# CO450 Computer Architectures Week 12 Exercise Handout

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# **Even and Odd Parity Checking**

Using an **Even Parity Bit Check**, check the following data transmissions by adding your own parity bit in the empty column and ticking the appropriate result:

1	0	0	1	0	0	1	0		Correctly Transmitted  Error Detected
0	1	1	0	0	0	1	0		Correctly Transmitted   Error Detected
0	0	1	1	0	0	1	1	C	Correctly Transmitted   Error Detected □
1	0	0	0	1	1	0	1	0	Correctly Transmitted   Error Detected □



Using an **Odd Parity Bit Check**, check the following data transmissions by adding your own parity bit in the empty column and ticking the appropriate result:

	1	1	1	0	0	1	1	0	$\bigcirc$	Correctly Transmitted <b>®</b> Error Detected □
(	0	0	0	1	1	0	1	0	0	Correctly Transmitted <b>●</b> Error Detected □
(	0	0	1	1	1	1	1	1		Correctly Transmitted ☐ Error Detected <b></b>
	1	0	0	0	0	1	0	1	O	Correctly Transmitted <b>●</b> Error Detected □

# Two-Dimensional Even Parity Scheme

Check the transmissions below with a Two-Dimensional Even Parity Scheme by adding your own parity bits to the rows and columns and ticking the appropriate result(s). If you do identify a single bit error reference which bit has the error by entering its Row and Bit Number e.g. R1 B0

1.

	B5	B4	В3	B2	B1	В0			
R1	1	1	1	0	1	0	D		
R2	1	0	0	1	0	0	D	Correctly transmitted □ Error detected <b>☎</b>	
R3	0	0	0	1	1	0	0	Error can be corrected Single Bit Error in:	80
R4	0	1	1	0	0	1			
	D	0	O	D	D				

	B5	B4	В3	B2	B1	В0			
R1	0	0	1	1	1	1	0		
R2	0	1	1	1	1	1	ı	Correctly transmitted ☐ Error detected <b>ਓ</b>	
R3	0	1	1	1	1	0	0	Error can be corrected Single Bit Error in:	82
R4	0	0	1	0	1	0	0		
	$\bigcirc$	0	0		0	0	1		

# Two-Dimensional Odd Parity Scheme

Check the transmissions below with a Two-Dimensional Odd Parity Scheme by adding your own parity bits to the rows and columns and ticking the appropriate result(s). If you do identify a single bit error reference which bit has the error by entering its Row and Bit Number e.g. R1 B0

1.

	B5	B4	В3	B2	B1	во		
R1	1	0	1	0	1	0	0	
R2	1	0	0	0	1	1	0	Correctly transmitted   Error detected
R3	1	1	0	1	1	0	١	Error can be corrected  Single Bit Error in:
R4	1	0	0	0	0	0	0	R 3 B
	1	Ũ	S	ס	0	o	١	

R4	0	1	1	1 •	0	1	0	RI B
R3	1	1	0	0	1	0	6	Error can be corrected Single Bit Error in:
R2	0	1	0	1	0	1	O	Correctly transmitted   Error detected
R1	1	0	1	1	0	1		
	B5	B4	В3	B2	B1	во		

# The Answers

# Using an **Even Parity Bit Check**

1	0	0	1	0	0	1	0	1	Correctly Transmitted ☐ Error Detected ⊠
0	1	1	0	0	0	1	0	1	Correctly Transmitted ☐ Error Detected ⊠
0	0	1	1	0	0	1	1	0	Correctly Transmitted ⊠ Error Detected □
1	0	0	0	1	1	0	1	0	Correctly Transmitted ⊠ Error Detected □

# Using an **Odd Parity Bit Check**

1	1	1	0	0	1	1	0	0	Correctly Transmitted ⊠ Error Detected □
0	0	0	1	1	0	1	0	0	Correctly Transmitted ⊠ Error Detected □
0	0	1	1	1	1	1	1	1	Correctly Transmitted ☐ Error Detected ⊠
1	0	0	0	0	1	0	1	0	Correctly Transmitted ⊠ Error Detected □

# Two-Dimensional Even Parity Scheme

1.

	B5	B4	В3	B2	B1	ВО		
R1	1	1	1	0	1	0	0	
R2	1	0	0	1	0	0	0	Correctly transmitted □ Error detected ⊠
R3	0	0	0	1	1	0	0	Error can be corrected ⊠ Single Bit Error in: <u>R4 B0</u>
R4	0	1	1	0	0	1	1	
	0	0	0	0	0	1	1	

	B5	B4	В3	B2	B1	во		
R1	0	0	1	1	1	1	0	
R2	0	1	1	1	1	1	1	Correctly transmitted □ Error detected ⊠
R3	0	1	1	1	1	0	0	Error can be corrected ⊠ Single Bit Error in: <u>R2 B2</u>
R4	0	0	1	0	1	0	0	
	0	0	0	1	0	0	1	

# Two-Dimensional Odd Parity Scheme

1.

	B5	В4	В3	B2	B1	В0		
R1	1	0	1	0	1	0	0	
R2	1	0	0	0	1	1	0	Correctly transmitted □ Error detected ⊠
R3	1	1	0	1	1	0	1	Error can be corrected ⊠ Single Bit Error in: <u>R3 B5</u>
R4	1	0	0	0	0	0	0	
	1	0	0	0	0	0	1	

	B5	B4	В3	B2	B1	В0		
R1	1	0	1	1	0	1	1	
R2	0	1	0	1	0	1	0	Correctly transmitted □ Error detected ⊠ Error can be corrected ⊠ Single Bit Error in: R1 B3
R3	1	1	0	0	1	0	0	
R4	1	1	1	1	0	1	0	
	0	0	1	0	0	0	1	