

Parallel BVH Construction for Real-Time Ray Tracing

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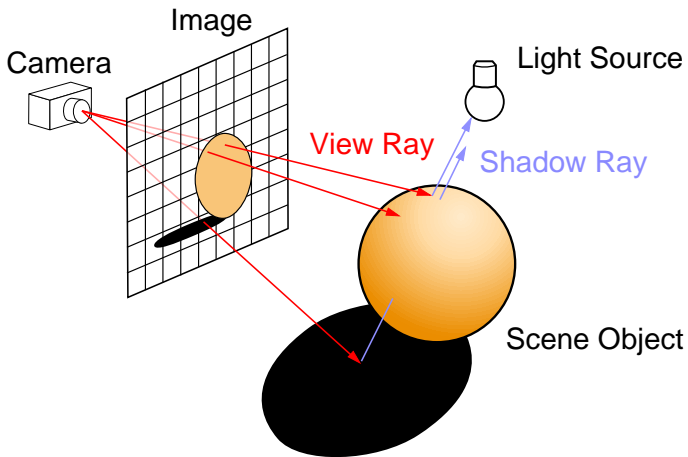
Ray Traced Scene



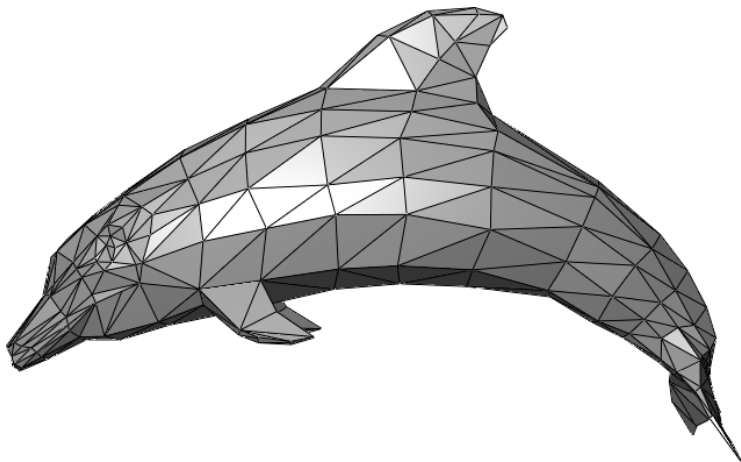
Outline

- 1 Background
- 2 Main Content
- 3 Results

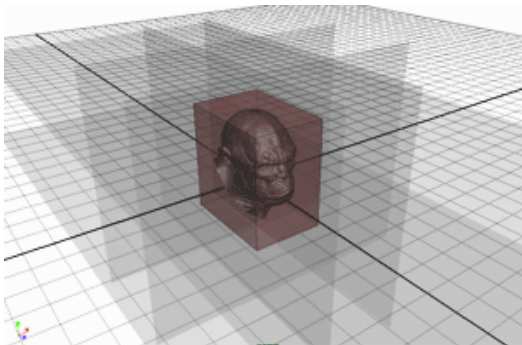
Ray Tracing



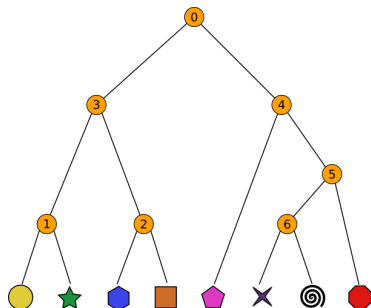
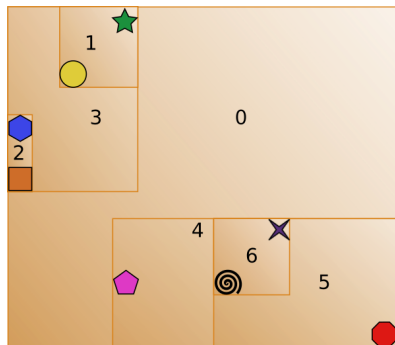
Primitives



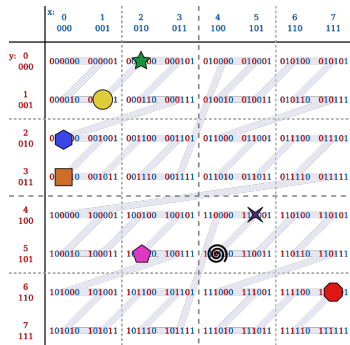
Axis-Aligned Bounding Boxes



Grouped Primitives



Scene

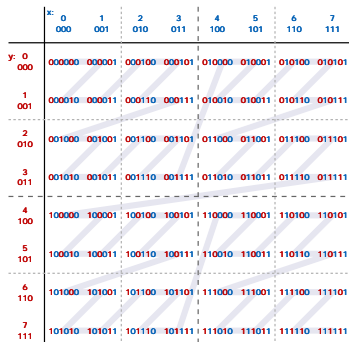


Morton Code Grid

	x:	0	1	2	3	4	5	6	7
		000	001	010	011	100	101	110	111
y: 0	000	000000	000001	000100	000101	010000	010001	010100	010101
1	001	000010	000011	000110	000111	010010	010011	010110	010111
2	010	001000	001001	001100	001101	011000	011001	011100	011101
3	011	001010	001011	001110	001111	011010	011011	011110	011111
4	100	100000	100001	100100	100101	110000	110001	110100	110101
5	101	100010	100011	100110	100111	110010	110011	110110	110111
6	110	101000	101001	101100	101101	111000	111001	111100	111101
7	111	101010	101011	101110	101111	111010	111011	111110	111111

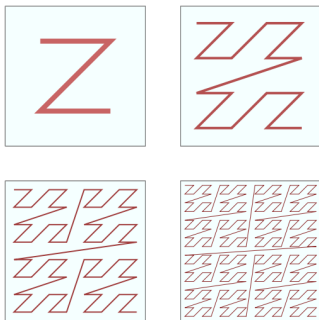
Morton Codes

- Interleave binary representations of coordinate values
- Transforms multidimensional coordinates into a single value
- Morton Code contains location information
- Used to sort objects

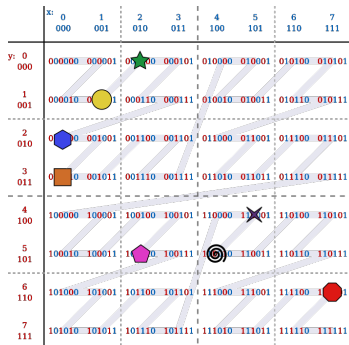


	x: 0 000	1 001	2 010	3 011	4 100	5 101	6 110	7 111
y: 0 000	000000 000001	000100 000101	010000 010001	010100 010101	100000 100001	100100 100101	110000 110001	110100 110101
1 001	000010 000011	000110 000111	010010 010011	010110 010111	100010 100011	100110 100111	110010 110011	110110 110111
2 010	001000 001001	001100 001101	011000 011001	011100 011101	101000 101001	101100 101101	111000 111001	111100 111101
3 011	001010 001011	001110 001111	011010 011011	011110 011111	101010 101011	101110 101111	111010 111011	111110 111111
4 100	100000 100001	100100 100101	110000 110001	110100 110101	000000 000001	000100 000101	010000 010001	010100 010101
5 101	100010 100011	100110 100111	110010 110011	110110 110111	000010 000011	000110 000111	010010 010011	010110 010111
6 110	101000 101001	101100 101101	111000 111001	111100 111101	001000 001001	001100 001101	011000 011001	011100 011101
7 111	101010 101011	101110 101111	111010 111011	111110 111111	001010 001011	001110 001111	011010 011011	011110 011111

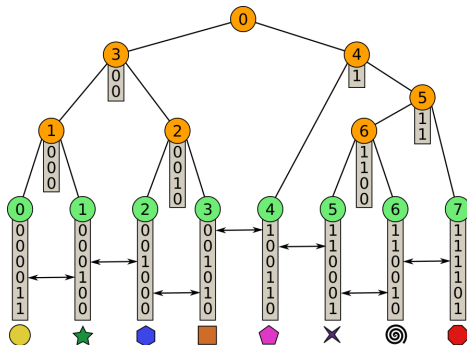
Shape of a Z-order Curve



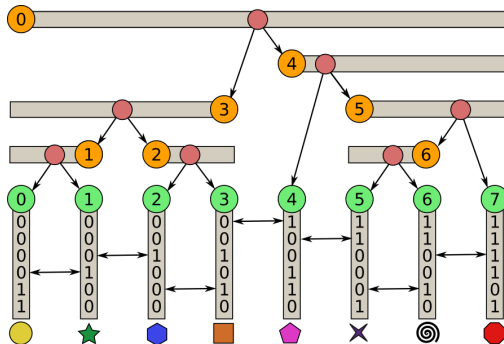
Scene



Binary Radix Tree



Internal Node Array



Discussion

Questions?