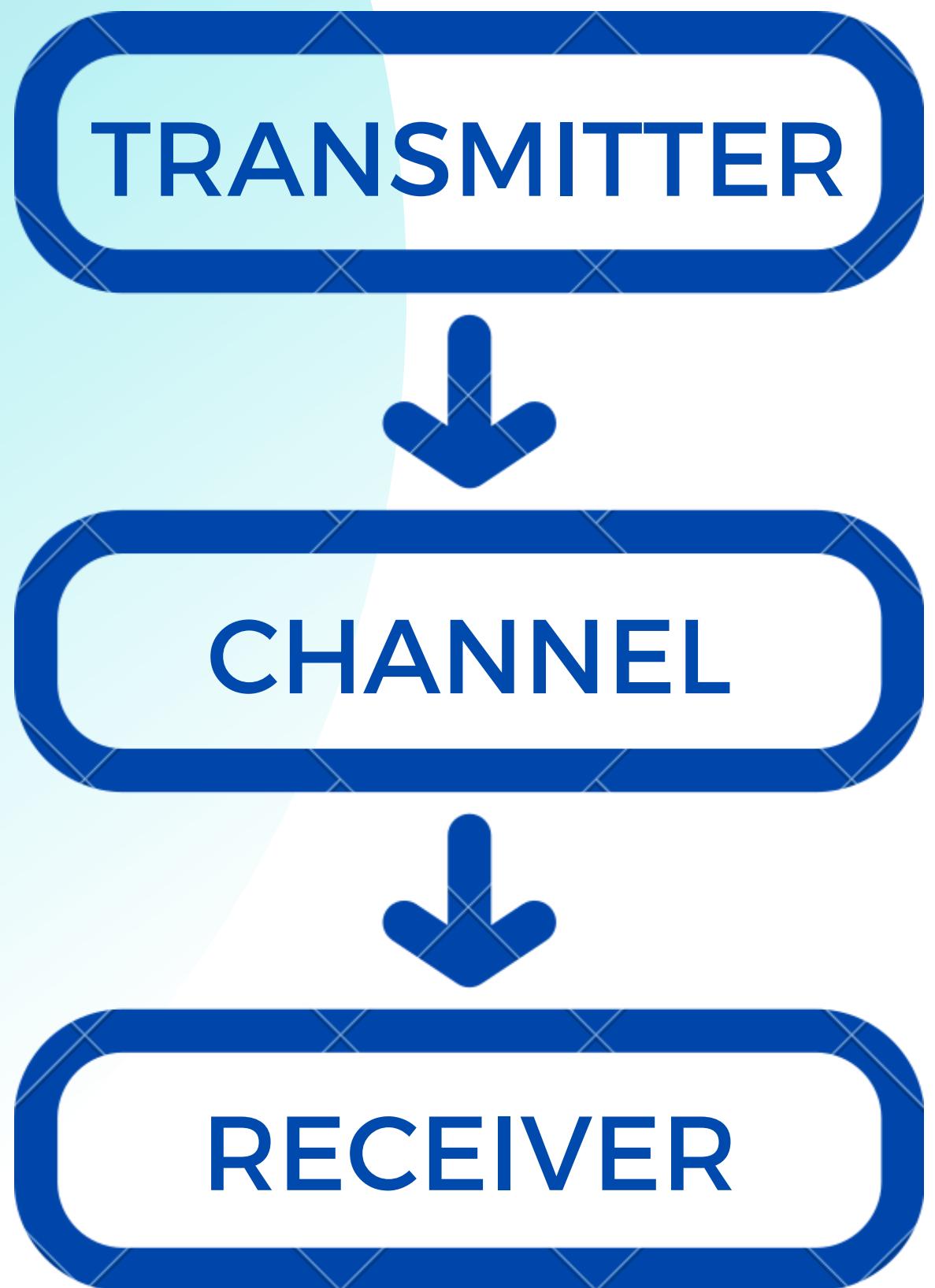
EN2130-COMMUNICATION DESIGN PROJECT

DESIGN METHODOLOGY



**WHY THESE TECHNIQUES
AND PARAMETERS?**

COMMUNICATION



FILE TRANSMISSIONS

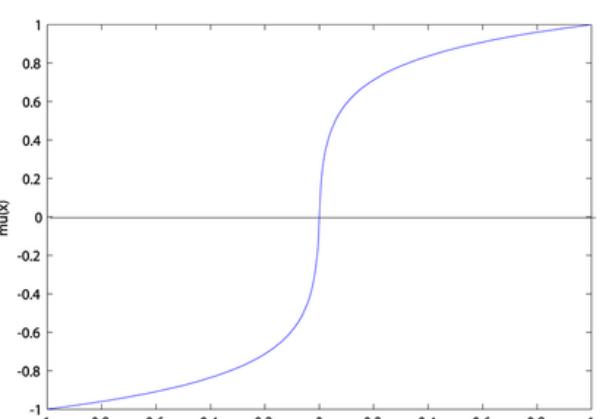
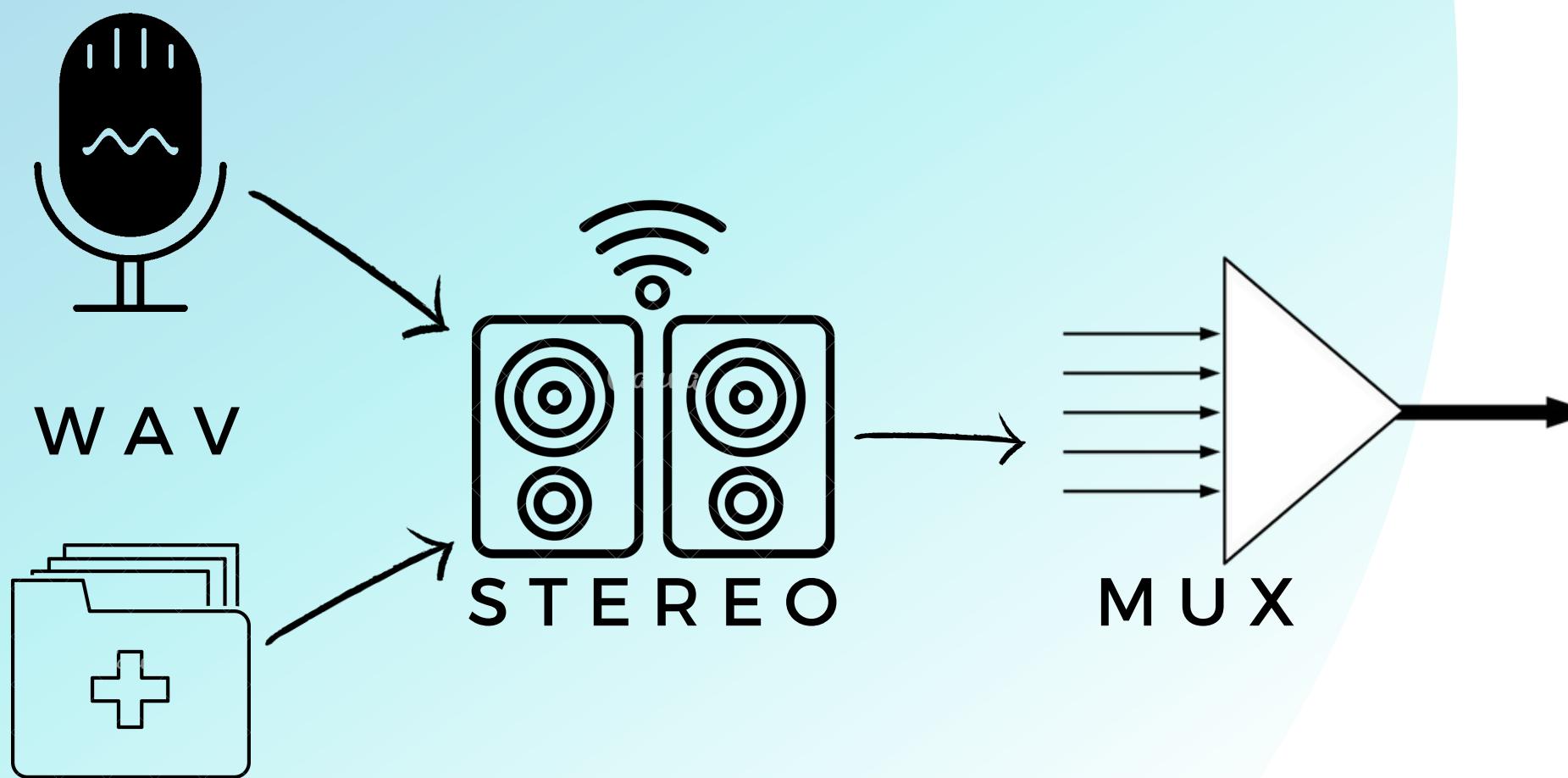
AUDIO BINARY STREAM IMAGE



00101011
01101010
10110101
11011000
10100110



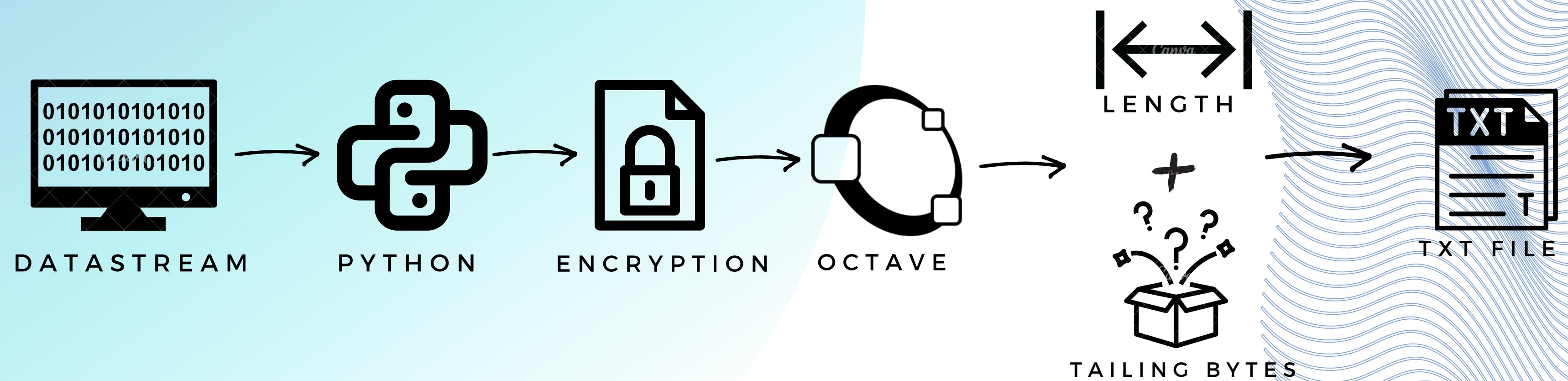
AUDIO FILE



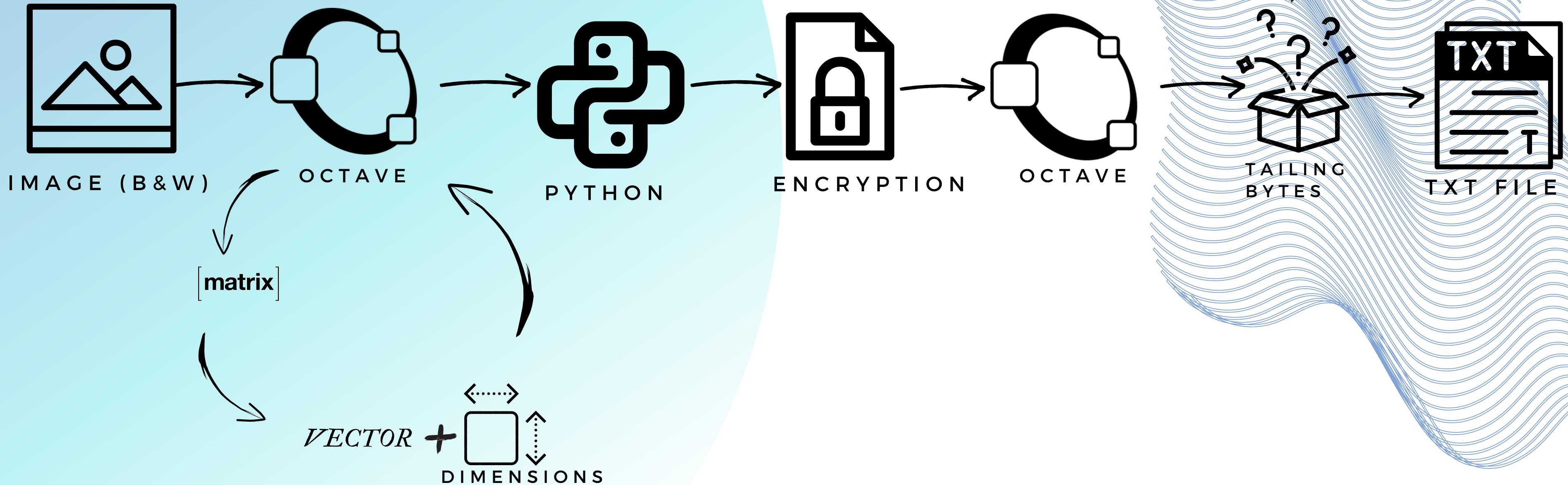
μ LAW
ENCODER

BYTE
STREAM

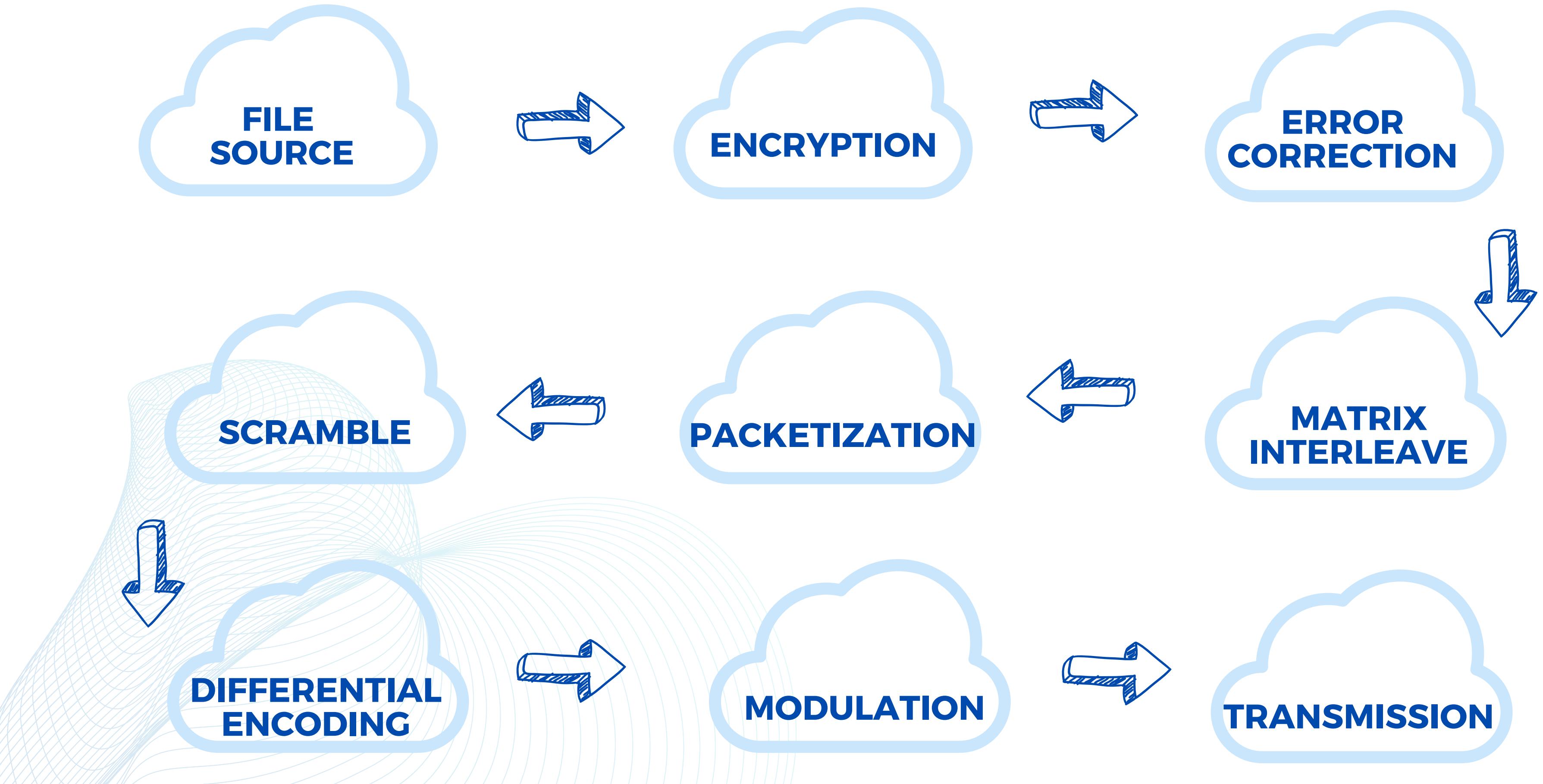
BINARY DATA STREAM



MONOCHROME IMAGE



TRANSMITTER



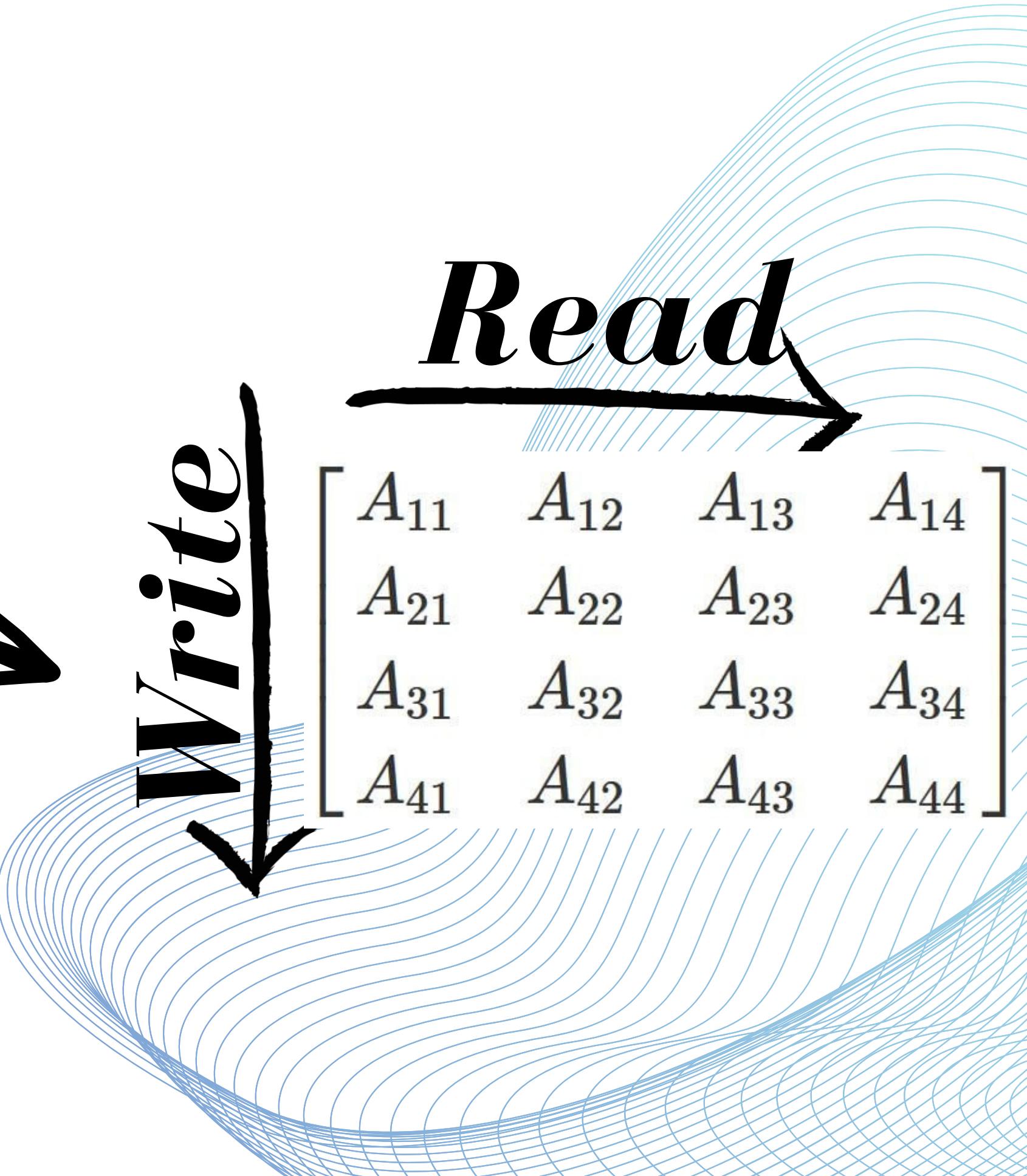
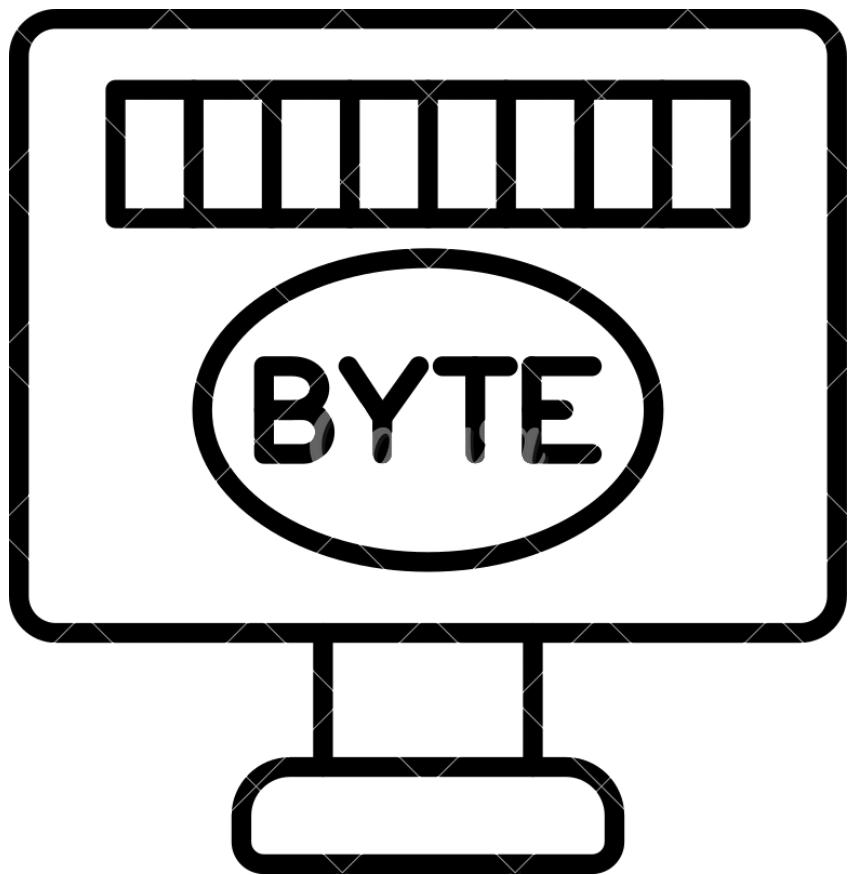
ERROR CORRECTION SCHEME

Convolution coding

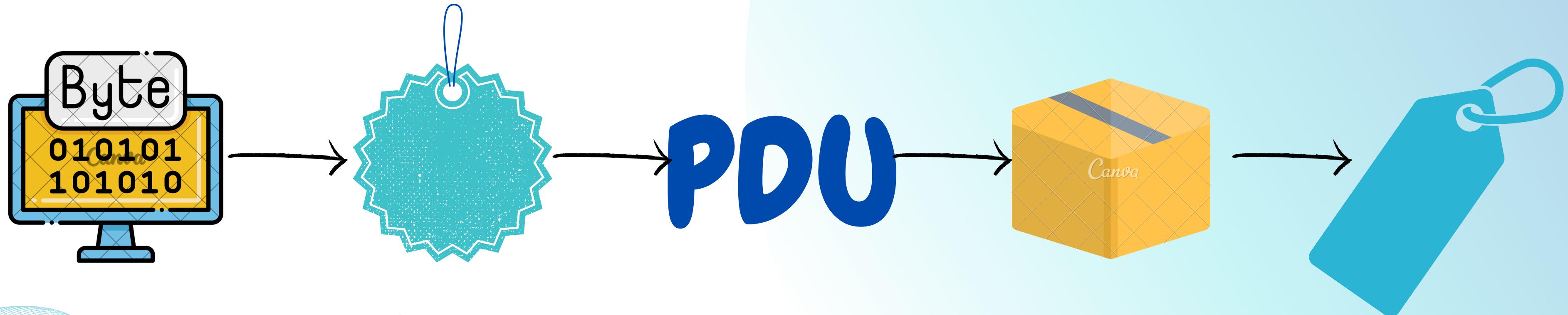


- Encoding Rate (k/n) = 1/2
- Constraint Length (K) = 7

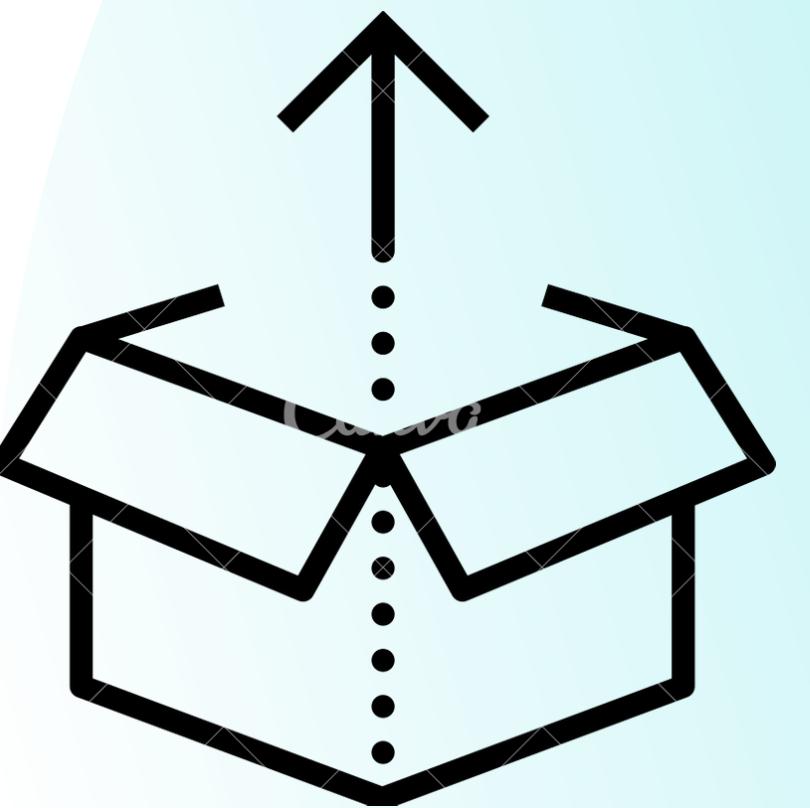
MATRIX INTERLEAVE



PACKETIZATION



- Byte stream length
 - of 256 bytes
 - Tag of Byte stream length
- Tag of new Byte stream length
- Packetization of 290 bytes
 - Pre-amble of 32 bytes
 - Acces code of 4 bytes

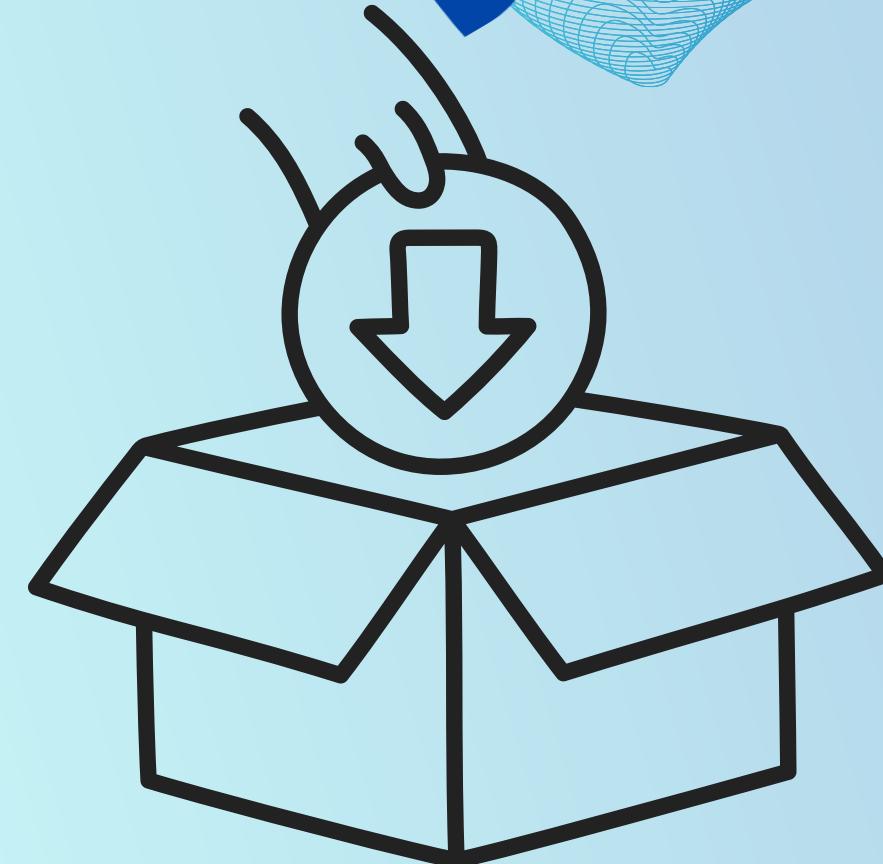


UNPACK 8 BITS

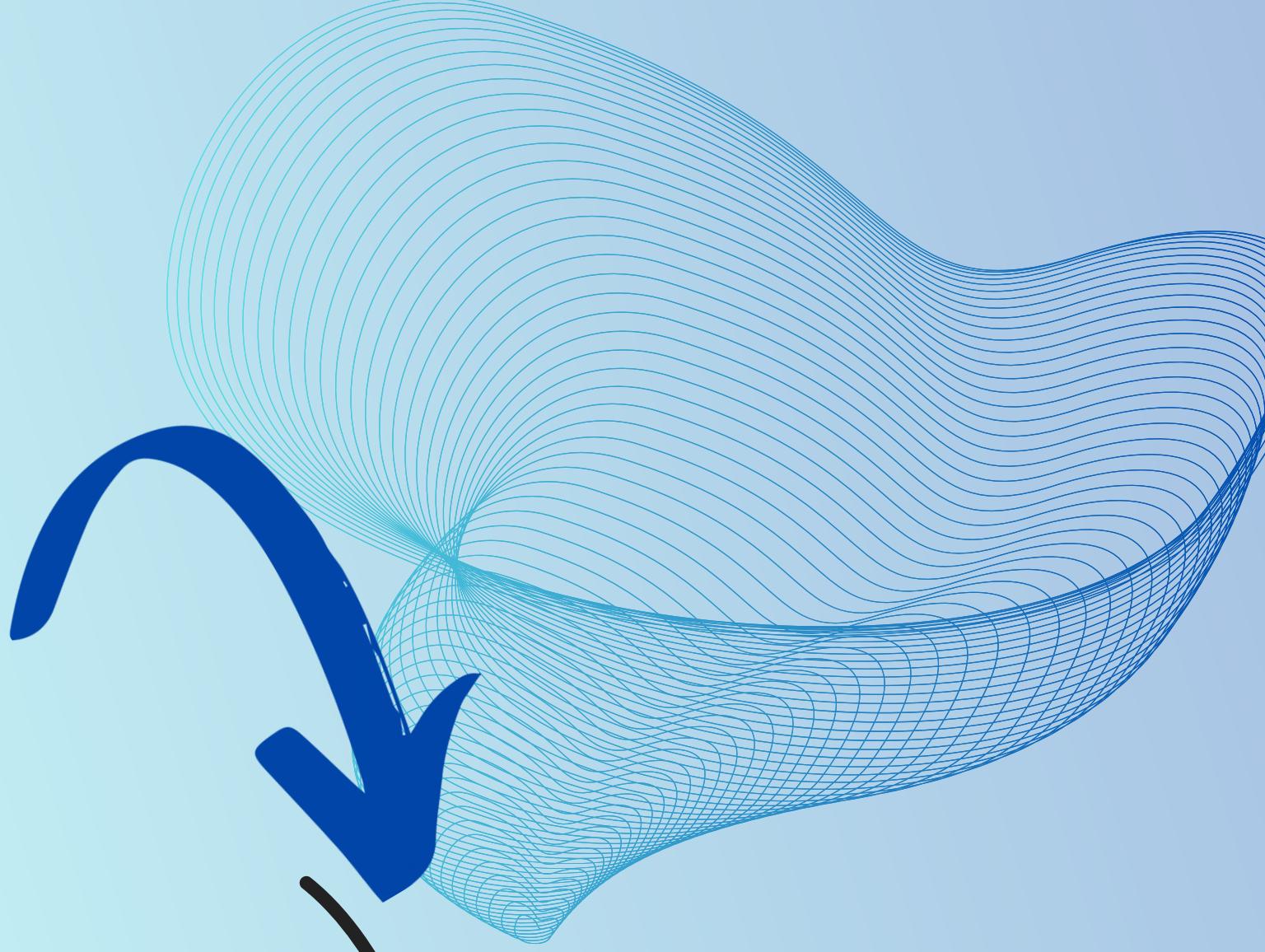
SCRAMBLE



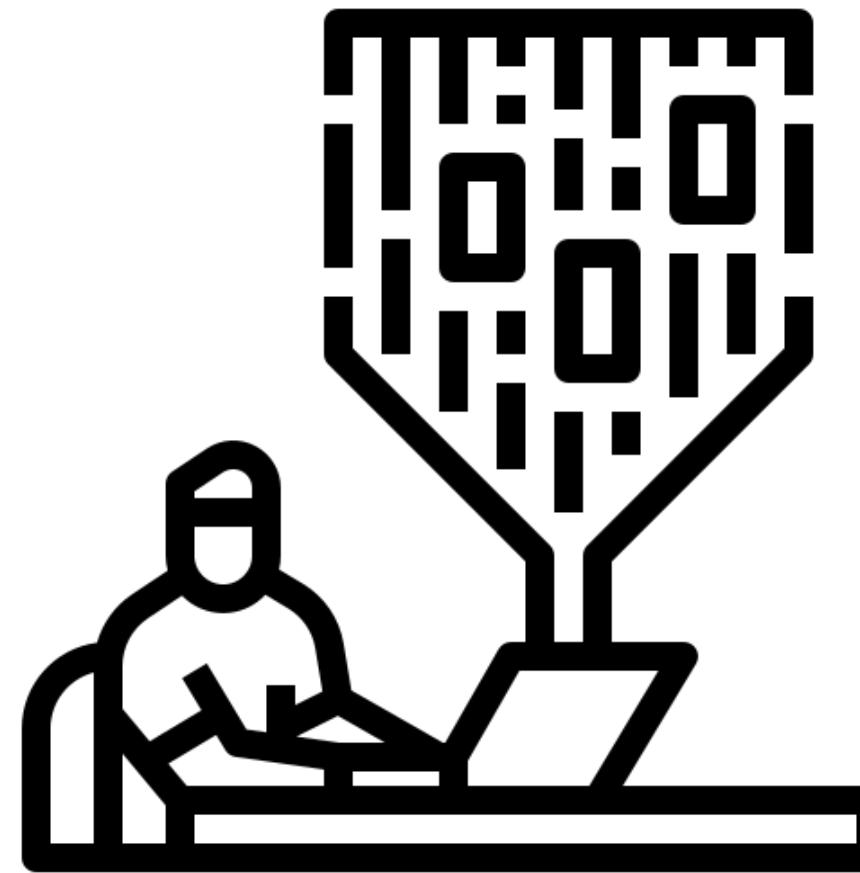
Scramble!



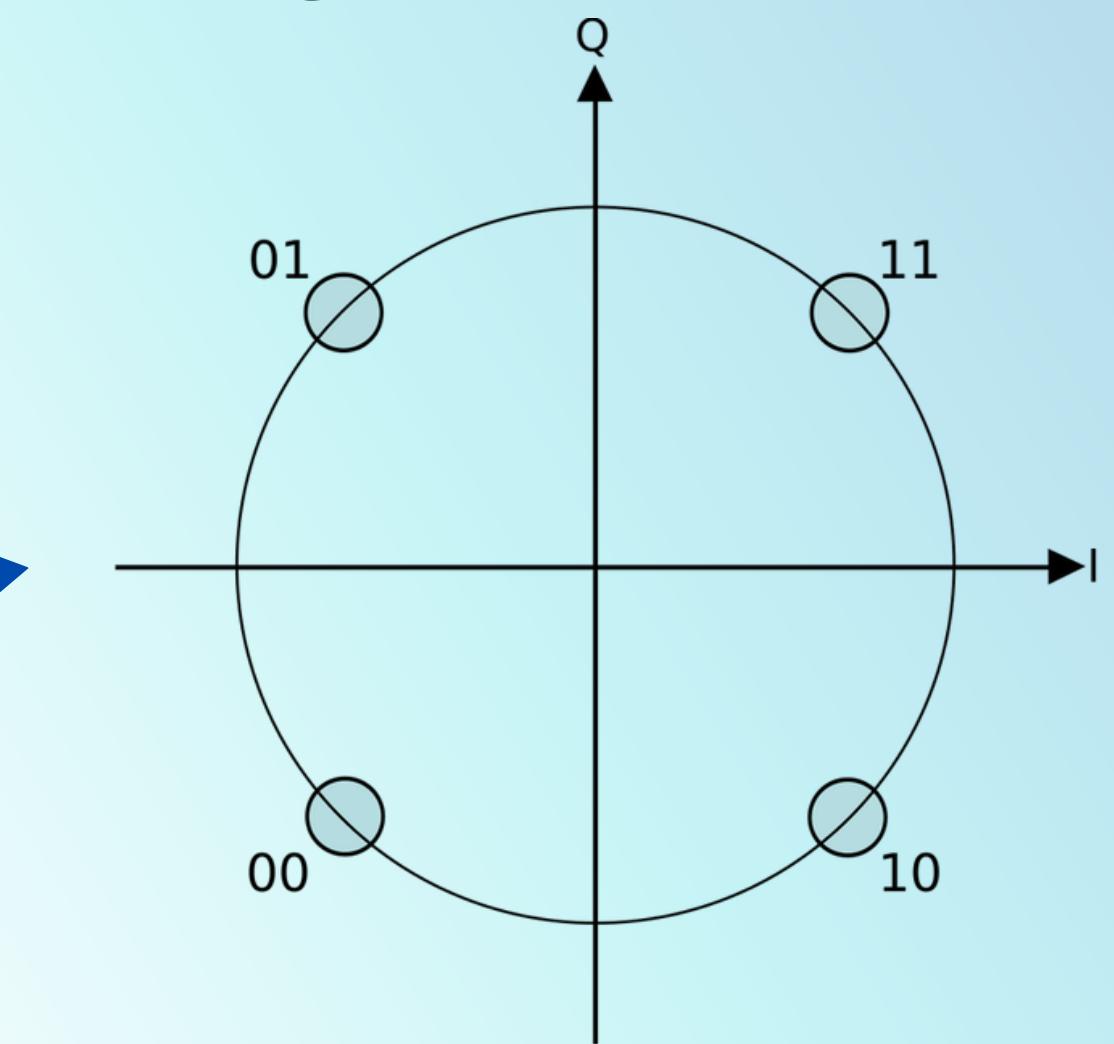
PACK 8 BITS



DIFFERENTIAL ENCODING

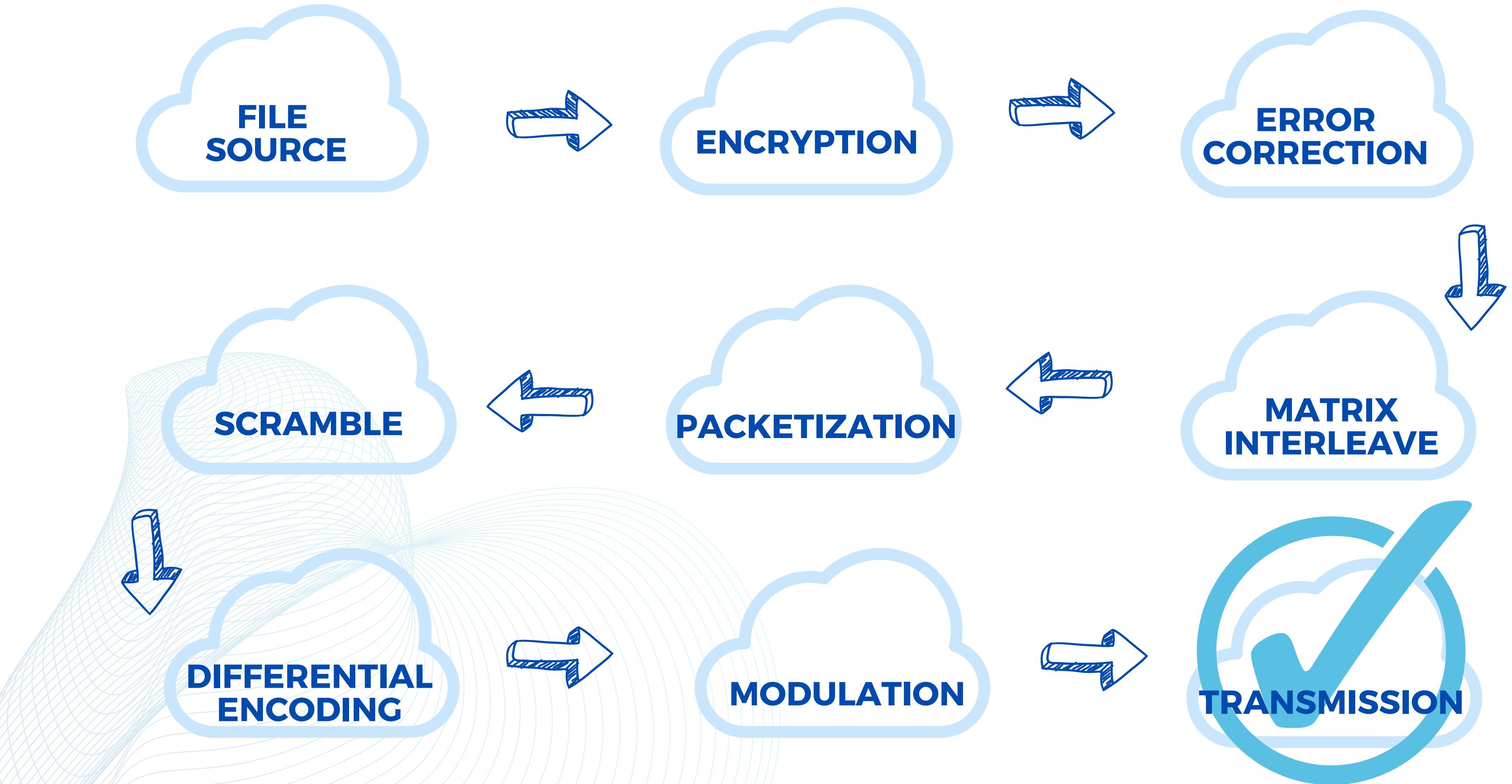


Q P S K

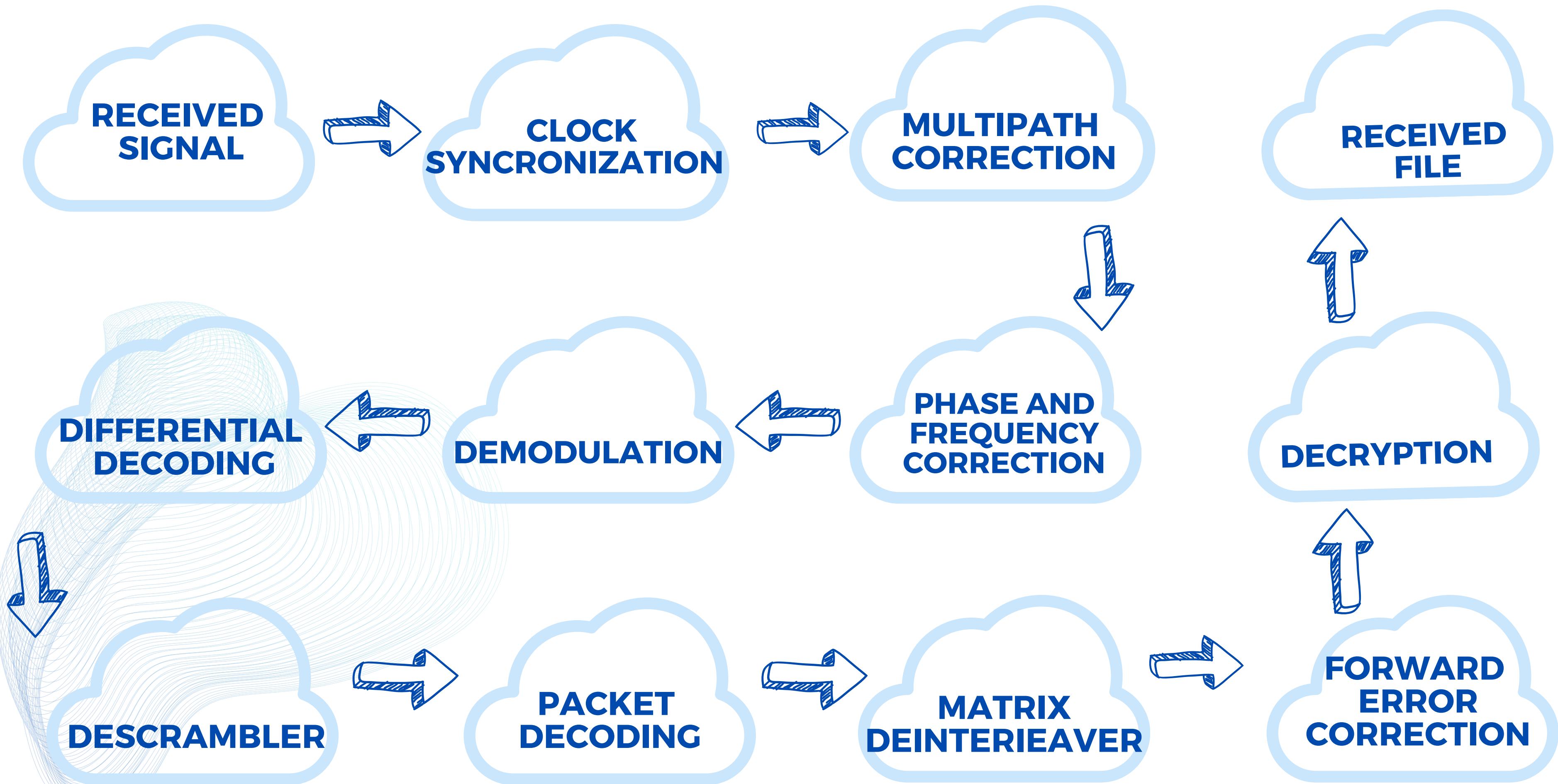


PHASE
MODULATION

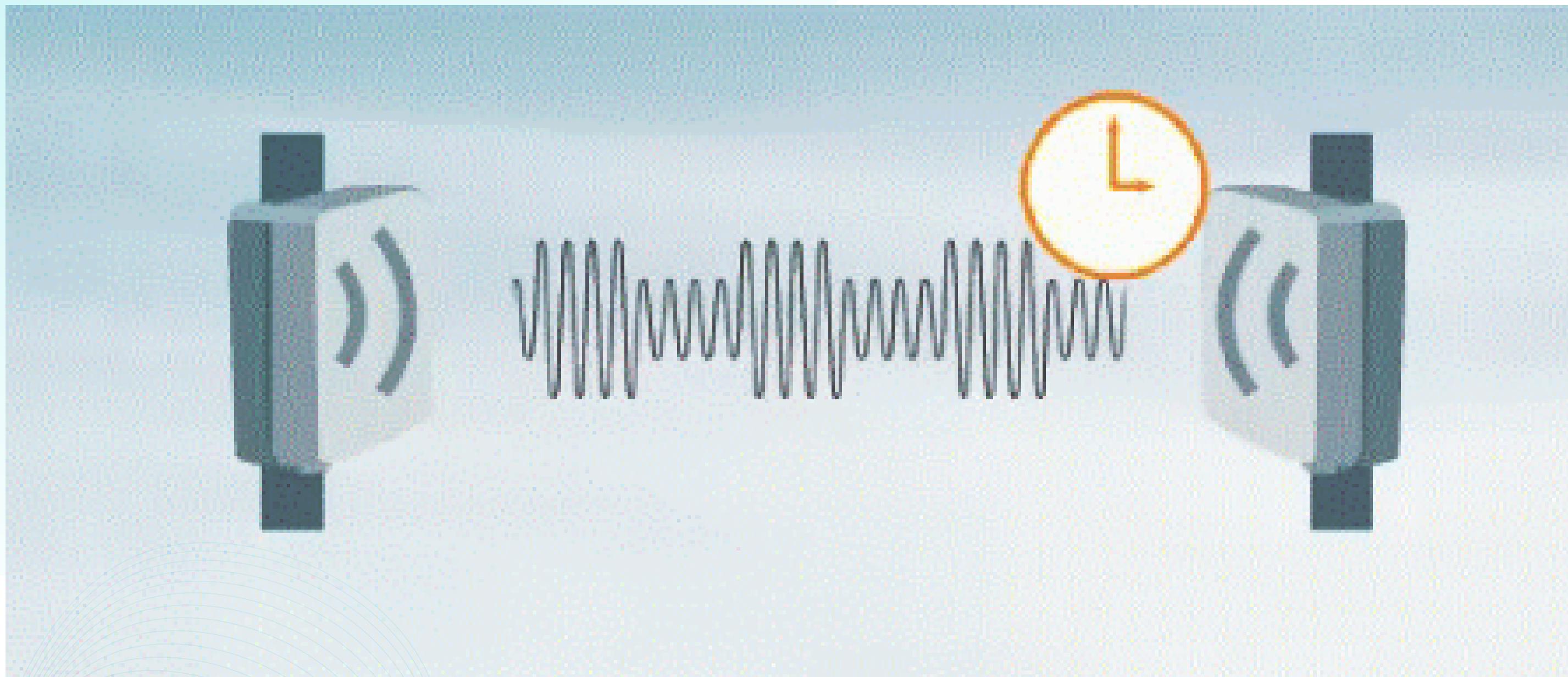
TRANSMITTER



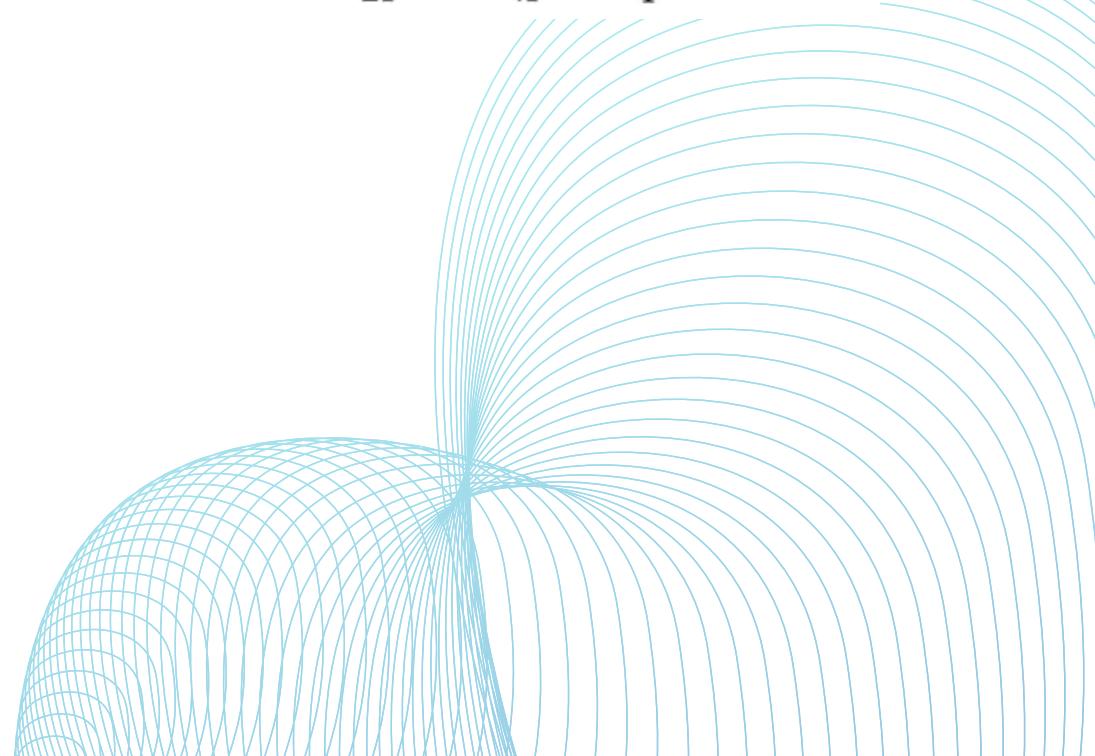
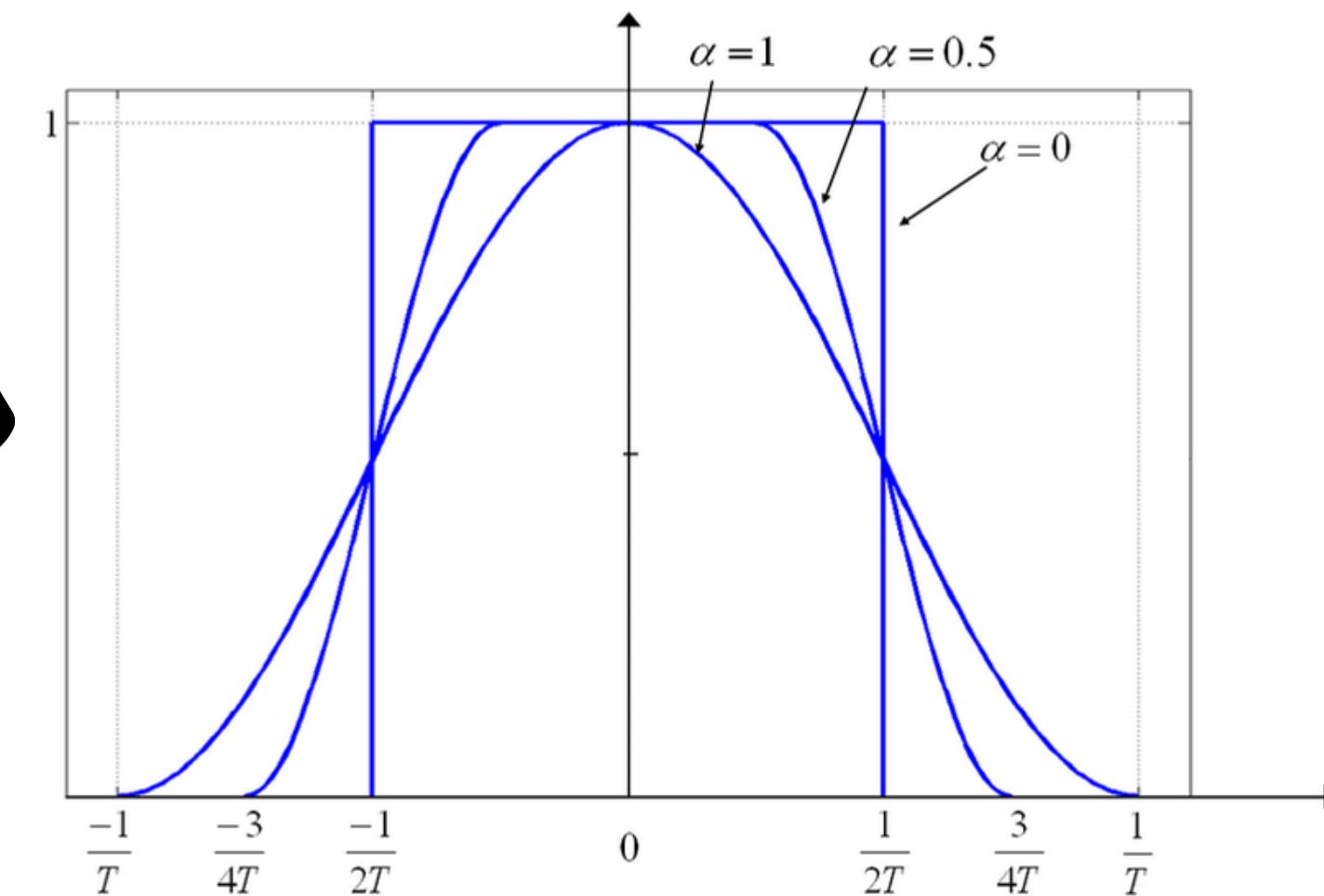
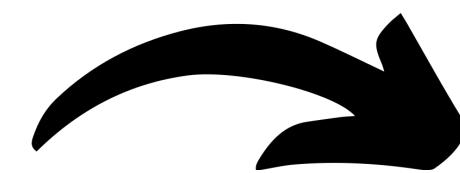
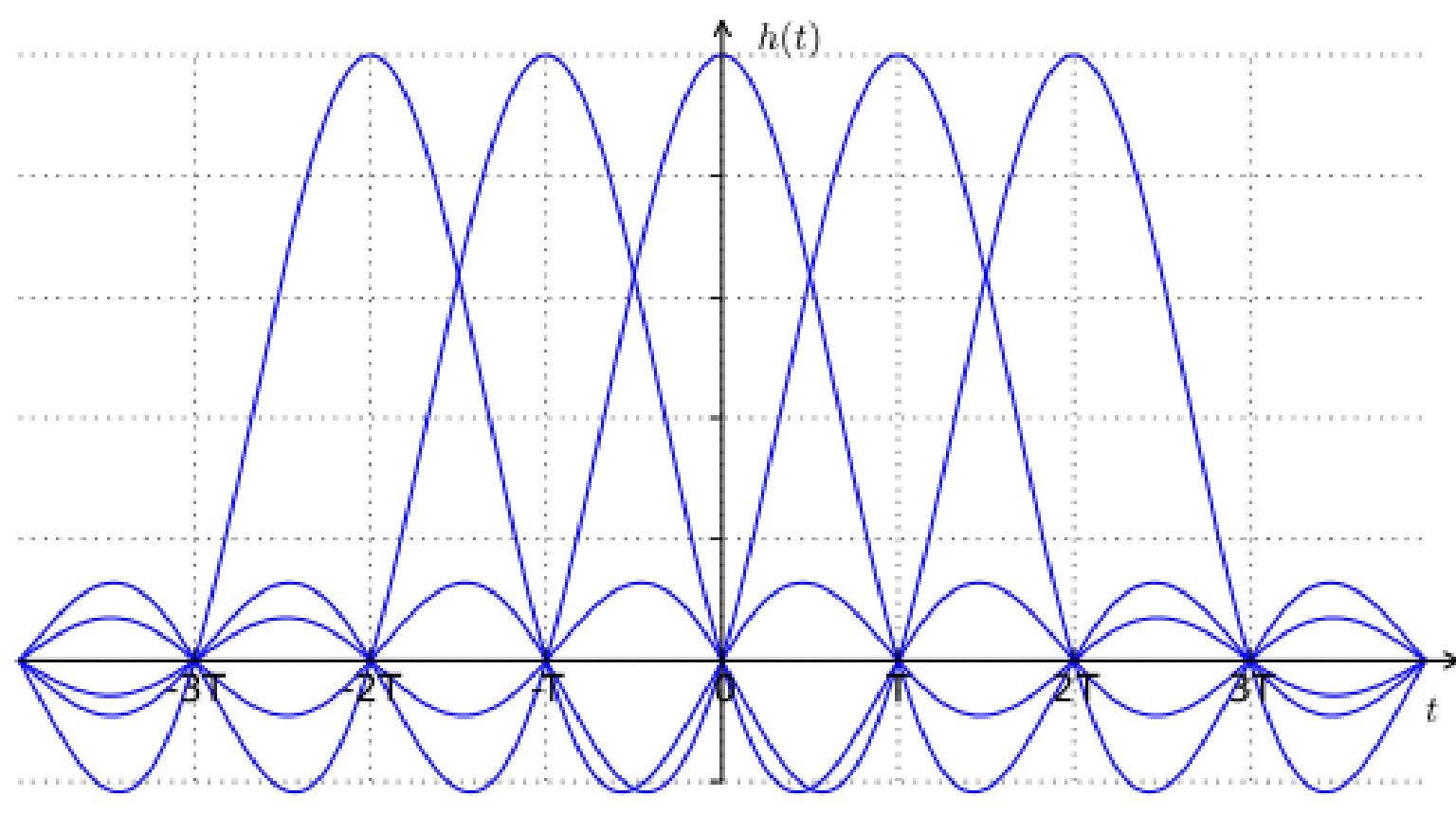
RECEIVER



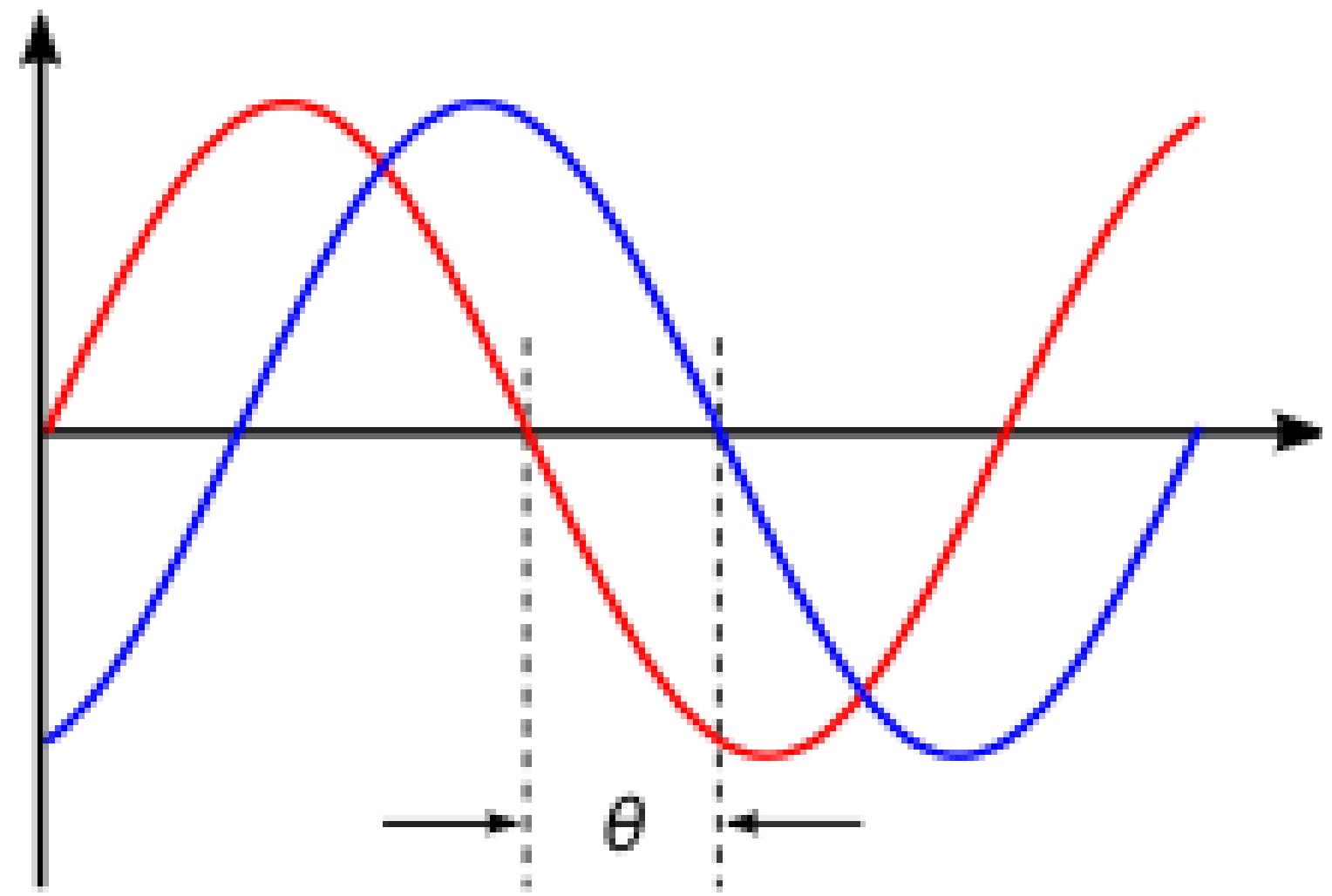
CLOCK SYNCHRONIZATION



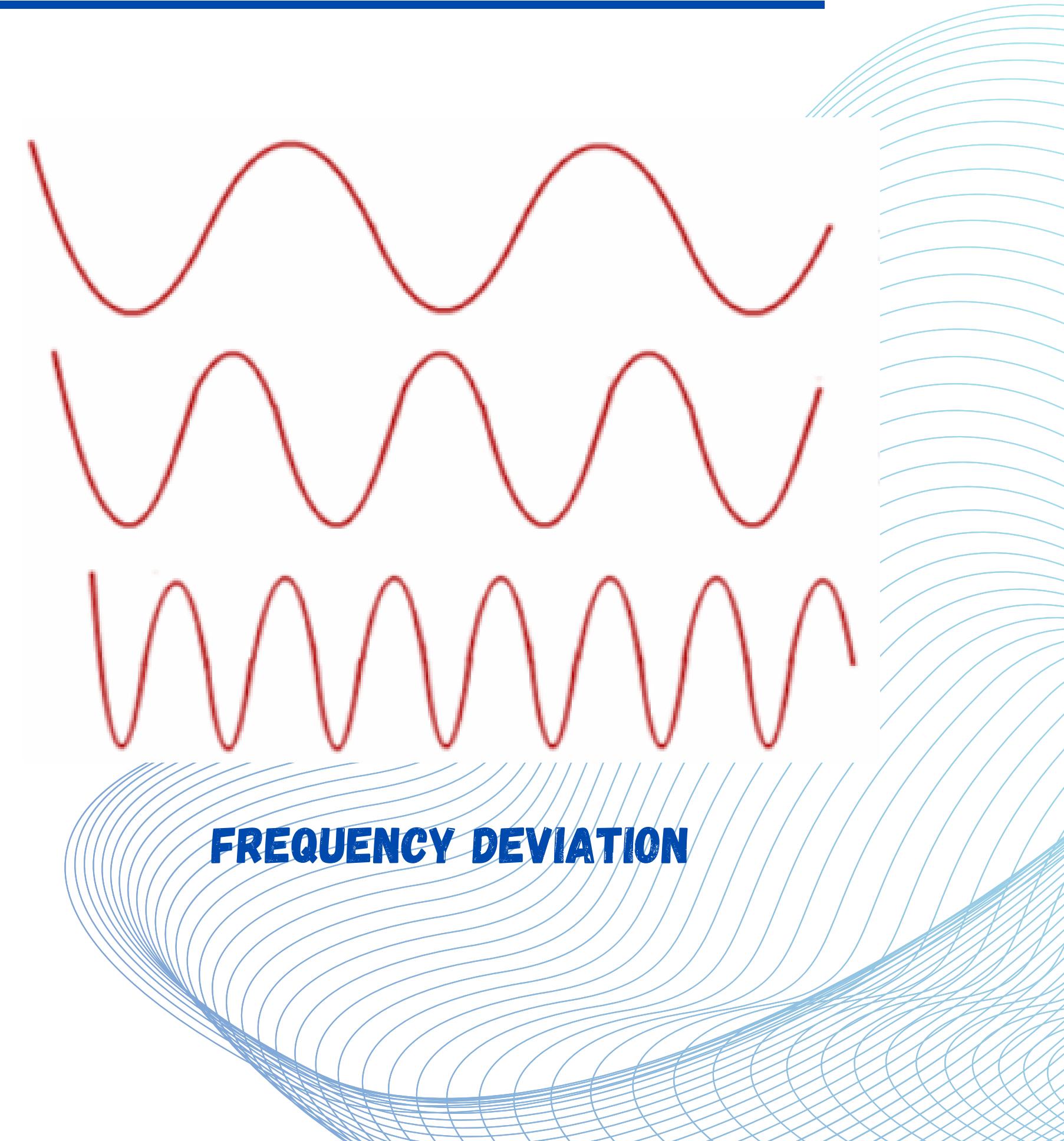
MULTIPATH CORRECTION



PHASE AND FREQUENCY CORRECTION

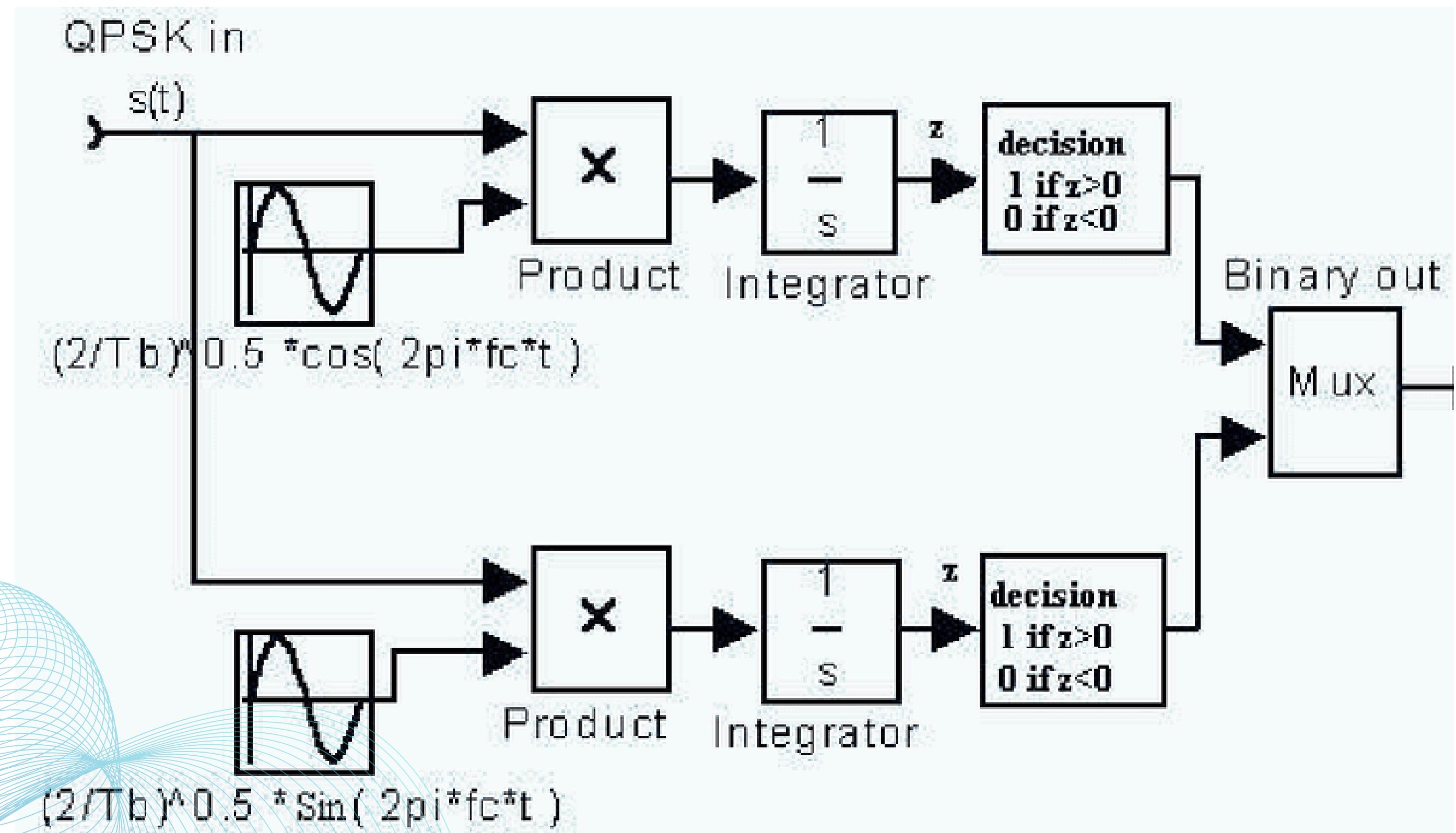


PHASE DEVIATION

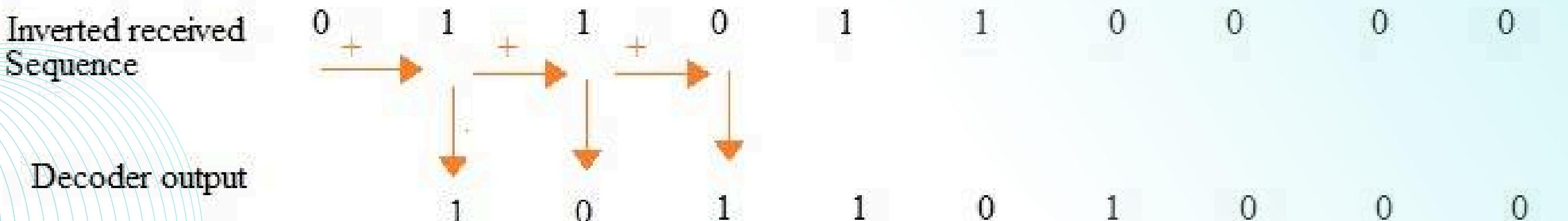
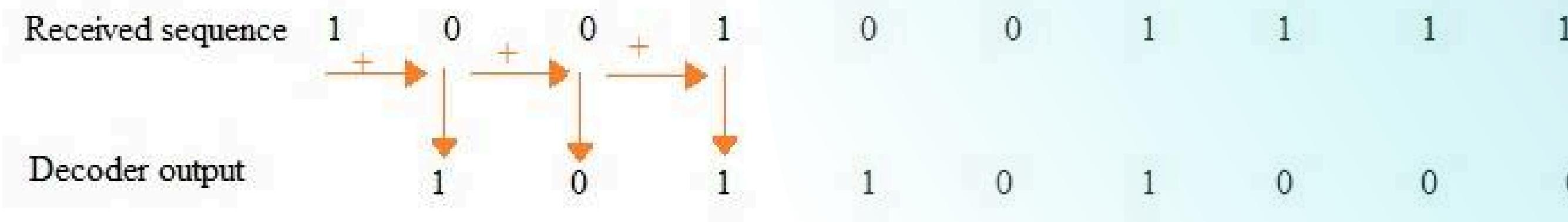
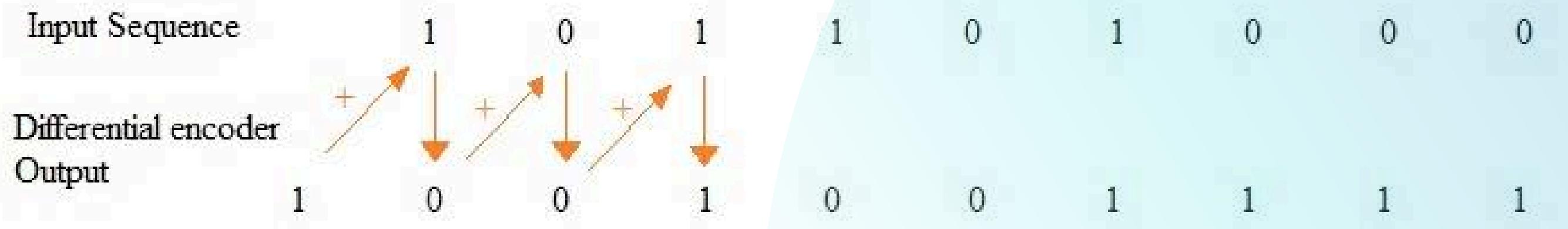


FREQUENCY DEVIATION

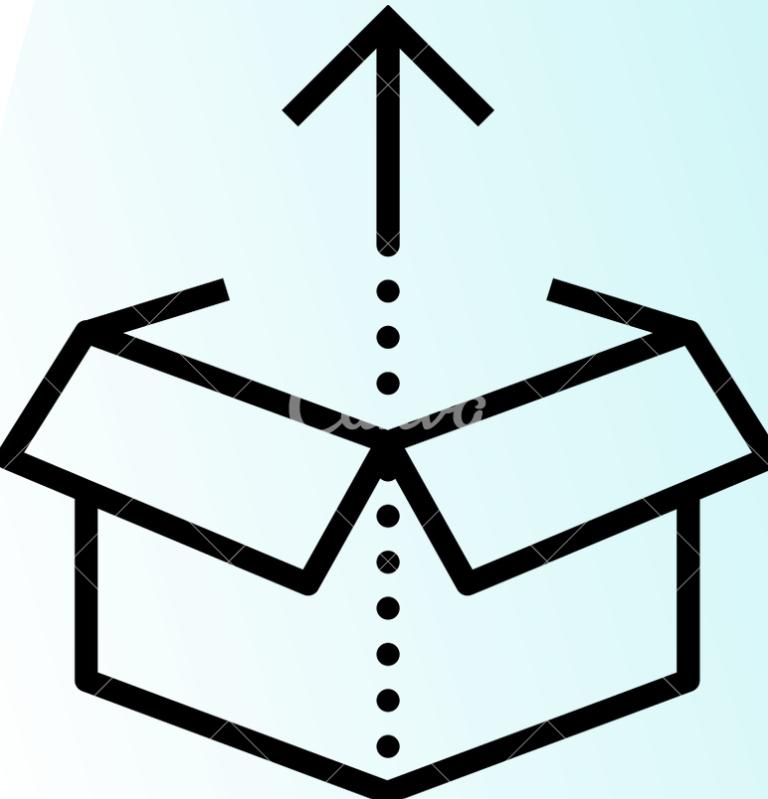
DEMODULATION



DIFFERENTIAL DECODING



DESCRAMBLE



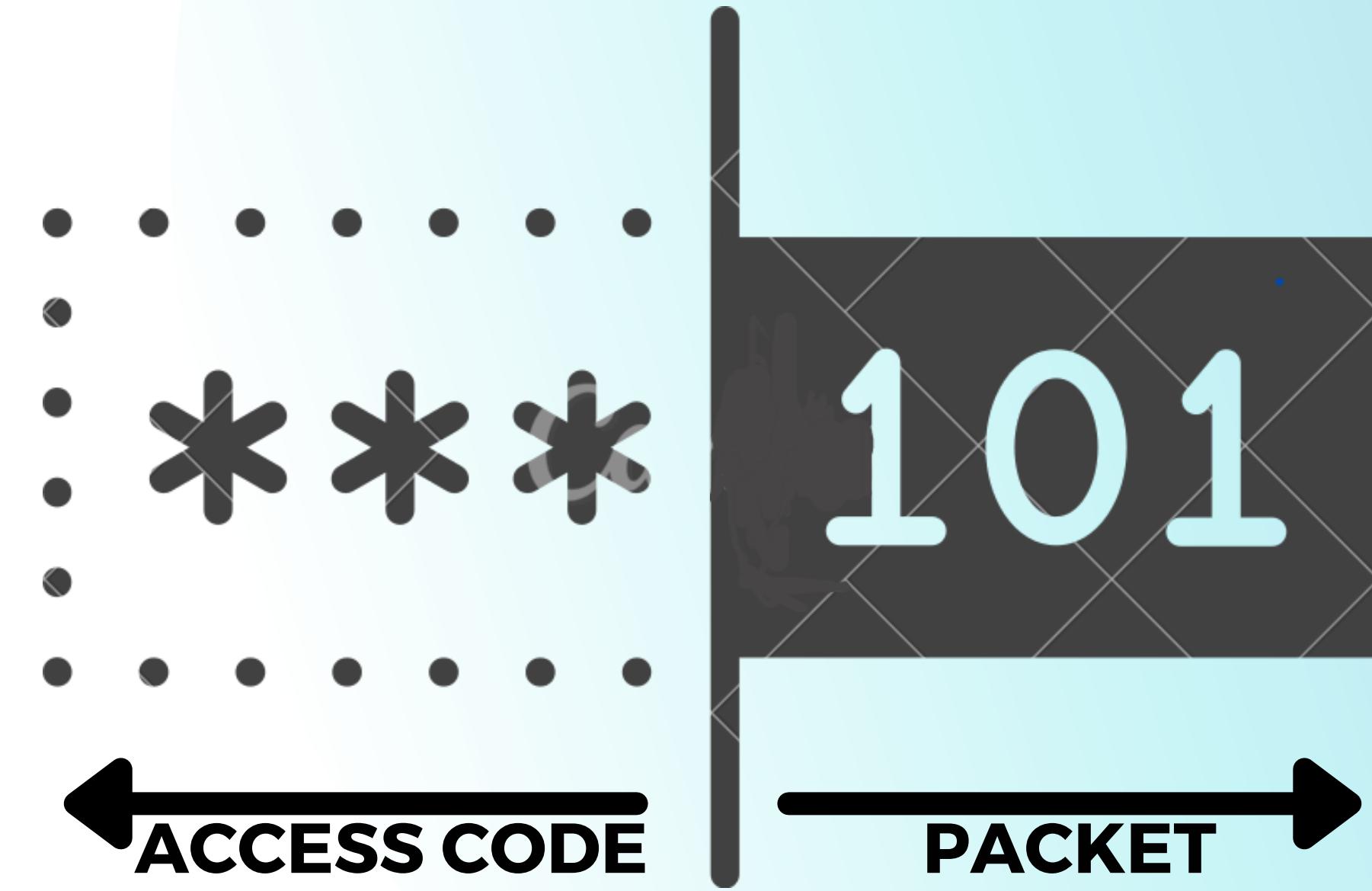
UNPACK 8 BITS

Descramble!

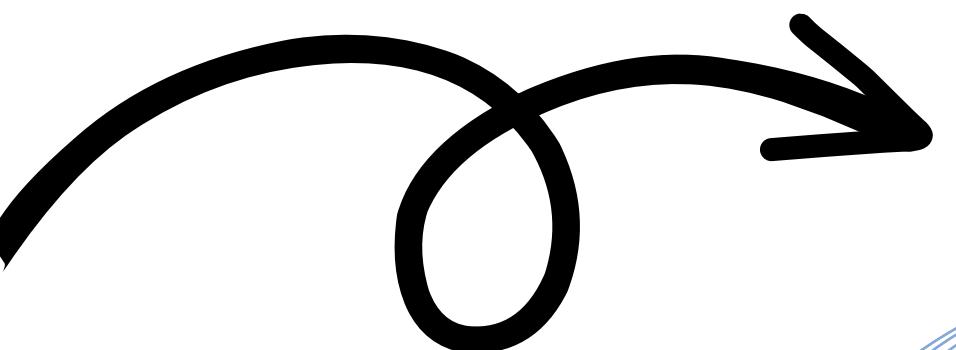
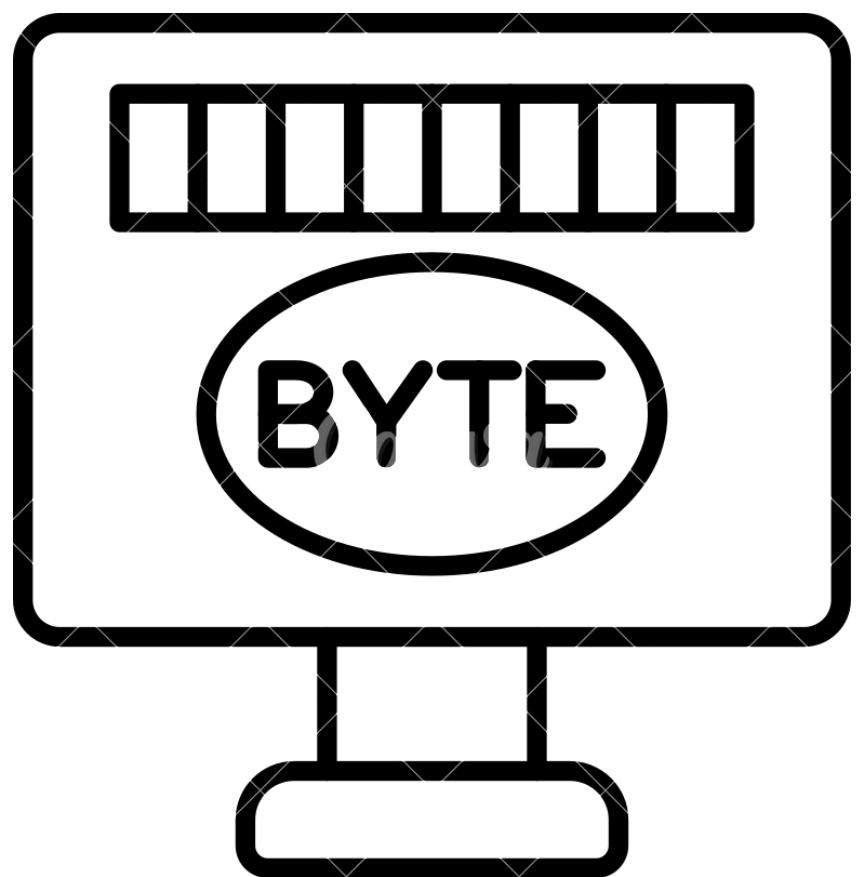


PACK 8 BITS

PACKET DECODING



MATRIX DEINTERLEAVE

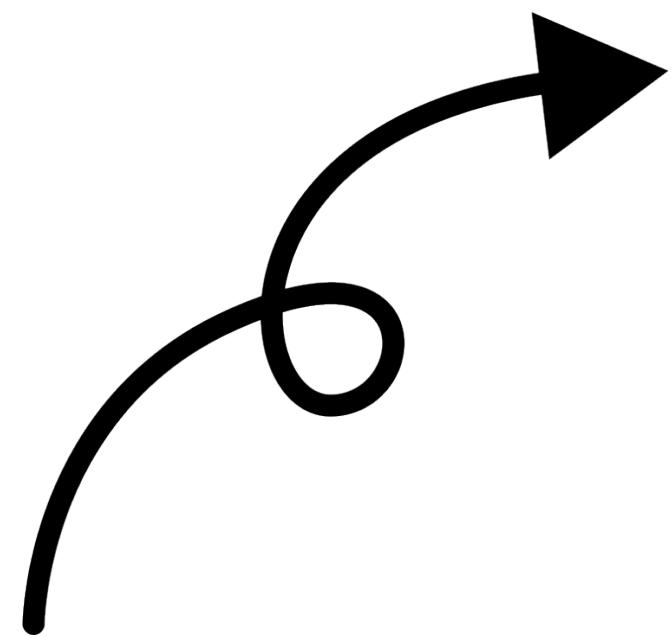


Read

Write

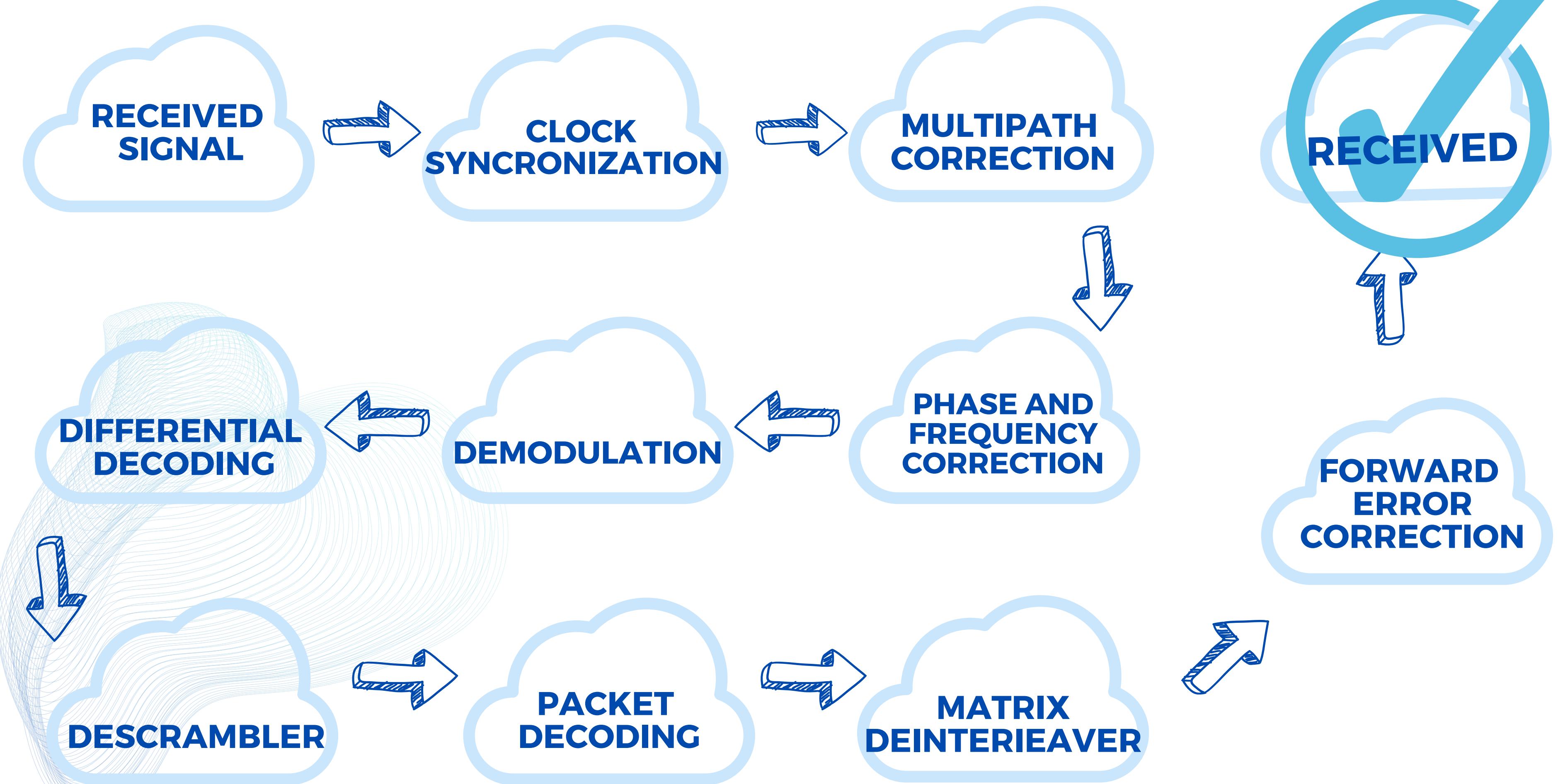
$$\begin{bmatrix} A_{11} & A_{12} & A_{13} & A_{14} \\ A_{21} & A_{22} & A_{23} & A_{24} \\ A_{31} & A_{32} & A_{33} & A_{34} \\ A_{41} & A_{42} & A_{43} & A_{44} \end{bmatrix}$$

FORWARD ERROR CORRECTION

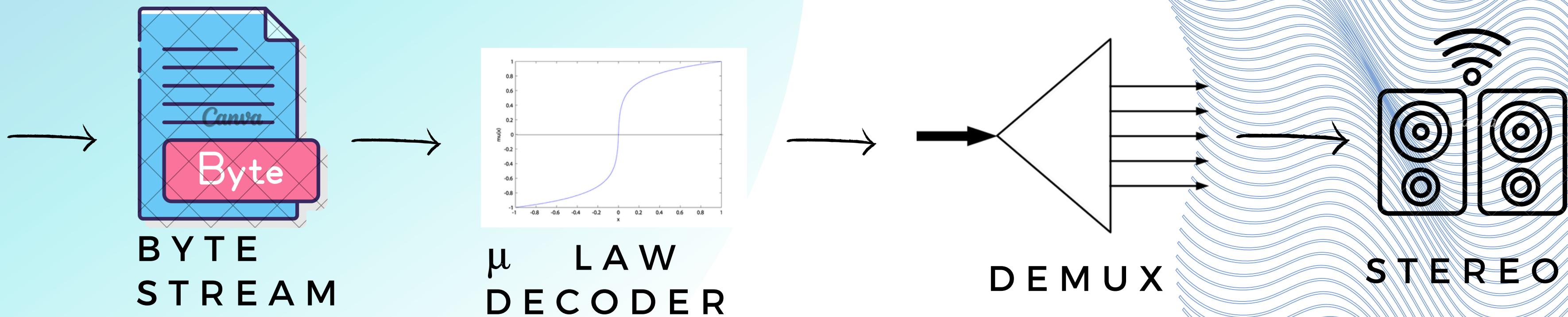


- Decoding Rate (k/n) = 1/2
- Constraint Length (K) = 7

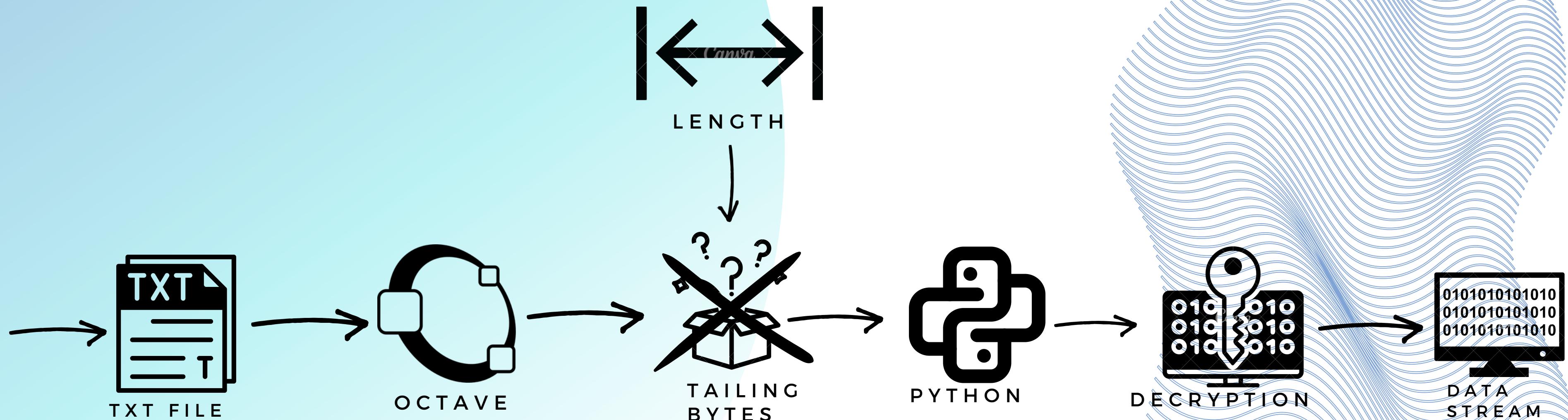
RECEIVER



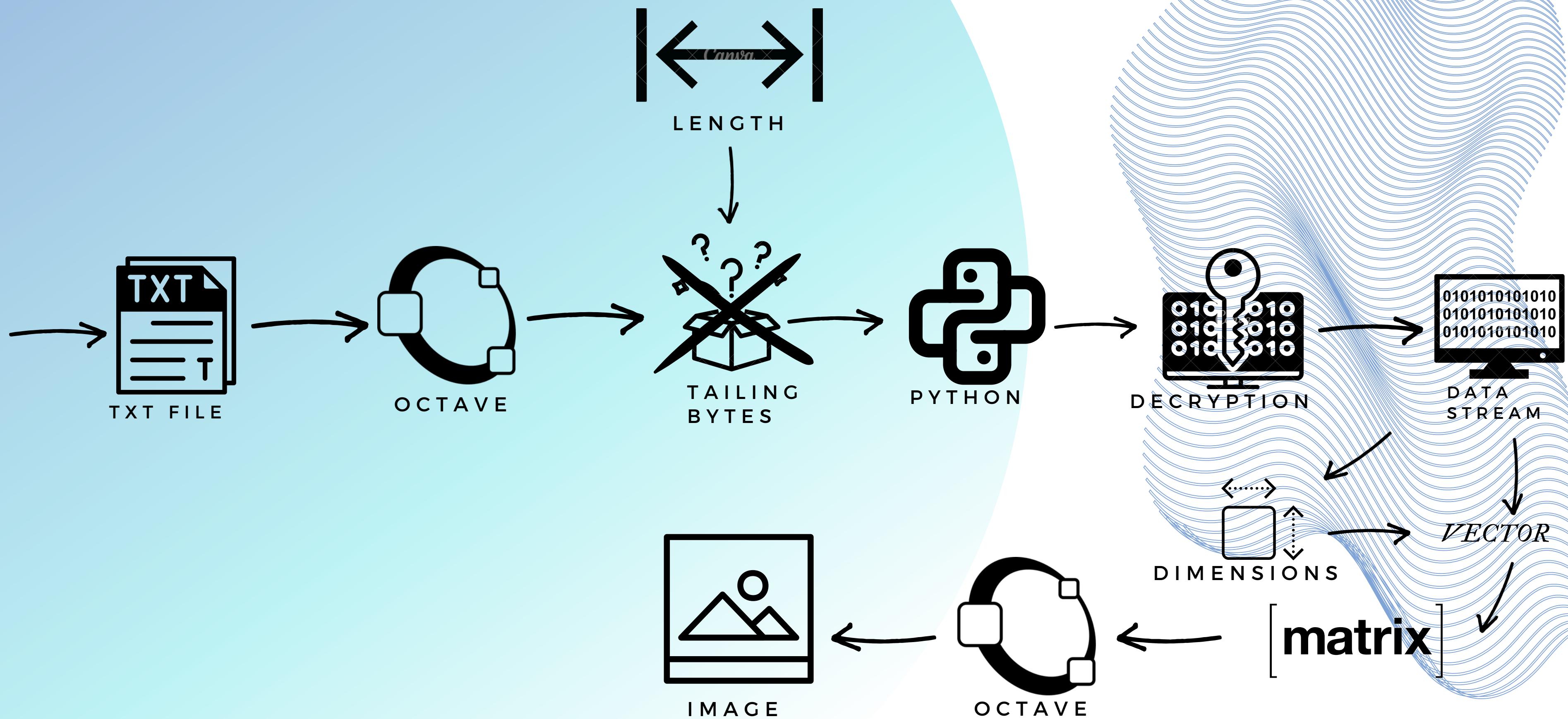
AUDIO FILE



BINARY DATA STREAM

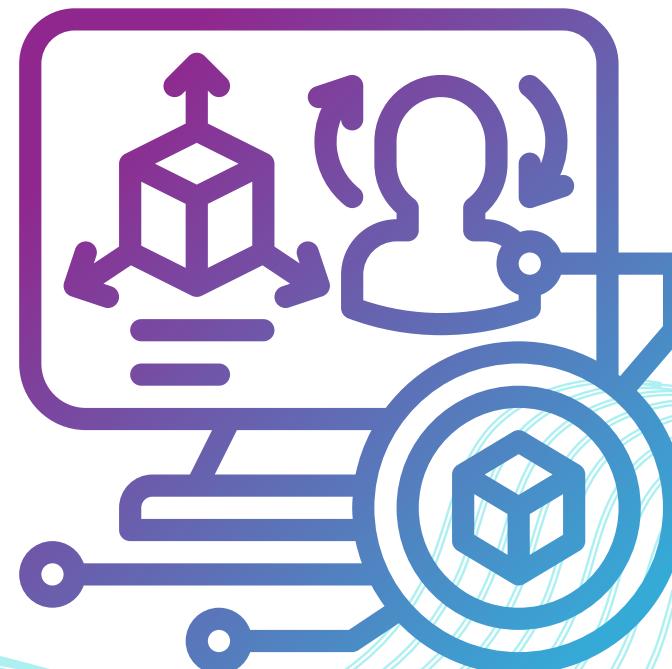


MONOCHROME IMAGE



PERFORMANCE FIGURES

SIMULATION RESULTS

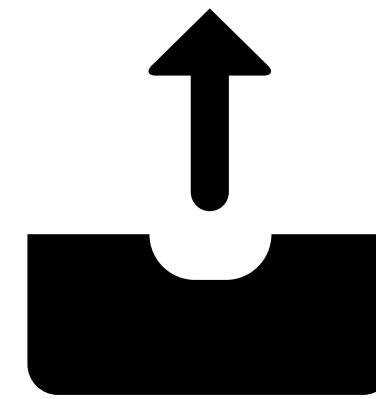


HERE WE USED A CHANNEL MODEL BLOCK WITH NOISE

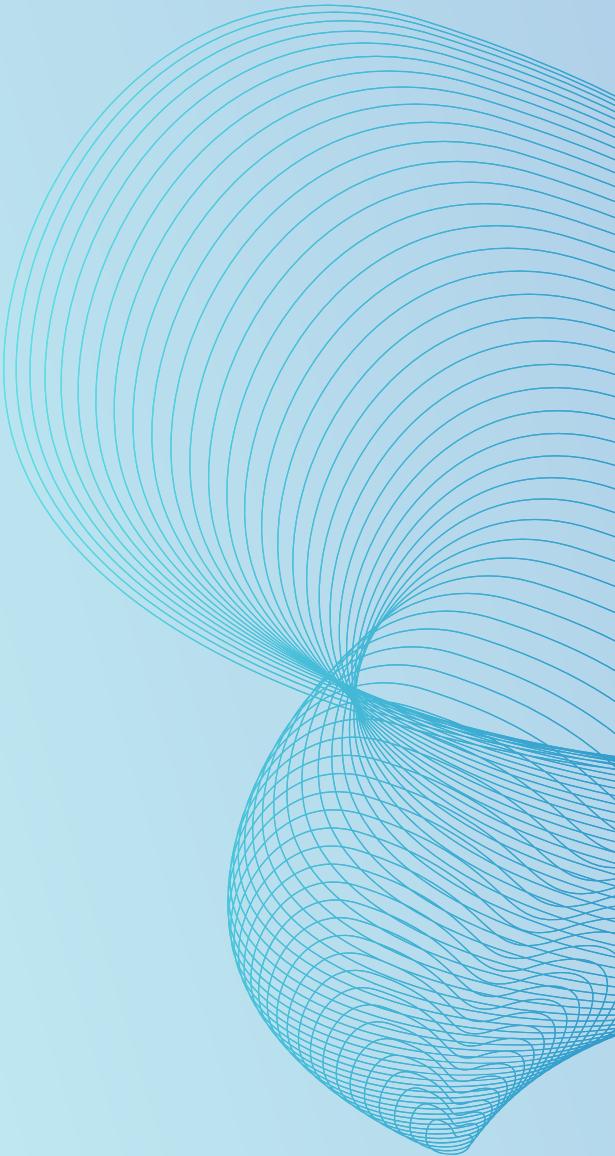
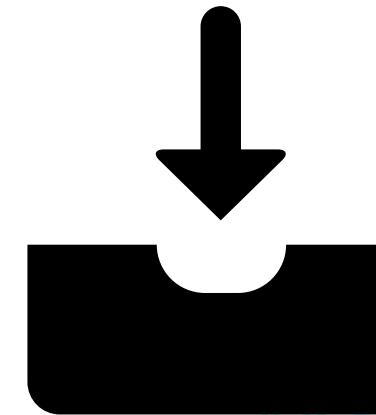
AUDIO



_TRANSMITTED



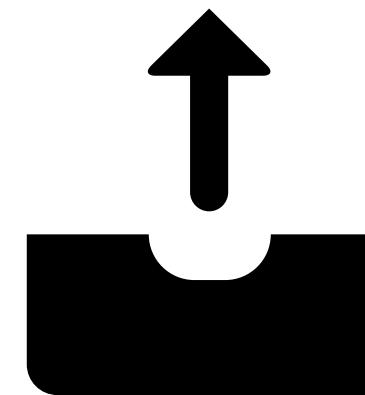
RECEIVED



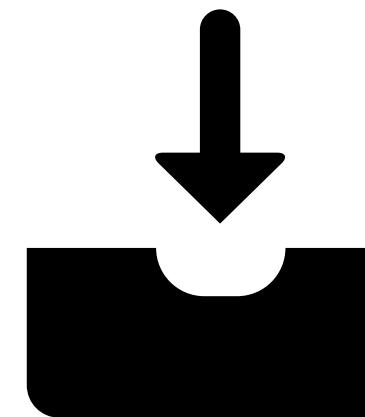
BINARY STREAM

00101011
01101010
101110101
11011000
10100110

TRANSMITTED



RECEIVED



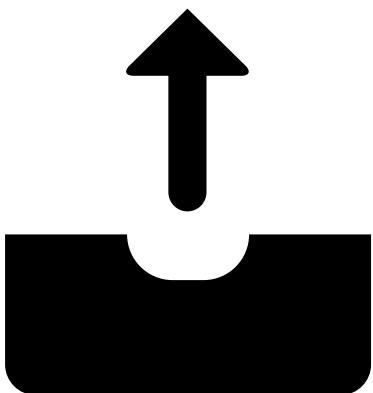
1,2,3,4,5,6,7,8,9,1,2,3,4,5,6,7,8,9,1,2,3,4,5,6,7,8,9,21,43,65,78,09,21,43,56,78,98,0,

WWW1,2,3,4,5,6,7,8,9,1,2,3,4,5,6,7,8,9,1,2,3,4,5,6,7,8,9,21,43,65,78,09,21,43,56,78,98,0,

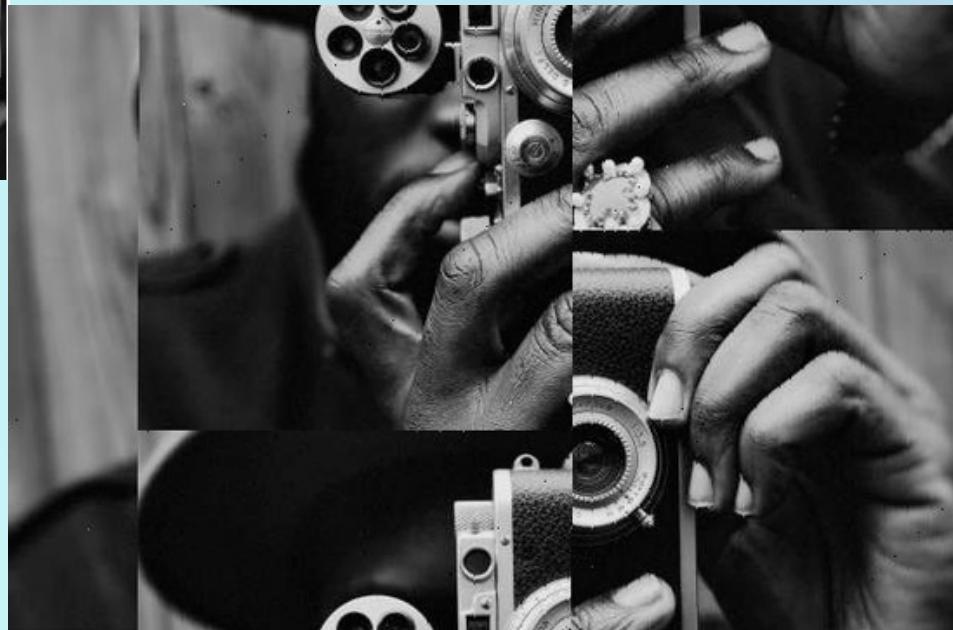
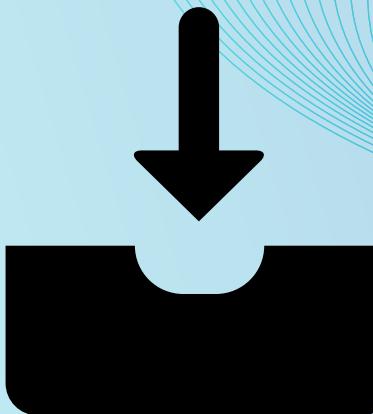
IMAGE



TRANSMITTED

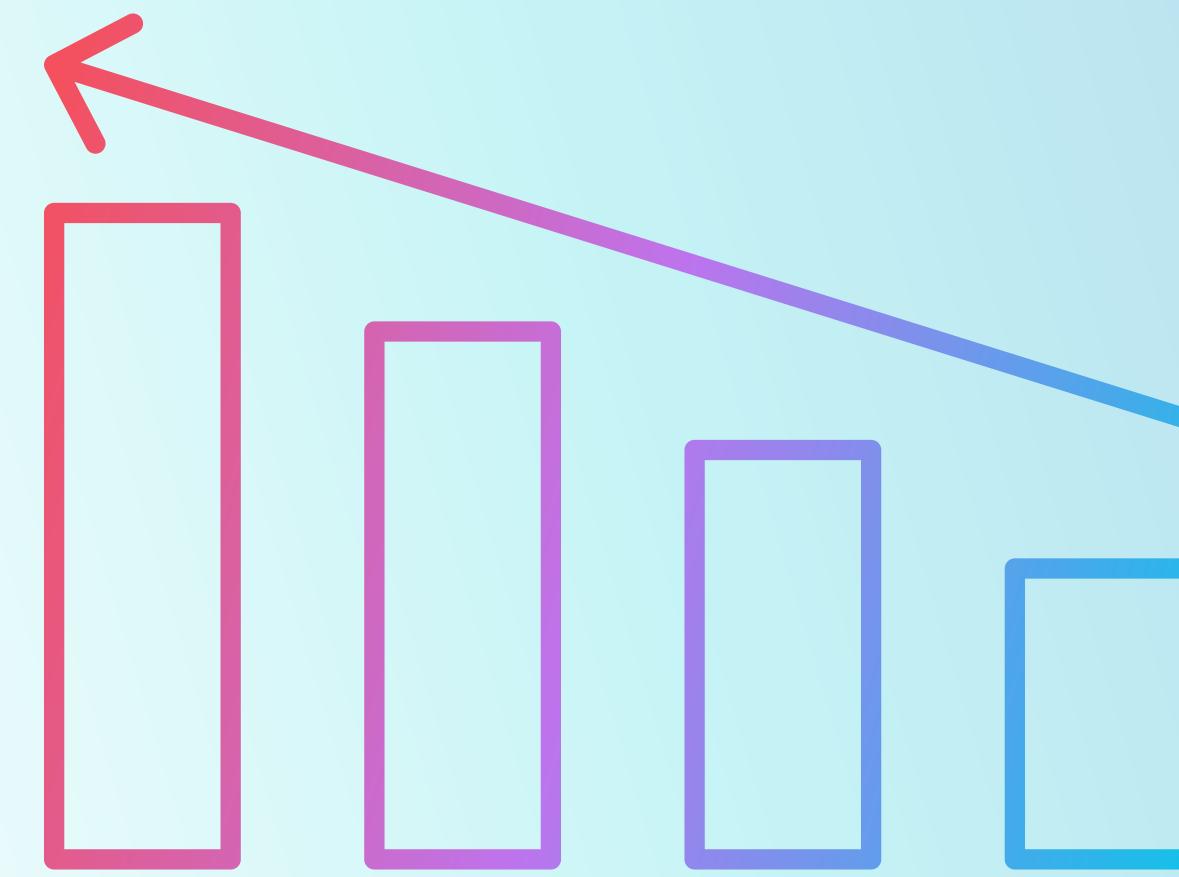
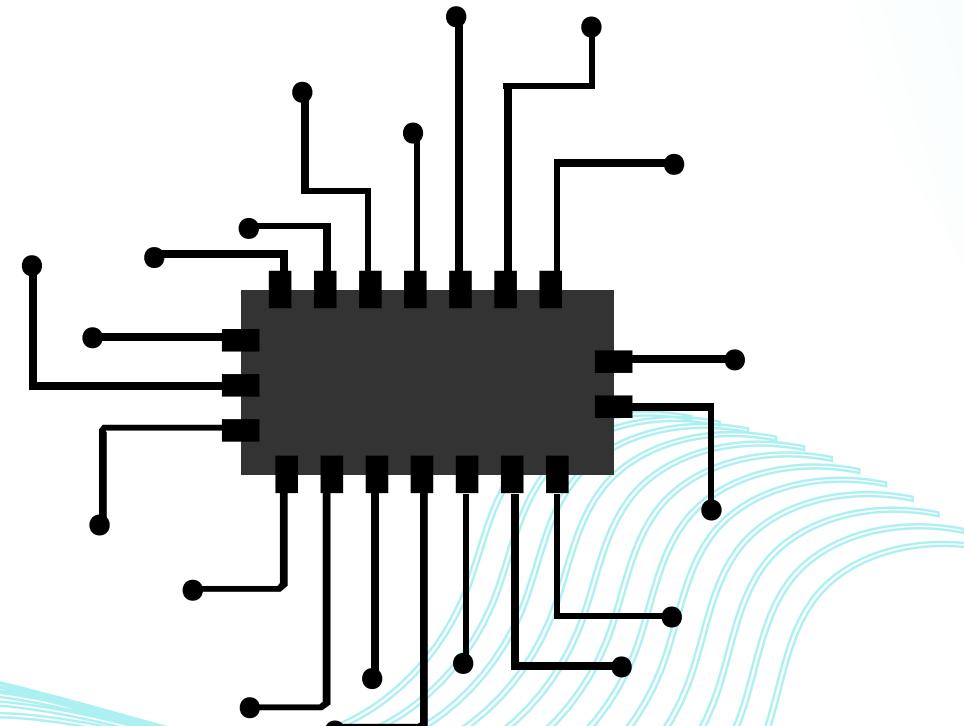


RECEIVED



PERFORMANCE FIGURES

PRACTICAL IMPLEMENTATION



RESULTS

AUDIO : SUCCESSFULLY TRANSMITTED BUT SOMETIMES THERE ARE SOME PROBLEMS DUE TO SYNCHRONISATION ERRORS

BINARY STREAM : NOT SUCCESFULLY TRANSMITTED BECUSE OF BEGINNING OF THE BIT STREAM WASN'T FOUND

IMAGE : NOT SUCCESFULLY TRANSMITTED BECUSE OF BEGINNING OF THE BIT STREAM WASN'T FOUND

THANK YOU