CLAIMS

1. A method of processing video data, comprising:

determining, for a conversion between a video comprising a video picture referring to a picture parameter set (PPS) and a bitstream of the video, a scanning process is applied to the video picture, wherein the video picture is partitioned into one or more tiles, one or more slices, and multiple coding tree units,

determining, in the scanning process, that a first syntax element is conditionally included in the PPS in the bitstream to indicate a number of rectangular slices in the video picture,

determining, for a slice of the number of rectangular slices which has a first slice index, that a second syntax element is conditionally included in the bitstream to indicate a number of explicitly provided slice heights for slices in a video tile containing the rectangular slice having the first slice index, wherein the number of explicitly provided slice heights for slices in the video tile is equal to N, and N is no less than 0,

determining, when N is no less than 1, N third syntax elements are included in the bitstream to indicate slice heights of N slices in units of coding tree unit (CTU) rows, respectively, and

performing the conversion based on the second syntax element and the N third syntax elements;

wherein when a height of the video tile is greater than a sum of the slice heights of the N slices, a slice height of a remaining slice in the video tile other than the N slices is determined based on a slice height of a last slice of the N slices.

2. The method of claim 1, wherein a slice height of a slice of the N slices in units of CTU rows is equal to 1 plus a value of a third syntax element of the N third syntax elements corresponding to the slice.

3. The method of claim 1 or 2, wherein when a difference between the height of the video tile in units of coding tree blocks and a sum of the slice heights of the N slices is no less than a slice height of the last slice of the N slices, a slice height of one remaining slice of the video tile other than the N slices is set to be equal to the slice height of the last slice of the N slices.

4. The method of any one of claims 1-3, wherein when a difference between the height of the video tile in units of coding tree blocks and a sum of the slice heights of the N slices is no less than a uniform slice height, the uniform slice height is used to partition the remaining part of the video tile other than the N slices recursively to form one or more uniform slices, until the remaining part of the video tile other than the N slices and the one or more uniform slices has a height less than the uniform slice height.

5. The method of claim 4, wherein the uniform slice height is equal to the slice height of the last slice of the N slices, and

wherein when the remaining part of the video tile other than the N slices and the one or more uniform slices has a slice height less than the uniform slice height, a slice height of a last slice of the video tile is set to be a difference between the height of the video tile and a sum of the slice heights of the N slices and the one or more uniform slices.

6. The method of any one of claims 1-5, wherein when a difference between the height of the video tile in units of coding tree blocks and a sum of the slice heights of the N slices is less than a uniform slice height, a slice height of a (N+1)-th slice of the video tile is set to be the difference.

7. The method of any one of claims 1-6, wherein the slice height of the last slice of the N slices is disallowed to be reset, and a value of a last third syntax element of the N third syntax elements is directly used to derive a uniform slice height without referring other information.

8. The method of any one of claims 1-7, wherein when a value of the second syntax element is equal to 0, the third syntax elements are absent from the bitstream, and a slice height of a slice in the video tile is derived to be equal to the height of the video tile in units of coding tree blocks.

9. The method of any one of claims 1-8, wherein the scanning process is applied to the video picture when the first syntax element is equal to 0, or when a syntax element which plus 1 specifies a width of the rectangular slice having the first slice index in units of tile columns is

equal to 0, and a syntax element which plus 1 specifies a height of the rectangular slice having the first slice index in units of tile rows is equal to 0.

10. The method of any one of claims 1-9, wherein the conversion includes encoding the video into the bitstream.

11. The method of any one of claims 1-9, wherein the conversion includes decoding the video from the bitstream.

12. An apparatus for processing video data comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to:

determine, for a conversion between a video comprising a video picture referring to a picture parameter set (PPS) and a bitstream of the video, a scanning process is applied to the video picture, wherein the video picture is partitioned into one or more tiles, one or more slices, and multiple coding tree units,

determine, in the scanning process, that a first syntax element is conditionally included in the PPS in the bitstream to indicate a number of rectangular slices in the video picture,

determine, for a slice of the number of rectangular slices which has a first slice index, that a second syntax element is conditionally included in the bitstream to indicate a number of explicitly provided slice heights for slices in a video tile containing the rectangular slice having the first slice index, wherein the number of explicitly provided slice heights for slices in the video tile is equal to N, and N is no less than 0,

determine, when N is no less than 1, N third syntax elements are included in the bitstream to indicate slice heights of N slices in units of coding tree unit (CTU) rows, respectively, and

perform the conversion based on the second syntax element and the N third syntax elements;

wherein when a height of the video tile is greater than a sum of the slice heights of the N slices, a slice height of a remaining slice in the video tile other than the N slices is determined based on a slice height of a last slice of the N slices.

13. The apparatus of claim 12, wherein a slice height of a slice of the N slices in units of CTU rows is equal to 1 plus a value of a third syntax element of the N third syntax elements corresponding to the slice.

14. The apparatus of claim 12 or 13, wherein when a difference between the height of the video tile in units of coding tree blocks and a sum of the slice heights of the N slices is no less than a slice height of the last slice of the N slices, a slice height of one remaining slice of the video tile other than the N slices is set to be equal to the slice height of the last slice of the N slices.

15. The apparatus of any one of claims 12-14, wherein when a difference between the height of the video tile in units of coding tree blocks and a sum of the slice heights of the N slices is no less than a uniform slice height, the uniform slice height is used to partition the remaining part of the video tile other than the N slices recursively to form one or more uniform slices, until the remaining part of the video tile other than the N slices and the one or more uniform slices has a height less than the uniform slice height.

16. The apparatus of claim 15, wherein the uniform slice height is equal to the slice height of the last slice of the N slices, and

wherein when the remaining part of the video tile other than the N slices and the one or more uniform slices has a slice height less than the uniform slice height, a slice height of a last slice of the video tile is set to be a difference between the height of the video tile and a sum of the slice heights of the N slices and the one or more uniform slices.

17. A non-transitory computer-readable storage medium storing instructions that cause a processor to:

determine, for a conversion between a video comprising a video picture referring to a picture parameter set (PPS) and a bitstream of the video, a scanning process is applied to the video picture, wherein the video picture is partitioned into one or more tiles, one or more slices, and multiple coding tree units,

determine, in the scanning process, that a first syntax element is conditionally included in the PPS in the bitstream to indicate a number of rectangular slices in the video picture,

determine, for a slice of the number of rectangular slices which has a first slice index, that a second syntax element is conditionally included in the bitstream to indicate a number of explicitly provided slice heights for slices in a video tile containing the rectangular slice having the first slice index, wherein the number of explicitly provided slice heights for slices in the video tile is equal to N, and N is no less than 0,

determine, when N is no less than 1, N third syntax elements are included in the bitstream to indicate slice heights of N slices in units of coding tree unit (CTU) rows, respectively, and

perform the conversion based on the second syntax element and the N third syntax elements;

wherein when a height of the video tile is greater than a sum of the slice heights of the N slices, a slice height of a remaining slice in the video tile other than the N slices is determined based on a slice height of a last slice of the N slices.

18. The non-transitory computer-readable storage medium of claim 17, wherein a slice height of a slice of the N slices in units of CTU rows is equal to 1 plus a value of a third syntax element of the N third syntax elements corresponding to the slice.

19. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

determining, for a video comprising a video picture referring to a picture parameter set (PPS), a scanning process is applied to the video picture, wherein the video picture is partitioned into one or more tiles, one or more slices, and multiple coding tree units,

determining, in the scanning process, that a first syntax element is conditionally included in the PPS in the bitstream to indicate a number of rectangular slices in the video picture,

determining, for a slice of the number of rectangular slices which has a first slice index, that a second syntax element is conditionally included in the bitstream to indicate a number of explicitly provided slice heights for slices in a video tile containing the rectangular slice having

the first slice index, wherein the number of explicitly provided slice heights for slices in the video tile is equal to N, and N is no less than 0,

determining, when N is no less than 1, N third syntax elements are included in the bitstream to indicate slice heights of N slices in units of coding tree unit (CTU) rows, respectively, and

generating the bitstream based on the second syntax element and the N third syntax elements,

wherein when a height of the video tile is greater than a sum of the slice heights of the N slices, a slice height of a remaining slice in the video tile other than the N slices is determined based on a slice height of a last slice of the N slices.

20. The non-transitory computer-readable recording medium of claim 19, wherein a slice height of a slice of the N slices in units of CTU rows is equal to 1 plus a value of a third syntax element of the N third syntax elements corresponding to the slice.

~~1. A video processing method, comprising:~~

~~performing a conversion between a video comprising a video picture comprising a video tile including one or more slices and a bitstream of the video according to a rule;~~

~~wherein the rule specifies that a second slice in a tile that includes a first slice in a picture has a height that is represented in a unit of coding tree units, wherein the first slice has a first slice index , wherein the second slice has a second slice index that is determined based on the first slice index and a number of explicitly provided slice heights in the video tile, and wherein the height of the second slice is determined based on the first slice index and the second slice index.~~

~~2. The method of claim 1, wherein the first slice index is represented as i,~~

~~wherein the second slice index is represented as (num_exp_slices_in_tile[i] - 1), where num_exp_slices_in_tile specifies a number of explicitly provided slice heights in the video tile, and~~

wherein the height of the second slice is determined based on exp_slice_height_in_ctus_minus1[i][num_exp_slices_in_tile[i] − 1] + 1, where exp_slice_height_in_ctus_minus1 specifies slice heights in the unit of coding tree units in the video tile.

3. The method of claim 1 or 2, wherein a height of uniform slices that partition the video tile is indicated by a last entry of exp_slice_height_in_ctus_minus1.

4. The method of any of claims 1 to 3, wherein the second slice always exists in the picture.

5. The method of any of claims 1 to 4, wherein the height of the second slice is disallowed to be reset for the conversion.

6. The method of any of claims 1 to 4, wherein a height of a third slice having an index greater than (num_exp_slices_in_tile[i] - 1) is determined based on exp_slice_height_in_ctus_minus1[i][num_exp_slices_in_tile[i] − 1].

7. The method of any of claims 1 to 3, wherein the second slice does not exist in the video tile.

8. The method of any of claims 1 to 7, wherein the height of the second slice is smaller than or equal to exp_slice_height_in_ctus_minus1[i][num_exp_slices_in_tile[i] − 1] + 1.

9. The method of any of claims 1 to 8, wherein the conversion includes encoding the video into the bitstream.

10. The method of any of claims 1 to 8, wherein the conversion includes decoding the video from the bitstream.

11. A method for storing bitstream of a video, comprising:

~~generating a bitstream of the video from a block according to a rule, wherein the video comprises a video tile including one or more slices, and wherein the rule specifies that a second slice in a tile that includes a first slice in a picture has a height that is represented in a unit of coding tree units, wherein the first slice has a first slice index, wherein the second slice has a second slice index that is determined based on the first slice index and a number of explicitly provided slice heights in the video tile, and wherein the height of the second slice is determined based on the first slice index and the second slice index; and~~

~~storing the bitstream in a non-transitory computer-readable recording medium.~~

~~12. A video decoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 11.~~

~~13. A video encoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 11.~~

~~14. A computer program product having computer code stored thereon, the code, when executed by a processor, causes the processor to implement a method recited in any of claims 1 to 11.~~

~~15. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:~~

~~generating a bitstream of the video from a block according to a rule, wherein the video comprises a video tile including one or more slices, and wherein the rule specifies that a second slice in a tile that includes a first slice in a picture has a height that is represented in a unit of coding tree units, wherein the first slice has a first slice index, wherein the second slice has a second slice index that is determined based on the first slice index and a number of explicitly provided slice heights in the video tile, and wherein the height of the second slice is determined based on the first slice index and the second slice index.~~

~~16. A method, an apparatus, a bitstream generated according to a method, or a system described in the present document.~~