CLAIMS

1. A method of video processing, comprising:

performing a conversion between a video comprising one or more pictures comprising one or more subpictures and a bitstream of the video,

wherein the bitstream conforms to a format rule that specifies that a subpicture cannot be a random access decodable leading subpicture or a random access skipped leading subpicture when the subpicture is not a leading subpicture of an intra random access point subpicture, and

wherein the leading subpicture precedes the intra random access point subpicture in output order,

wherein the format rule specifies an order by which pictures are indicated in the bitstream,

wherein the format rule disallows an entry in a reference picture list of a current slice from including a first picture that precedes a second picture according to a first order or a second order,

wherein the second picture comprises an intra random access point subpicture having zero or more associated leading subpictures and having a same layer identifier and a same subpicture index as a current subpicture, and

wherein the current subpicture follows the intra random access point subpicture and the zero or more associated leading subpictures in the first order and the second order, and

wherein the first order comprises a decoding order, and the second order comprises an output order, and

wherein the reference picture list includes a reference picture list 0 or a reference picture list 1.

2. The method of claim 1, wherein the intra random access point subpicture is a subpicture for which all video coding layer (VCL) network abstraction layer (NAL) units have a same value of NAL unit type in the range of IDR_W_RADL to CRA_NUT, inclusive,

wherein the random access decodable leading subpicture is a subpicture for which each VCL NAL unit has NAL unit type equal to RADL_NUT, and

wherein the random access skipped leading subpicture is a subpicture for which each video coding layer (VCL) network abstraction layer (NAL) has NAL unit type equal to RASL_NUT.

3. The method of claim 1 or 2, wherein the format rule further specifies that a third subpicture precedes a fourth subpicture in a recovery point picture in the output order in response to:

the third subpicture and the fourth subpicture having a same layer identifier and a same subpicture index, and

the third subpicture preceding the fourth subpicture in the decoding order.

4. The method of any one of claims 1-3,

wherein the format rule further specifies that when the current subpicture is a clean random access subpicture, the format rule disallows a picture referred to by an entry in the reference picture list that precedes, in a third order, any preceding picture, in a fourth order, containing an intra random access point subpicture with a same layer identifier and a same subpicture index as the current subpicture,

wherein the clean random access subpicture is an intra random access point subpicture for which each VCL NAL unit has nal_unit_type equal to CRA_NUT.

5. The method of claim 4, wherein the third order comprises the decoding order or the output order,

wherein the fourth order comprises the decoding order.

6. The method of any one of claims 1-3,

wherein the format rule disallows an active entry in the reference picture list of the current slice from including a fifth picture that precedes a sixth picture according to a fifth order,

wherein the sixth picture comprises an intra random access point subpicture having a same layer identifier and a same subpicture index as the current subpicture, and

wherein the current subpicture follows the intra random access point subpicture in a sixth order.

7. The method of claim 6, wherein the fifth order comprises the decoding order or the output order, and the sixth order comprises the decoding order and the output order,

wherein the active entry corresponds to an entry that is available for use as a reference index in an inter prediction of the current slice.

8. The method of any one of claims 1-7, wherein the format rule further specifies that in response to the current subpicture being a random access decodable leading subpicture, an active entry of the reference picture list of the current slice is disallowed from including any one or more of:

a seventh picture including a random access skipped leading subpicture having a same subpicture index as that of the current subpicture, and

a eighth picture that precedes a picture including an intra random access point subpicture associated with the random access decodable leading subpicture in the decoding order.

9. The method of claim 8, wherein the active entry corresponds to an entry that is available for use as a reference index in an inter prediction of the current slice.

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

11. The method of any one of claims 1-9, wherein the performing the conversion comprises 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:

perform a conversion between a video comprising one or more pictures comprising one or more subpictures and a bitstream of the video,

wherein the bitstream conforms to a format rule that specifies that a subpicture cannot be a random access decodable leading subpicture or a random access skipped leading subpicture when the subpicture is not a leading subpicture of an intra random access point subpicture, and wherein the leading subpicture precedes the intra random access point subpicture in output order,

wherein the format rule specifies an order by which pictures are indicated in the bitstream,

wherein the format rule disallows an entry in a reference picture list of a current slice from including a first picture that precedes a second picture according to a first order or a second order,

wherein the second picture comprises an intra random access point subpicture having zero or more associated leading subpictures and having a same layer identifier and a same subpicture index as a current subpicture, and

wherein the current subpicture follows the intra random access point subpicture and the zero or more associated leading subpictures in the first order and the second order, and

wherein the first order comprises a decoding order, and the second order comprises an output order, and

wherein the reference picture list includes a reference picture list 0 or a reference picture list 1.

13. The apparatus of claim 12, wherein the intra random access point subpicture is a subpicture for which all video coding layer (VCL) network abstraction layer (NAL) units have a same value of NAL unit type in the range of IDR_W_RADL to CRA_NUT, inclusive,

wherein the random access decodable leading subpicture is a subpicture for which each VCL NAL unit has NAL unit type equal to RADL_NUT, and

wherein the random access skipped leading is a subpicture for which each video coding layer (VCL) network abstraction layer (NAL) has NAL unit type equal to RASL_NUT.

14. The apparatus of claim 12 or 13, wherein the format rule further specifies that a third subpicture precedes a fourth subpicture in a recovery point picture in the output order in response to:

the third subpicture and the fourth subpicture having a same layer identifier and a same subpicture index, and

the third subpicture preceding the fourth subpicture in the decoding order.

15. The apparatus of any one of claims 12-14,

wherein the format rule further specifies that when the current subpicture is a clean random access subpicture, the format rule disallows a picture referred to by an entry in the reference picture list that precedes, in a third order, any preceding picture, in a fourth order, containing an intra random access point subpicture with a same layer identifier and a same subpicture index as the current subpicture,

wherein the clean random access subpicture is an intra random access point subpicture for which each VCL NAL unit has nal_unit_type equal to CRA_NUT;

wherein the third order comprises the decoding order or the output order,

wherein the fourth order comprises the decoding order.

16. The apparatus of any one of claims 12-14,

wherein the format rule disallows an active entry in the reference picture list of the current slice from including a fifth picture that precedes a sixth picture according to a fifth order,

wherein the sixth picture comprises an intra random access point subpicture having a same layer identifier and a same subpicture index as the current subpicture, and

wherein the current subpicture follows the intra random access point subpicture in a sixth order;

wherein the fifth order comprises the decoding order or the output order, and the sixth order comprises the decoding order and the output order,

wherein the active entry corresponds to an entry that is available for use as a reference index in an inter prediction of the current slice.

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

perform a conversion between a video comprising one or more pictures comprising one or more subpictures and a bitstream of the video,

wherein the bitstream conforms to a format rule that specifies that a subpicture cannot be a random access decodable leading subpicture or a random access skipped leading subpicture when the subpicture is not a leading subpicture of an intra random access point subpicture, and

wherein the leading subpicture precedes the intra random access point subpicture in output order,

wherein the format rule specifies an order by which pictures are indicated in the bitstream,

wherein the format rule disallows an entry in a reference picture list of a current slice from including a first picture that precedes a second picture according to a first order or a second order,

wherein the second picture comprises an intra random access point subpicture having zero or more associated leading subpictures and having a same layer identifier and a same subpicture index as a current subpicture, and

wherein the current subpicture follows the intra random access point subpicture and the zero or more associated leading subpictures in the first order and the second order, and

wherein the first order comprises a decoding order, and the second order comprises an output order, and

wherein the reference picture list includes a reference picture list 0 or a reference picture list 1.

18. 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 the bitstream of the video comprising one or more pictures comprising one or more subpictures,

wherein the bitstream conforms to a format rule that specifies that a subpicture cannot be a random access decodable leading subpicture or a random access skipped leading subpicture when the subpicture is not a leading subpicture of an intra random access point subpicture, and

wherein the leading subpicture precedes the intra random access point subpicture in output order,

wherein the format rule specifies an order by which pictures are indicated in the bitstream,

wherein the format rule disallows an entry in a reference picture list of a current slice from including a first picture that precedes a second picture according to a first order or a second order,

wherein the second picture comprises an intra random access point subpicture having zero or more associated leading subpictures and having a same layer identifier and a same subpicture index as a current subpicture, and

wherein the current subpicture follows the intra random access point subpicture and the zero or more associated leading subpictures in the first order and the second order, and

wherein the first order comprises a decoding order, and the second order comprises an output order, and

wherein the reference picture list includes a reference picture list 0 or a reference picture list 1.