Binary Shifts

Leading to Division & Multiplication

Examples 1 & 2 - Right Shifts (Division)

128	64	32	16	8	4	2	1			Shift	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
1	0	0	1	0	0	0	0			N/A	144	
	1	0	0	1	0	0	0	0		1	72	Division by 2^1
		1	0	0	1	0	0	0	0	2	36	Division by 2^2
			1	0	0	1	0	0	0	3	18	Division by 2^3

128	64	32	16	8	4	2	1			Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
0	0	1	0	1	0	0	0			N/A	40	
	0	0	1	0	1	0	0	0		1	20	Division by 2^1
		0	0	1	0	1	0	0	0	2	10	Division by 2^2
			0	0	1	0	1	0	0	3	5	Division by 2^3

Examples 3 & 4 - Right Shift with bits dropping off

128	64	32	16	8	4	2	1			Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
1	0	0	1	0	0	0	1			N/A	145	
	1	0	0	1	0	0	0	**1**		1	72	

128	64	32	16	8	4	2	1			Shift - no of places	Den	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
0	0	0	0	1	1	0	0			N/A	12	
	0	0	0	0	1	1	0	0		1	6	
		0	0	0	1	1	0	0	0	2	3	
			0	0	0	0	1	**1**	0	3	1	

Exercises on Right Shift (Division)

128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
0	0	0	1	1	0	0	0		N/A		
									1		
									2		
									3		

128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
0	0	0	0	0	1	1	0		N/A		
									1		
									2		
									3		

Examples 5 & 6 -Left Shifts for Multiplication

128	64	32	16	8	4	2	1			Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
0	0	0	0	0	1	1	0			N/A	6	
0	0	0	0	1	1	0	0			1	12	Multiplication by 2^1
0	0	0	1	1	0	0	0			2	24	Multiplication by 2^2
0	1	1	0	0	0	0	0			3	48	Multiplication by 2^3

128	64	32	16	8	4	2	1			Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
0	0	0	0	0	1	1	0			N/A	6	
0	0	0	0	1	1	0	0			1	12	Multiplication by 2^1
0	0	0	1	1	0	0	0			2	24	Multiplication by 2^2
0	1	1	0	0	0	0	0			3	48	Multiplication by 2^3

Examples 7& 8- Left Shifts with Overflow

	128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
	1	0	0	0	0	1	1	0		N/A	134	
1	0	0	0	0	1	1	0	0		1	12	

	128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
	1	1	0	0	0	1	1	0		N/A	198	
1	1	0	0	0	1	1	0	0		1	140	

Exercises for Left Shifts for Multiplication

128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
0	0	0	0	1	1	1	0		N/A	14	
									1		
									2		
									3		

	128	64	32	16	8	4	2	1		Shift - no of places	Denary	Effect
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0				
	1	0	1	0	0	0	0	0		N/A	160	
										1		

Exercises and Answers on Right Shift (Division)

128	64	32	16	8	4	2	1				Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0						
0	0	0	1	1	0	0	0				N/A	24	
0	0	0	0	1	1	0	0				1	12	Division by 2^1
0	0	0	0	0	1	1	0				2	6	Division by 2^2
0	0	0	0	0	0	1	1				3	3	Division by 2^3

128	64	32	16	8	4	2	1				Shift - no of places	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0						
0	0	0	0	1	1	0	0				N/A	12	
0	0	0	0	0	1	1	0				1	6	Division by 2^1
0	0	0	0	0	0	1	1				2	3	Division by 2^2
0	0	0	0	0	0	0	1	1			3	1	Losing a bit

Exercises and Answers for Left Shifts for Multiplication

128	64	32	16	8	4	2	1			Shift	Denary	Effect
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
0	0	0	0	1	1	1	0			N/A	14	
0	0	0	1	1	1	0	0			1	28	Multiplication by 2^1
0	0	1	1	1	0	0	0			2	56	Multiplication by 2^2
0	1	1	1	0	0	0	0			3	120	Multiplication by 2^3

	128	64	32	16	8	4	2	1			Shift - no of places	Denary	Effect
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0					
	1	0	1	0	0	0	0	0			N/A	160	
1	0	1	0	0	0	0	0	0			1	64	Overflow bit