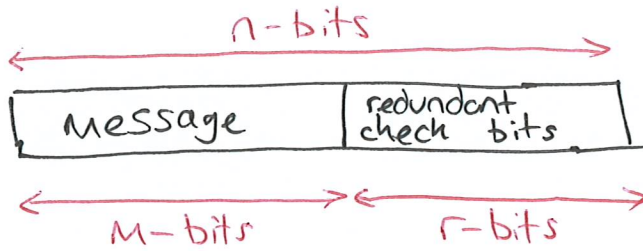
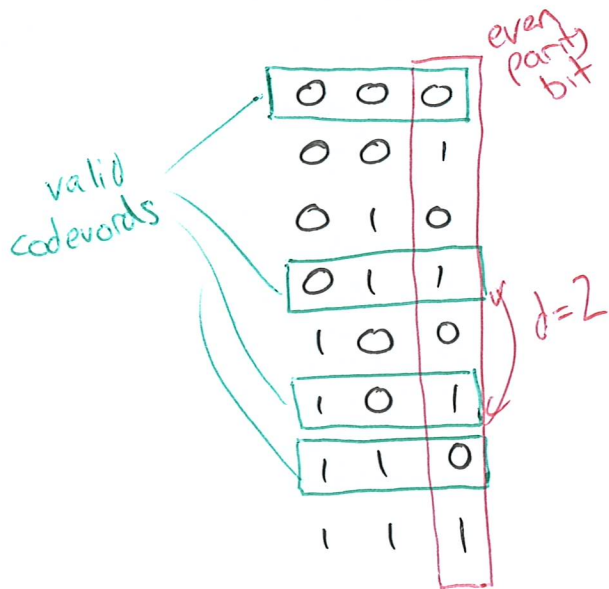


n-bit codeword

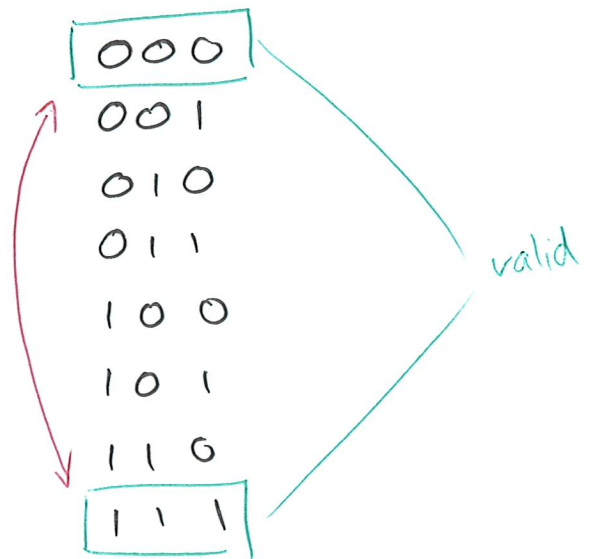


- an (n, m) code
- code rate m/n

Hamming Distance



$d=3$



Checksums (4-bit)

2	11	12	10	3
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Fletcher's Checksum

A: 2 13 25 35 mod $2^n = 3$

B: 2 15 40 75 mod $2^n = 11$

2	11	12	10	A	...	B
				3		11

CRCs

message: 110101111₂

generator: $10011_2 \Rightarrow x^4 + x + 1$

10011) 11010111110000

10011

010011

10011

000000

11110

10011

011010

10011

010010

10011

000010

Hamming Codes

(11, 7) Hamming Code

Message 1 0 0 0 0 0 1

		2+1		4+1	4+2	4+2+1		8+1	8+2	8+2+1
1	2	3	4	5	6	7	8	9	10	11
P_1	P_2	M_3	P_4	M_5	M_6	M_7	P_8	M_9	M_{10}	M_{11}
0	0	1	0	0	0	0	1	0	0	1



X error



0 0 1 0 1 0 0 1 0 0 1

P_8 : 1 0 0 1

P_4 : 0 0 0 0

P_2 : 0 1 0 0 0 1

P_1 : 0 1 1 0 0 1



error syndrome

0 1 0 1₂ = S_{10}

