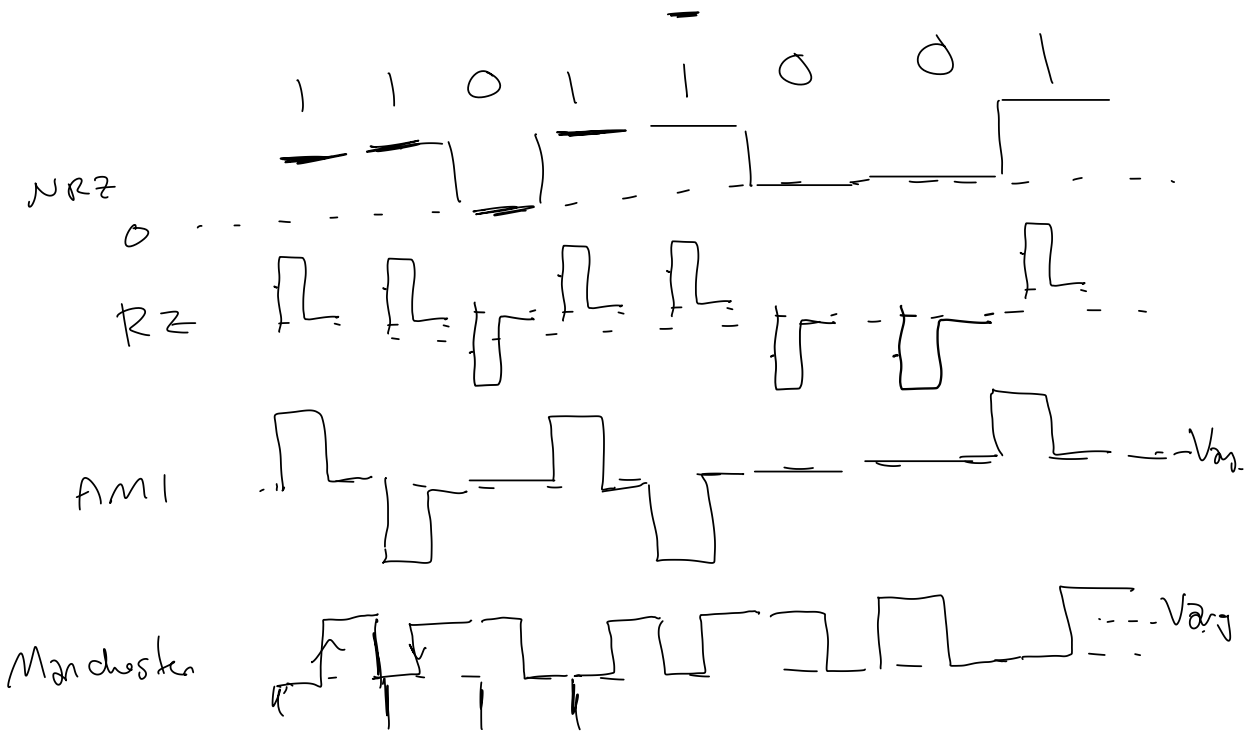


Line Codes

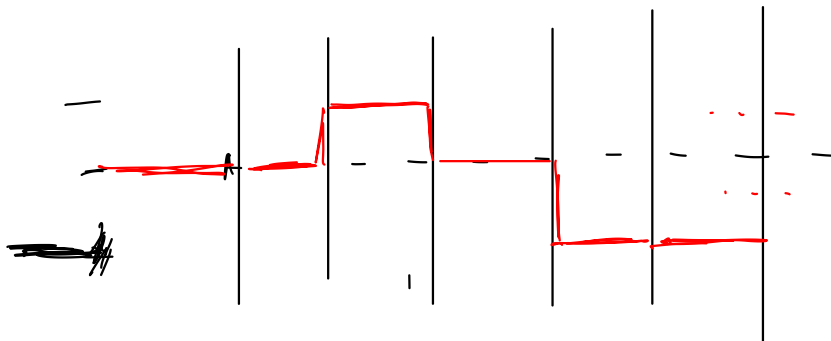
Exercise 1: Encode the bit sequence 1101 1001 using NRZ, RZ, AMI and Manchester line codes described below.



Exercise 2: How would the bit sequence 0110 be encoded using 4B5B followed by MLT3 assuming the starting level is 0V?

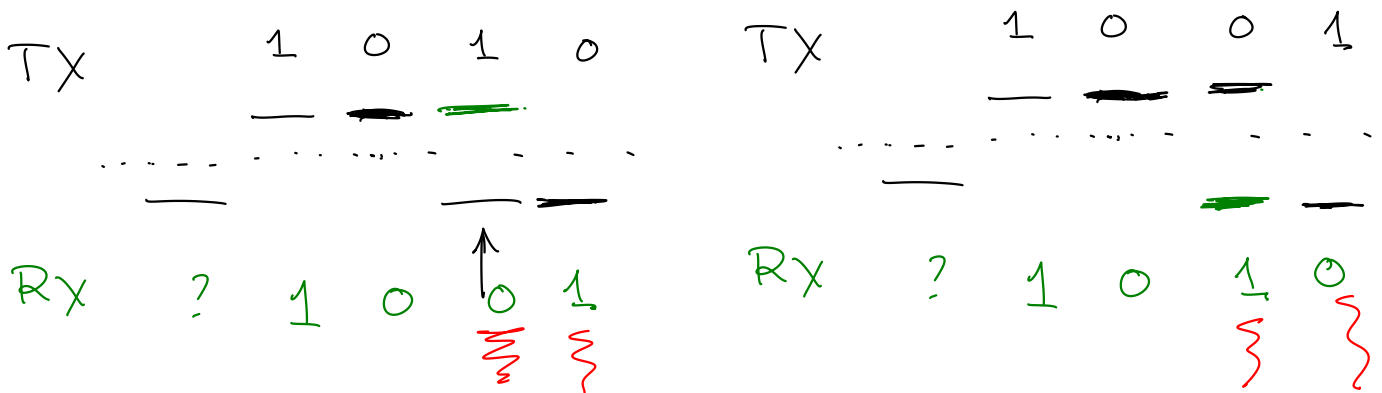
0110 → 0 1 1 1 0

↳ & previous transition was -ve to 0.
(4B5B)

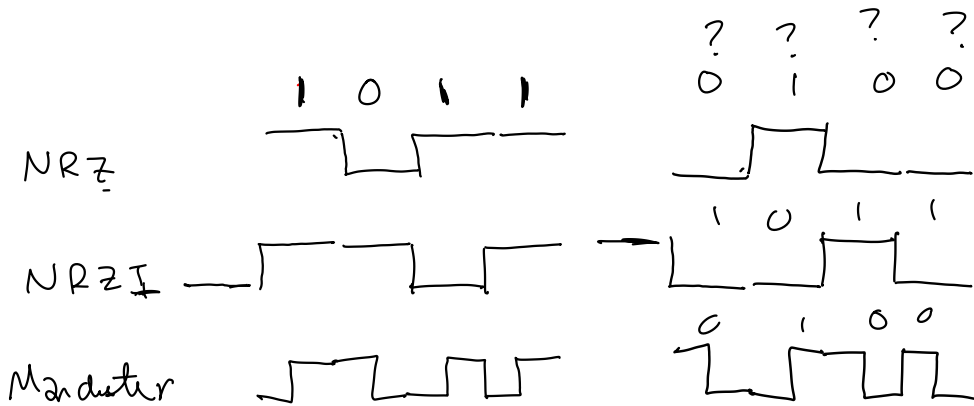


(MLT3)

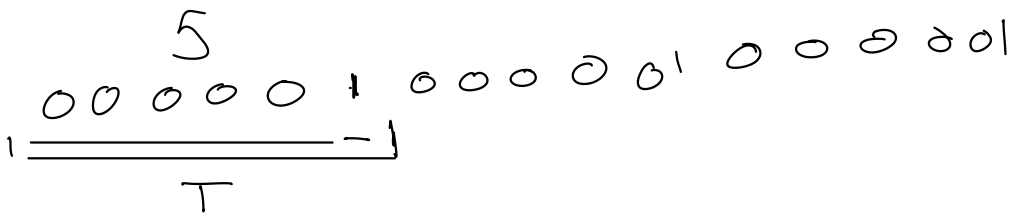
Exercise 3: Why?



Exercise 4: Encode the bit sequence 1011 using NRZ, NRZI and Manchester. Invert the waveforms. Decode them. Assume the initial value of the waveform is 0.

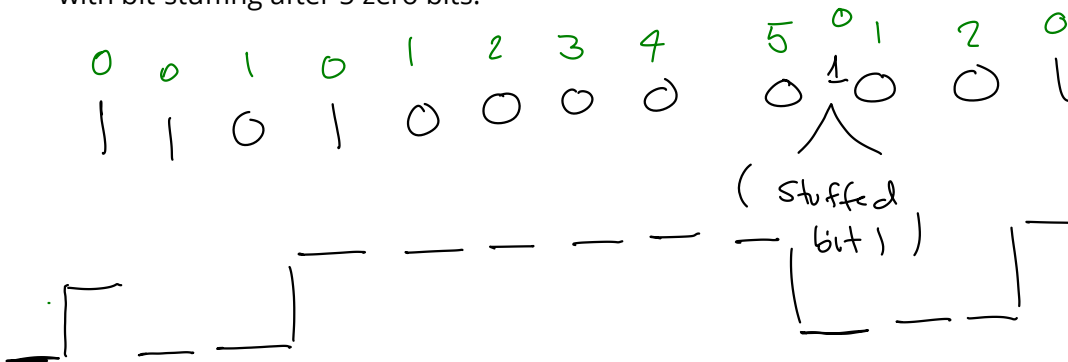


Exercise 5: What is worst-case ^{difference} increase in bit rate?

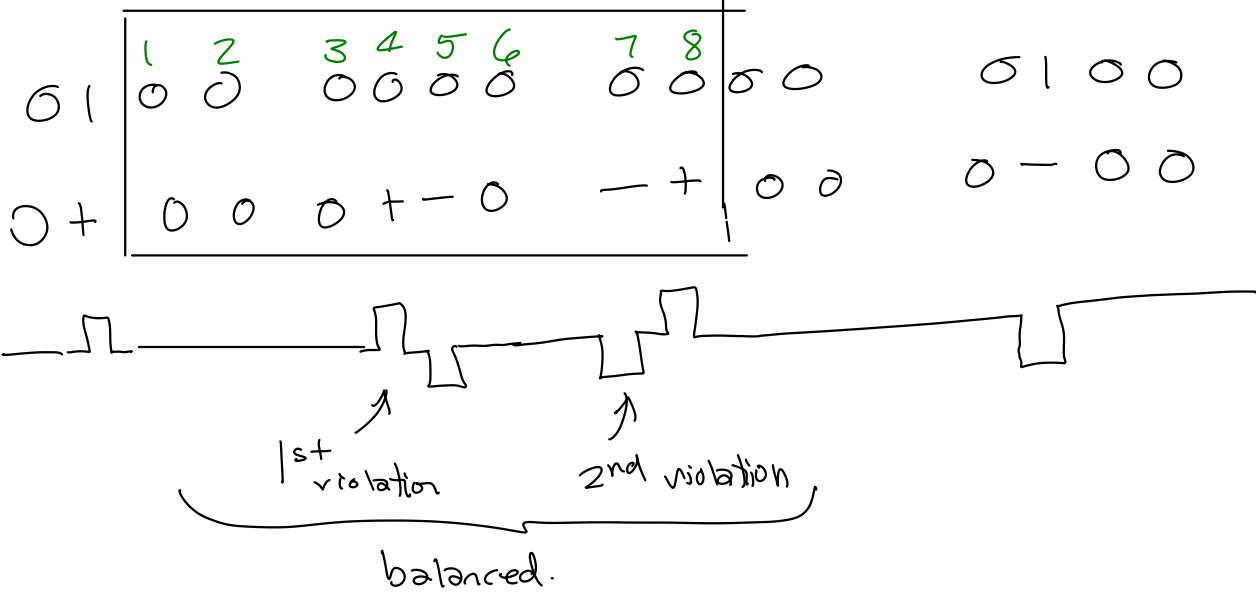


5 bits / T } 20% difference in bit rate
 6 bits / T }

Exercise 6: Encode the bit sequence 1101 0000 0001 using NRZI with bit-stuffing after 5 zero bits.



Exercise 7: Convert the sequence 0100 0000 0000 0100 to a B8ZS waveform assuming the first 1 is transmitted as a positive pulse.



Exercise 8: Show the binary and Gray-coded encodings for PAM4. What is the average number of bits in error in each case if the only errors are between adjacent levels?

