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Non-RCE4: Removal of syntax redundancy in RCE4 Test1

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Overall Summary

- Propose to remove syntax redundancy in RCE4 Test1
  - The major color index of the above and the left samples are used to predict that of the current sample.
  - If the two predictors are different, use two different codewords to represent them
  - Otherwise, use one codeword to represent them

- Results

Lossy coding BD-rate	AI-MT	RA-MT	LB-MT
SC YUV 444 sequences	-0.6%	-0.5%	-0.5%

- For further study in a CE

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Syntax Redundancy in RCE4 Test1

- Two major color index prediction modes, copy above and copy left, are allowed in the normal line mode.
  - Reuse the major color index of the above (A) or left (L) sample

- Different codewords for copy above and copy left even when the major color indices of these two predictors are the same

	Codeword
Copy above	1
Copy left	00
No prediction	01

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Proposed Method

- Use only one codeword to represent the two prediction modes when the left index (L) and the above index (A) are the same

Mode	Codeword	
	L != A	L == A
Copy above	1	1
Copy left	00	1
No prediction	01	0

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Lossy Coding Results

- Anchor: RCE4 Test1

- 0.6% / 0.5% / 0.5% BD-rate savings for SC YUV 444 sequences under AI-MT / RA-MT / LB-MT

- Thank Microsoft for cross-verification (JCTVC-P0269)

BD-rate Y	AI-MT	AI-HT	AI-SHT	RA-MT	RA-HT	LB-MT	LB-HT
Class F	-0.3%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%
Class B	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.7%
SC RGB 444	-0.6%	-0.6%	-0.6%	-0.5%	-0.5%	-0.6%	-0.6%
Animation RGB 444	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.2%
SC YUV 444	-0.6%	-0.6%	-0.6%	-0.3%	-0.2%	-0.5%	-0.6%
Animation YUV 444	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
RangeExt	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.6%
SC(444) GBR Opt.	-6.3%	-6.5%	-6.4%	-5.7%	-6.4%	-6.0%	-6.7%
SC(444) YUV Opt.	-5.2%	-6.0%	-6.3%	-4.6%	-5.6%	-5.6%	-5.9%

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Lossless Coding Results

- Anchor: RCE4 Test1

- 0.5% / 0.4% / 0.4% bit savings for YCbCr 444 SC sequences under AI / RA / LB

	AI	RA	LB
Class F	0.0%	0.0%	0.0%
Class B	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-0.5%	-0.5%	-0.4%
RGB 4:4:4 Animation	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-0.5%	-0.4%	-0.4%
YCbCr 4:4:4 Animation	0.0%	-0.1%	0.0%
RangeExt	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	-5.2%	-5.2%	-5.4%
YCbCr 4:4:4 SC (Optional)	-4.6%	-4.6%	-5.0%

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Conclusions

- This proposal removes the syntax redundancy in RCE4 Test1 that uses two different codewords for two major color index predictors even when they are the same
  - When the predictors are the same, only one codeword is used.

- Results

Lossy coding BD-rate	AI-MT	RA-MT	LB-MT
SC YUV 444 sequences	-0.6%	-0.5%	-0.5%

- For further study in a CE

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