Amended Set of Claims 1 to 80

1. A method for decoding transform coefficients in a video decoding process comprising:

decoding a one-dimensional array of transform coefficients; and

performing a scan on the one-dimensional array of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a block of transform coefficients, wherein the sub-block scan order comprises an order in which each sub-block of a plurality of sub-blocks within the block is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks.

2. The method of claim 1, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

3. The method of claim 2, wherein the scan orientation comprises a reverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

4. The method of claim 2, wherein the scan orientation comprises an reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

5. The method of claim 2, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan order from bottom to top and right to left of the block.

6. The method of claim 1, wherein performing the scan comprises beginning the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

7. The method of claim 1, wherein performing the scan comprises beginning the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

8. The method of claim 1, wherein the sub-block scan order and the coefficient scan order have different orientations.

9. The method of claim 1, wherein performing the scan comprises scanning all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

10. The method of claim 9, wherein scanning transform coefficients of the current sub-block comprises scanning significance bins and transform coefficient level bins in the coefficient scan order.

11. The method of claim 1, wherein performing the scan comprises scanning significance bins for the block prior to scanning transform coefficient level bins for the block.

12. The method of claim 1 further comprising:

determining the sub-block scan order for the plurality of sub-blocks; and

determining the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

13. The method of claim 1, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

14. The method of claim 13, wherein performing the scan further comprises adaptively selecting the sub-block scan order and the coefficient scan order based on one of a rate-distortion metric, a block size, a prediction mode, and information associated with a neighboring block.

15. The method of claim 1, wherein decoding the one-dimensional array of transform coefficients context adaptive binary arithmetic decoding the one-dimensional array of transform coefficients.

16. The method of claim 15, further comprising:

determining a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

17. An apparatus for decoding transform coefficients in a video decoding process, the apparatus comprising one or more processors configured to:

decode a one-dimensional array of transform coefficients; and

perform a scan on the one-dimensional array of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a block of transform coefficients, wherein the sub-block scan order comprises an order in which each sub-block of a plurality of sub-blocks within the block is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks.

18. The apparatus of claim 17, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

19. The apparatus of claim 18, wherein the scan orientation comprises an inverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

20. The apparatus of claim 18, wherein the scan orientation comprises an reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

21. The apparatus of claim 18, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan order from bottom to top and right to left of the block.

22. The apparatus of claim 17, wherein to perform the scan, the one or more processors are configured to begin the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

23. The apparatus of claim 17, wherein to perform the scan, the one or more processors are configured to begin the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

24. The apparatus of claim 17, wherein the sub-block scan order and the coefficient scan order have different orientations.

25. The apparatus of claim 17, wherein to perform the scan, the one or more processors are configured to scan all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

26. The apparatus of claim 25, wherein to scan transform coefficients of the current sub-block, the one or more processors are configured to scan significance bins and transform coefficient level bins in the coefficient scan order.

27. The apparatus of claim 17, wherein to perform the scan, the one or more processors are configured to scan significance bins for the block prior to scanning transform coefficient level bins for the block.

28. The apparatus of claim 17, wherein the one or more processors are further configured to:

determine the sub-block scan order for the plurality of sub-blocks; and

determine the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

29. The apparatus of claim 17, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

30. The apparatus of claim 29, wherein to perform the scan the one or more processors are configured to adaptively select the sub-block scan order and the coefficient scan order based on one of a rate-distortion metric, a block size, a prediction mode, and information associated with a neighboring block.

31. The apparatus of claim 17, wherein to decode the one-dimensional array of transform coefficients, the one or more processors are configured to context adaptive binary arithmetic decode the one-dimensional array of transform coefficients.

32. The apparatus of claim 31, wherein the one or more processors are further configured to:

determine a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

33. An apparatus for decoding transform coefficients in a video decoding process, the apparatus comprising:

means for decoding a one-dimensional array of transform coefficients; and

means for performing a scan on the one-dimensional array of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a block of transform coefficients, wherein the sub-block scan order comprises an order in which each sub-block of a plurality of sub-blocks within the block is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks.

34. The apparatus of claim 33, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

35. The apparatus of claim 33, wherein means for decoding comprises means for context adaptive binary arithmetic decoding the one-dimensional array of transform coefficients.

36. The apparatus of claim 35, further comprising:

means for determining a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

37. A computer-readable storage medium having instructions stored thereon that, when executed, cause one or more processors to:

decode a one-dimensional array of transform coefficients; and

perform a scan on the one-dimensional array of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a block of transform coefficients, wherein the sub-block scan order comprises an order in which each sub-block of a plurality of sub-blocks within the block is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks.

38. The computer-readable storage medium of claim 37, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

39. The computer-readable storage medium of claim 37, wherein the instructions further cause the one or more processors to context adaptive binary arithmetic decode the one-dimensional array of transform coefficients.

40. The computer-readable storage medium of claim 39, further comprising:

instructions that cause the one or more processors to determine a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

41. A method for encoding transform coefficients in a video encoding process comprising:

dividing a block of transform coefficients into a plurality of sub-blocks;

performing a scan on the block of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a one-dimensional array of transform coefficients, wherein the sub-block scan order comprises an order in which each of the plurality of sub-blocks is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks; and

encoding the one-dimensional array of transform coefficients.

42. The method of claim 41, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

43. The method of claim 42, wherein the scan orientation comprises a reverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

44. The method of claim 42, wherein the scan orientation comprises a reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

45. The method of claim 42, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan order from bottom to top and right to left of the block.

46. The method of claim 41, wherein performing the scan comprises beginning the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

47. The method of claim 41, wherein performing the scan comprises beginning the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

48. The method of claim 41, wherein the sub-block scan order and the coefficient scan order have different orientations.

49. The method of claim 41, wherein performing the scan comprises scanning all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

50. The method of claim 49, wherein scanning transform coefficients of the current sub-block comprises scanning significance bins and transform coefficient level bins in the coefficient scan order.

51. The method of claim 41, wherein performing the scan comprises scanning significance bins for the block prior to scanning transform coefficient level bins for the block.

52. The method of claim 41, further comprising:

determining the sub-block scan order for the plurality of sub-blocks; and

determining the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

53. The method of claim 41, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

54. The method of claim 53, wherein performing the scan further comprises adaptively selecting the sub-block scan order and the coefficient scan order based on one of a rate-distortion metric, a block size, a prediction mode, and information associated with a neighboring block.

55. The method of claim 41, wherein encoding comprises context adaptive binary arithmetic encoding.

56. The method of claim 55, further comprising:

determining a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

57. An apparatus for encoding transform coefficients in an encoding process, the apparatus comprising one or more processors configured to:

divide a block of transform coefficients into a plurality of sub-blocks;

perform a scan on the block of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a one-dimensional array of transform coefficients, wherein the sub-block scan order comprises an order in which each of the plurality of sub-blocks is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks; and

encode the one-dimensional array of transform coefficients.

58. The apparatus of claim 57, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

59. The apparatus of claim 58, wherein the scan orientation comprises an reverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

60. The apparatus of claim 58, wherein the scan orientation comprises an reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

61. The apparatus of claim 58, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan order from bottom to top and right to left of the block.

62. The apparatus of claim 57, wherein to perform the scan, the one or more processors are configured to begin the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

63. The apparatus of claim 57, wherein to perform the scan, the one or more processors are configured to begin the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

64. The apparatus of claim 57, wherein the sub-block scan order and the coefficient scan order have different orientations.

65. The apparatus of claim 57, wherein to perform the scan, the one or more processors are configured to scan all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

66. The apparatus of claim 65, wherein to scan transform coefficients of the current sub-block, the one or more processors are configured to scan significance bins and transform coefficient level bins in the coefficient scan order.

67. The apparatus of claim 57, wherein to perform the scan, the one or more processors are configured to scan significance bins for the block prior to scanning transform coefficient level bins for the block.

68. The apparatus of claim 57, wherein the one or more processors are further configured to:

determine the sub-block scan order for the plurality of sub-blocks; and

determine the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

69. The apparatus of claim 57, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

70. The apparatus of claim 69, wherein to perform the scan the one or more processors are configured to adaptively select the sub-block scan order and the coefficient scan order based on a rate-distortion metric.

71. The apparatus of claim 57, wherein to encode, the one or more processors are configured to context adaptive binary arithmetic encode the one-dimensional array of transform coefficients.

72. The apparatus of claim 71, wherein the one or more processors are further configured to:

determine a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

73. An apparatus for encoding transform coefficients in a video encoding process, the apparatus comprising:

means for dividing a block of transform coefficients into a plurality of sub-blocks;

means for performing a scan on the block of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a one-dimensional array of transform coefficients, wherein the sub-block scan order comprises an order in which each of the plurality of sub-blocks is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks; and

means for encoding the one-dimensional array of transform coefficients.

74. The apparatus of claim 73, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

75. The apparatus of claim 73, wherein means for encoding comprises means for context adaptive binary arithmetic encoding the one-dimensional array of transform coefficients.

76. The apparatus of claim 75, further comprising:

means for determining a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

77. A computer-readable storage medium having instructions stored thereon that, when executed, cause one or more processors to:

divide a block of transform coefficients into a plurality of sub-blocks;

perform a scan on the block of transform coefficients according to a sub-block scan order and a coefficient scan order to produce a one-dimensional array of transform coefficients, wherein the sub-block scan order comprises an order in which each of the plurality of sub-blocks is scanned, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks; and

encode the one-dimensional array of transform coefficients.

78. The computer-readable storage medium of claim 77, wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

79. The computer-readable storage medium of claim 77, wherein the instructions further cause the one or more processors to context adaptive binary arithmetic encode the one-dimensional array of transform coefficients.

80. The computer-readable storage medium of claim 79, further comprising:

instructions that cause the one or more processors to determine a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

CLAIMS

1. A method for decoding transform coefficients in a video decoding process comprising:

decoding a one-dimensional array of transform coefficients; and

performing a scan on the one-dimensional array of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a block of transform coefficients, wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

2. The method of claim 1, wherein decoding the one-dimensional array of transform coefficients comprises context adaptive binary arithmetic decoding the one-dimensional array of transform coefficients.

3. The method of claim 2, further comprising:

determining a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

4. An apparatus for decoding transform coefficients in a video decoding process, the apparatus comprising one or more processors configured to:

decode a one-dimensional array of transform coefficients; and

perform a scan on the one-dimensional array of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a block of transform coefficients, wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

5. The apparatus of claim 4, wherein to decode the one-dimensional array of transform coefficients, the one or more processors are configured to context adaptive binary arithmetic decode the one-dimensional array of transform coefficients.

6. The apparatus of claim 5, wherein the one or more processors are further configured to:

determine a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

7. An apparatus for decoding transform coefficients in a video decoding process, the apparatus comprising:

means for decoding a one-dimensional array of transform coefficients; and

means for performing a scan on the one-dimensional array of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a block of transform coefficients, and wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation.

8. The apparatus of claim 7, wherein means for decoding comprises means for context adaptive binary arithmetic decoding the one-dimensional array of transform coefficients.

9. The apparatus of claim 8, further comprising:

means for determining a context for decoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being decoded in the block.

10. A method for encoding transform coefficients in a video encoding process comprising:

dividing a block of transform coefficients into a plurality of sub-blocks;

performing a scan on the block of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a one-dimensional array of transform coefficients, wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation; and

encoding the one-dimensional array of transform coefficients.

11. The method of claim 1 or 10, wherein the scan orientation comprises a reverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

12. The method of claim 1 or 10, wherein the scan orientation comprises a reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

13. The method of claim 1 or 10, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan

order from bottom to top and right to left of the block.

14. The method of claim 1 or 10, wherein performing the scan comprises beginning the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

15. The method of claim 1 or 10, wherein performing the scan comprises beginning the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

16. The method of claim 1 or 10, wherein performing the scan comprises scanning all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

17. The method of claim 16, wherein scanning transform coefficients of the current sub-block comprises scanning significance bins and transform coefficient level bins in the coefficient scan order.

18. The method of claim 1 or 10, wherein performing the scan comprises scanning significance bins for the block prior to scanning transform coefficient level bins for the block.

19. The method of claim 1 or 10, further comprising:

determining the sub-block scan order for the plurality of sub-blocks; and

determining the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

20. The method of claim 1 or 10, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

21. The method of claim 20, wherein performing the scan further comprises adaptively selecting the sub-block scan order and the coefficient scan order based on one of a rate-distortion metric, a block size, a prediction mode, and information associated with a neighboring block.

22. The method of claim 1 or 10, wherein encoding comprises context adaptive binary arithmetic encoding.

23. The method of claim 22, further comprising:

determining a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

24. An apparatus for encoding transform coefficients in an encoding process, the apparatus comprising one or more processors configured to:

divide a block of transform coefficients into a plurality of sub-blocks;

perform a scan on the block of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a one-dimensional array of transform coefficients, wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation; and

encode the one-dimensional array of transform coefficients.

25. The apparatus of claim 4 or 24, wherein the scan orientation comprises an reverse diagonal orientation such that performing the scan on the block comprises reverse diagonally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from a lower-right corner to an upper-left corner of each of the plurality of sub-blocks and diagonally scanning across each of the plurality of sub-blocks in the sub-block scan order from an lower-right sub-block of the block to a upper-left sub-block of the block.

26. The apparatus of claim 4 or 24, wherein the scan orientation comprises an reverse horizontal orientation such that performing the scan on the block comprises horizontally scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from right to left and bottom to top within each of the plurality of sub-blocks and horizontally scanning across each of the plurality of sub-blocks in the sub-block scan order from right to left and bottom to top of the block.

27. The apparatus of claim 4 or 24, wherein the scan orientation comprises a reverse vertical orientation such that performing the scan on the block comprises vertically scanning transform coefficients of each of the plurality of sub-blocks in the coefficient scan order from bottom to top and right to left within each of the plurality of sub-blocks and vertically scanning across each of the plurality of sub-blocks in the sub-block scan order from bottom to top and right to left of the block.

28. The apparatus of claim 4 or 24, wherein to perform the scan, the one or more processors are configured to begin the scan in a sub-block of the plurality of sub-blocks that contains a last significant coefficient of the array of transform coefficients.

29. The apparatus of claim 4 or 24, wherein to perform the scan, the one or more processors are configured to begin the scan in each of the plurality of sub-blocks from a last significant coefficient in the coefficient scan order.

30. The apparatus of claim 4 or 24, wherein to perform the scan, the one or more processors are configured to scan all bins associated with transform coefficients of a current sub-block of the plurality of sub-blocks before scanning bins associated with transform coefficients of a next sub-block of the plurality of sub-blocks in the sub-block scan order.

31. The apparatus of claim 30, wherein to scan transform coefficients of the current sub-block, the one or more processors are configured to scan significance bins and transform coefficient level bins in the coefficient scan order.

32. The apparatus of claim 4 or 24, wherein to perform the scan, the one or more processors are configured to scan significance bins for the block prior to scanning transform coefficient level bins for the block.

33. The apparatus of claim 4 or 24, wherein the one or more processors are further configured to:

determine the sub-block scan order for the plurality of sub-blocks; and

determine the coefficient scan order for transform coefficients within each of the plurality of sub-blocks.

34. The apparatus of claim 4 or 24, wherein the sub-block scan order and the coefficient scan order are one of a forward zig-zag scan, a forward horizontal scan, a forward vertical scan, a forward diagonal scan, an inverse zig-zag scan, an inverse horizontal scan, an inverse vertical scan, and an inverse diagonal scan.

35. The apparatus of claim 34, wherein to perform the scan the one or more processors are configured to adaptively select the sub-block scan order and the coefficient scan order based on a rate-distortion metric.

36. The apparatus of claim 4 or 24, wherein to encode, the one or more processors are configured to context adaptive binary arithmetic encode the one-dimensional array of transform coefficients.

37. The apparatus of claim 36, wherein the one or more processors are further configured to:

determine a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

38. An apparatus for encoding transform coefficients in a video encoding process, the apparatus comprising:

means for dividing a block of transform coefficients into a plurality of sub-blocks;

means for performing a scan on the block of transform coefficients according to a sub-block scan order in which sub-blocks of a plurality of sub-blocks are scanned and decoded and a coefficient scan order in which transform coefficients are scanned and decoded within the sub-blocks to produce a one-dimensional array of transform coefficients, wherein the coefficient scan order comprises a unified scan order for a significance information scan pass and one or more coefficient level information scan passes of the transform coefficients within each sub-block of the plurality of sub-blocks, and wherein the sub-block scan order and the coefficient scan order have a same scan orientation; and

means for encoding the one-dimensional array of transform coefficients.

39. The apparatus of claim 38, wherein means for encoding comprises means for context adaptive binary arithmetic encoding the one-dimensional array of transform coefficients.

40. The apparatus of claim 38, further comprising:

means for determining a context for encoding significance information associated with the transform coefficients in parallel, wherein the context varies based on a position of a transform coefficient currently being encoded in the block.

41. A computer-readable storage medium having instructions stored thereon that, when executed, cause one or more processors to perform a method according to any one of claims 1 to 3 or 10 to 23.