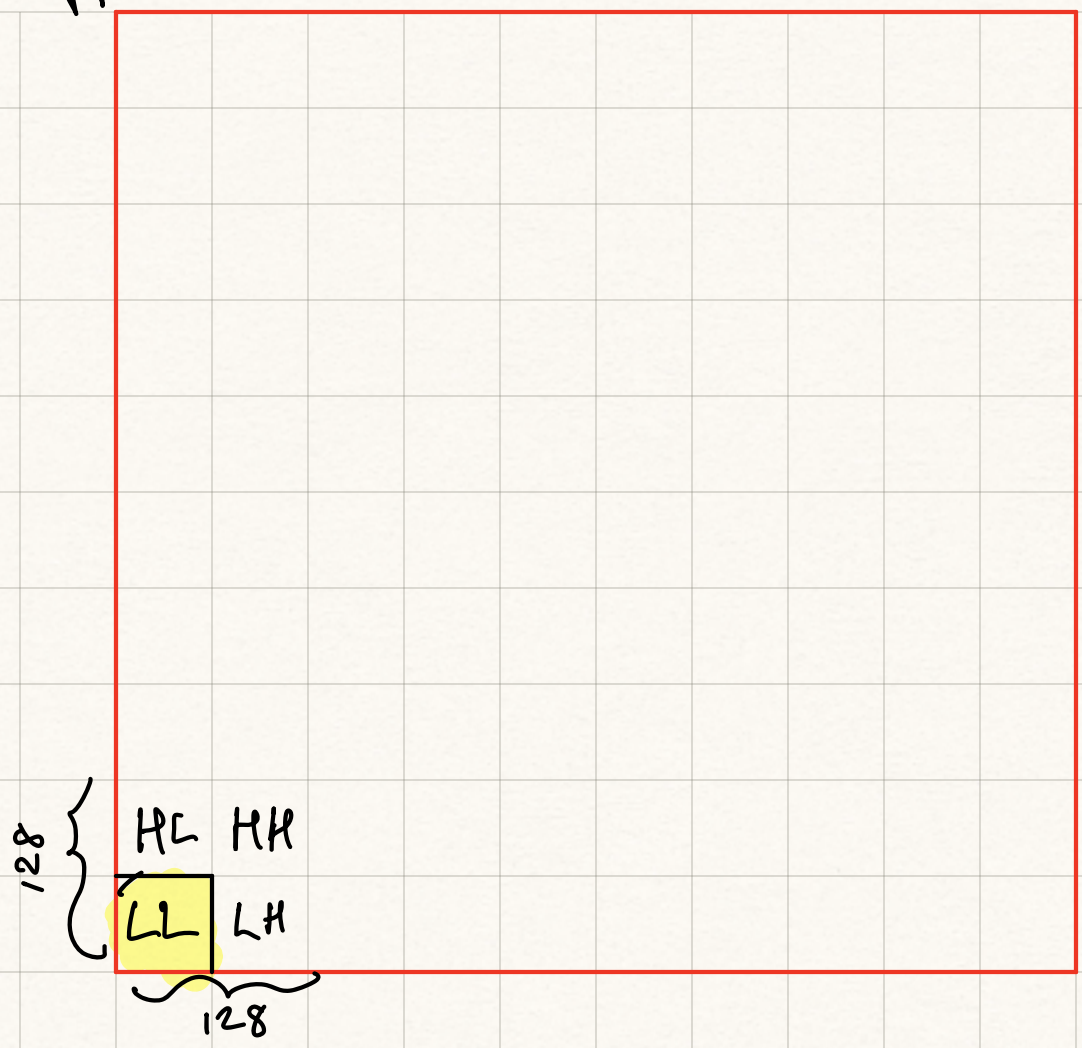
Initial approach



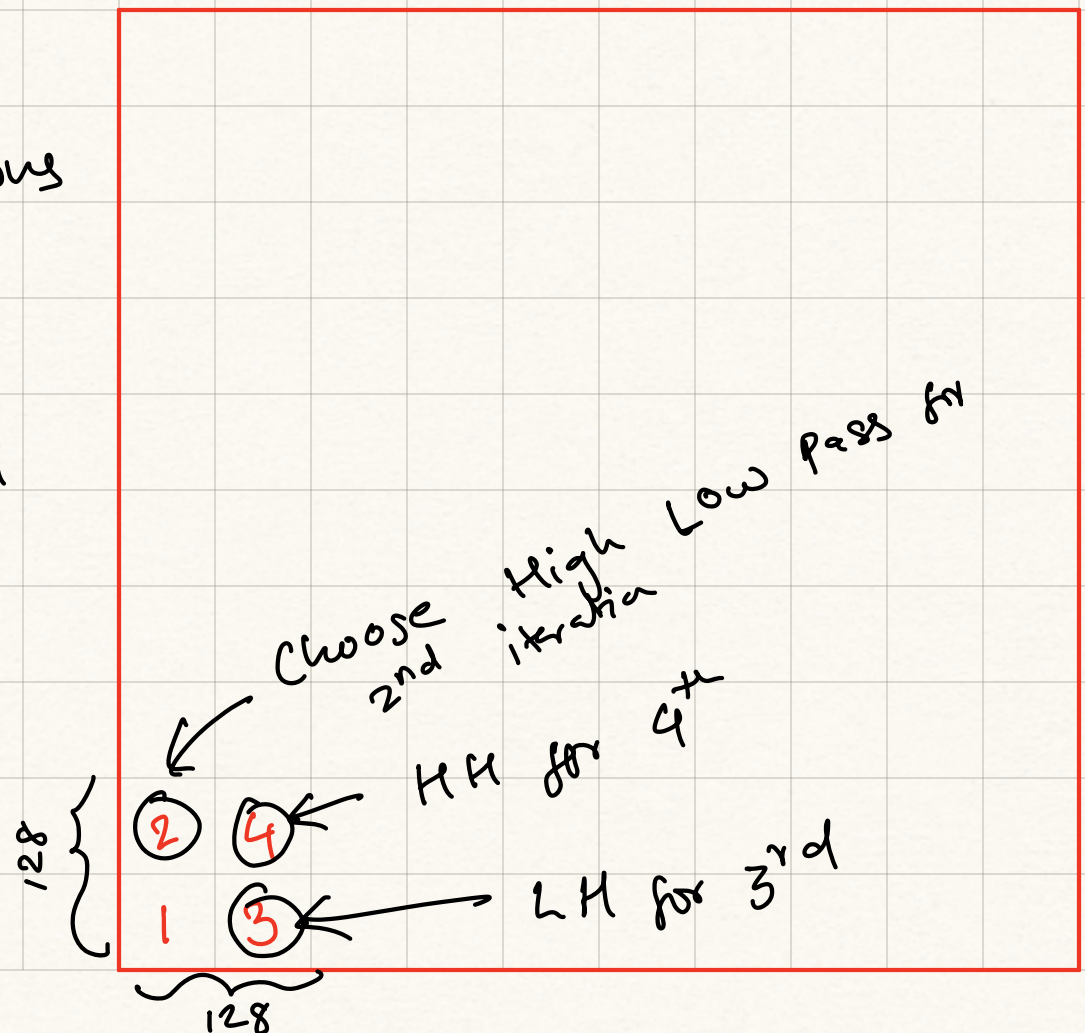
Iterations

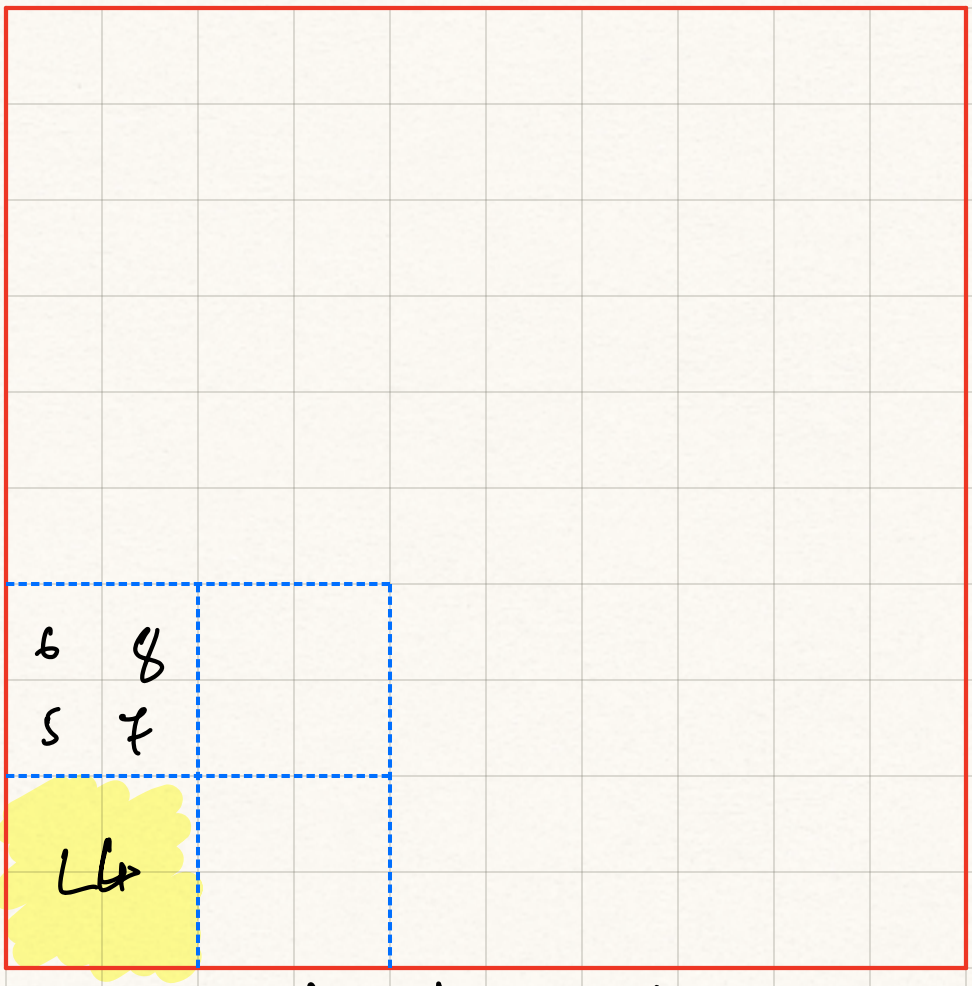
1, 4

for

16384

Coeffs





for the next iteration intermediately take 4096 coefficients until all the coefficients in that pass are covered.

Go in the order of LL, HL, LH, HL

22	24	30	32	55	56	62	64
21	23	29	31	53	54	61	63
18	20	26	28	50	52	58	60
17	19	25	27	49	51	57	59
6	8	14	16	38	40	46	48
5	7	13	15	37	39	45	47
2	4	10	12	34	36	42	44
1	3	9	11	33	35	41	43

The order of what 4096 coefficients that you choose is given in this order →

Implemented approach

The progressive decoding for the Discrete Wavelet Transform (DWT) is achieved iteratively by incrementally retaining the most significant coefficients at each level of decomposition. The approach follows the requirement of selecting coefficients in a hierarchical manner, starting from the lowest frequency details and progressively adding higher frequency details.

The selection process begins at the coarsest level of detail, corresponding to the largest block in the wavelet decomposition. For each level, the function determines the size of the block using bit-shifting operations (size >> level). The block size is halved with each successive level, starting from the full image size down to smaller blocks as determined by the wavelet hierarchy.

At each level, the function iterates through the rows and columns of the matrix corresponding to the current block size. It counts the coefficients within the active block until the specified number of coefficients (numCoefficients) is reached. The startRow and startCol variables define the bounds of the active region for the current level, ensuring that only coefficients within the relevant block are retained. Coefficients outside the current region are explicitly set to zero, effectively discarding unnecessary details.

This implementation aligns with the requirements by retaining coefficients level by level, progressing from the lowest frequency details to higher frequency details. The function ensures that each iteration retains a total of iteration * 4096 coefficients, where iteration ranges from 1 to 64.