information to reproduce the original image. In other words, upsampling with conventional filters results in jagged or blurry edges in a reconstructed image. The jagged or blurry edges need to be corrected using a substantial amount of residual data, making such an encoding technique undesirable for use in higher resolution applications.

BRIEF DESCRIPTION

Embodiments herein deviate with respect to conventional systems and methods to reduce an amount of reconstruction data needed to reconstruct a signal with desirable accuracy. For simplicity, the non-limiting embodiments illustrated herein refer to the signal as a multi-dimensional plane of settings. Suitable sets of coordinates in the plane identify plane elements (or "pels"), each characterized by one or more settings (e.g., by ways of non-limiting examples, color settings in a suitable color space, settings indicating density level, settings indicating temperature levels, settings indicating duration in time, etc.). As non-limiting examples, a signal can be an image, a volumetric signal (e.g., medical imaging, scientific imaging, holographic imaging, etc.), a signal featuring more than three dimensions, a time-based signal (e.g., audio signal, video signal, etc.), and so forth. For simplicity, embodiments illustrated herein often refer to signals that are displayed as 2D planes of settings (e.g., 2D images in a suitable color space), such as for instance a picture. However, the same concepts and methods are also applicable to any other type of signal.

In accordance with a first aspect of the present disclosure, there is provided a method of processing a signal in a hierarchy including multiple levels of quality, the method comprising: receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment value to apply to a preliminary setting of a parent element to produce a modified setting for the parent element during reconstruction of the signal at the first level of quality; combining the preliminary setting of the parent element and the adjustment value to produce the modified setting for the parent element at the first level of quality; dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of

quality; and utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

In accordance with a second aspect of the present disclosure, there is provided a computer readable hardware storage having instructions stored thereon, the instructions, when carried out by a processing device, causing the processing device to perform operations of: receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment value to apply to a preliminary setting of a parent element to produce a modified setting for the parent element during reconstruction of the signal at the first level of quality; dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

In accordance with a third aspect of the present disclosure, there is provided a computer system comprising: a processor; a memory unit that stores instructions associated with an application executed by the processor; and an interconnect coupling the processor and the memory unit, causing the computer system to execute the application and perform operations of: receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment value to apply to a preliminary setting of a parent element to produce a modified setting of the parent element during reconstruction of the signal at the first level of quality; combining the preliminary setting of the parent element and the adjustment value to produce the modified setting of the parent element at the first level of quality; dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

Innovative embodiments described herein are directed to unique ways of inheriting information from one level in a hierarchy to the next.

More specifically, one embodiment herein includes a signal processor such as a decoder configured to reconstruct a signal at higher levels of quality in a hierarchy. The signal processor receives a first set of reconstruction data to reconstruct the signal at a first level of quality in the hierarchy. Assume that the first set of reconstruction data includes a symbol specifying an attribute setting of a parent element in the rendition of the signal at the first level of quality. The attribute setting can be a setting for one of multiple planes of attribute settings of the parent element (e.g., attribute settings can include color components in a suitable color space, coordinates of motion vectors, temperature values,

## CLAIMS

1. A method of processing a signal in a hierarchy including multiple levels of quality, the method comprising:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol specifying an attribute setting of a parent element in the rendition of the signal at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the attribute setting of the parent element as specified by the symbol as a default attribute setting for a respective sub-element in the multiple sub-elements until a second set of reconstruction data to reconstruct the signal at the second level of quality specifies a different attribute setting for the respective sub-element.

2. The method as in claim 1, wherein the symbol specifies that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality have been assigned a same attribute setting as indicated by the symbol assigned to the parent element at the first level of quality.

3. The method as in claim 2, wherein the symbol specifies one of multiple class types to which the parent element belongs.

4. The method as in claim 2, wherein the symbol specifies one of multiple class types to which the parent element belongs and that strings of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the symbol for the parent element, since the symbol indicates that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality inherit the attribute setting as indicated by the symbol assigned to the parent element at the first level of quality.

5. The method as in claim 1 further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol specifying an

attribute setting of a sub-element derived from the parent element in the rendition of the signal at the first level of quality, the symbol in the second set of reconstruction data being an inherit marker indicating that the sub-element inherits the attribute setting assigned to the parent element as specified by the symbol.

6. The method as in claim 1, wherein the symbol is selected from multiple symbols, a first set of the multiple symbols configured to indicate assignment of a first class type, a second set of the multiple symbols allocated to indicate assignment of a second class type, the symbol assigned to the parent element indicating a class type of the parent element.

7. The method as in claim 6, wherein the first set of symbols includes at least a first symbol and a second symbol;

wherein assignment of the first symbol in the first set indicates that a respective element is assigned the first class type and that at least one sub-element derived from the respective element at a higher level of quality is assigned to a different class than the first class type; and

wherein assignment of the second symbol in the first set indicates that a respective element is assigned the first class type and that all sub-elements derived from the respective element at a higher level of quality inherit the first class type.

8. The method as in claim 7, wherein the second set of symbols includes at least a first symbol and a second symbol;

wherein assignment of the first symbol in the second set indicates that a respective element is assigned the second class type and that the at least one sub-element derived from the respective element at a higher level of quality is assigned to a different class that the second class type; and

wherein assignment of the second symbol in the second set indicates that a respective element is assigned to the second class type and that all sub-elements derived from the respective element at a higher level of quality inherit the second class type.

9. The method as in claim 8, wherein reconstruction data to reconstruct the signal at each of multiple higher levels of quality indicates a probability distribution of the multiple symbols including the first set of symbols and the second set of symbols.

10. The method as in claim 8, wherein assignment of the second symbol in the first set or assignment of the second symbol in the second set to the parent element indicates that reconstruction data to reconstruct the signal at higher levels of quality will not include information indicating a class type to which any sub-elements derived from the parent belong and that the sub-elements are assigned to a type as indicated by the symbol.

11. The method as in claim 1, wherein the symbol assigned to the parent element indicates that the parent element belongs to a first class type, the method further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol assigned to a first sub-element of the multiple sub-elements, the symbol assigned to the first sub-element specifying that the first sub-element belongs to a second class type differing from the class type of the parent element.

12. The method as in claim 11, wherein the second set of reconstruction data includes a symbol assigned to a second sub-element of the multiple sub-elements, the symbol assigned to the sub-element specifying that the first sub-element belongs to a first class type like the parent element.

13. The method as in claim 1, wherein the symbol indicates an adjustment value to apply to the parent element during reconstruction of the signal at the first level of quality; and

wherein the symbol indicates that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality are assigned a same adjustment value setting or the same final value setting as indicated by the symbol assigned to the parent element at the first level of quality.

14. The method as in claim 13, wherein the symbol indicates that the adjustment is to be inherited by each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality, and that strings of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the symbol.

15. The method as in claim 1 further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol specifying an attribute setting of a sub-element derived from the parent element in the rendition of the signal at the first level of quality, the symbol in the second set of reconstruction data being an inherit marker indicating that the sub-element inherits the adjustment value setting assigned to the parent element as specified by the symbol.

16 The method as in claim 1, wherein the symbol is selected from multiple symbols, each symbol in a first set of the multiple symbols configured to indicate a different respective adjustment value in a range of adjustment values, each symbol in a second set of adjustment values configured to indicate different respective adjustment values in the range;

assignment of a respective symbol in the first set of symbols indicating that each of the multiple sub-elements and all further divisions of the multiple sub-elements derived from the parent element into smaller sub-elements at higher levels of quality may be assigned different symbols as specified by symbols in strings of reconstruction data indicating how to reconstruct the signal at levels of quality higher than the first level of quality; and

assignment of a respective symbol in the second set of symbols indicating that each of the multiple sub-elements and all further divisions of the multiple sub-elements derived from the parent element into smaller sub-elements at higher levels of quality are assigned the same value as the respective symbol and that strings of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the respective symbol.

17. The method as in claim 1 further comprising:

wherein the first set of reconstruction data includes a first symbol specifying an attribute setting of a first parent element in the rendition of the signal at the first level of quality, the first set of reconstruction data including a second symbol specifying an attribute setting of a second parent element in the rendition of the signal at the first level of quality;

dividing the first parent element and the second parent element into respective multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality, a given sub-element of the multiple sub-elements including a portion of the first parent element and a portion of the second parent element; and

deriving an attribute setting for the given sub-element based on the first symbol and the second symbol.

18. The method as in claim 1, wherein the given sub-element inherits the attribute setting of the first parent element or the second parent element depending on which parent element has more area or volume in common with the given sub-element.

19. The method as in claim 1, wherein the attribute setting of the parent element as specified by the symbol is a first setting plane amongst multiple types of setting planes associated with each of the parent element and the respective sub-element, the method further comprising:

deriving a setting value for the first setting plane for the respective sub-element; and

deriving a setting value for a second setting plane for the respective sub-element based on the setting value in the first setting plane in lieu of directly receiving setting information for the second setting plane from the second set of reconstruction data.

20. Computer readable hardware storage having instructions stored thereon, the instructions, when carried out by a processing device, causing the processing device to perform operations of:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol specifying an attribute setting of a parent element in the rendition of the signal at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the attribute setting of the parent element as specified by the symbol and the rendition of the signal at the first level of quality to produce a default attribute setting for a respective sub-element in the multiple sub-elements unless a second set of

reconstruction data to reconstruct the signal at the second level of quality specifies a different attribute setting for the respective sub-element.

21. A computer system comprising:

a processor;

a memory unit that stores instructions associated with an application executed by the processor; and

an interconnect coupling the processor and the memory unit, enabling the computer system to execute the application and perform operations of:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol specifying an attribute setting of a parent element in the rendition of the signal at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the attribute setting of the parent element as specified by the symbol as a default attribute setting for a respective sub-element in the multiple sub-elements until a second set of reconstruction data to reconstruct the signal at the second level of quality specifies a different attribute setting for the respective sub-element.

## CLAIMS

1. A method of processing a signal in a hierarchy including multiple levels of quality, the method comprising:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment value to apply to a preliminary setting of a parent element to produce a modified setting for the parent element during reconstruction of the signal at the first level of quality;

combining the preliminary setting of the parent element and the adjustment value to produce the modified setting for the parent element at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

2. The method as in claim 1, wherein the symbol specifies that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality also have been assigned the adjustment value as indicated by the symbol assigned to the parent element at the first level of quality.

3. The method as in claim 2, wherein the symbol specifies one of multiple class types to which the parent element belongs.

4. The method as in claim 2, wherein the symbol specifies one of multiple class types to which the parent element belongs and that sets of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the symbol for the parent element, since the symbol indicates that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality inherit the adjustment value as indicated by the symbol assigned to the parent element at the first level of quality.

5. The method as in claim 1 further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol

specifying settings of sub-elements derived from the parent element in the rendition of the signal at the first level of quality, the symbol in the second set of reconstruction data being an inherit marker indicating that the sub-element inherits the adjustment value assigned to the parent element as specified by the symbol.

6. The method as in claim 1, wherein the symbol is selected from multiple symbols, a first set of the multiple symbols configured to indicate assignment of a first class type, a second set of the multiple symbols allocated to indicate assignment of a second class type, the symbol assigned to the parent element indicating a class type of the parent element.

7. The method as in claim 6, wherein the first set of symbols includes at least a first symbol and a second symbol;

wherein assignment of the first symbol in the first set indicates that a respective element is assigned the first class type and that at least one sub-element derived from the respective element at a higher level of quality is assigned to a different class than the first class type; and

wherein assignment of the second symbol in the first set indicates that a respective element is assigned the first class type and that all sub-elements derived from the respective element at a higher level of quality inherit the first class type.

8. The method as in claim 7, wherein the second set of symbols includes at least a first symbol and a second symbol;

wherein assignment of the first symbol in the second set indicates that a respective element is assigned the second class type and that the at least one sub-element derived from the respective element at a higher level of quality is assigned to a different class that the second class type; and

wherein assignment of the second symbol in the second set indicates that a respective element is assigned to the second class type and that all sub-elements derived from the respective element at a higher level of quality inherit the second class type.

9. The method as in claim 8, wherein reconstruction data to reconstruct the signal at each of multiple higher levels of quality indicates a probability distribution of the multiple symbols including the first set of symbols and the second set of symbols.

10. The method as in claim 8, wherein assignment of the second symbol in the first set or assignment of the second symbol in the second set to the parent element indicates

that reconstruction data to reconstruct the signal at higher levels of quality will not include information indicating a class type to which any sub-elements derived from the parent belong and that the sub-elements are assigned to a type as indicated by the symbol.

11. The method as in claim 1, wherein the symbol assigned to the parent element indicates that the parent element belongs to a first class type, the method further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol assigned to a first sub-element of the multiple sub-elements, the symbol assigned to the first sub-element specifying that the first sub-element belongs to a second class type differing from the class type of the parent element.

12. The method as in claim 11, wherein the second set of reconstruction data includes a symbol assigned to a second sub-element of the multiple sub-elements, the symbol assigned to the second sub-element specifying that the second sub-element belongs to the first class type.

13. The method as in claim 1,

wherein the symbol indicates that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality are assigned a same adjustment value setting or the same final value setting as indicated by the symbol assigned to the parent element at the first level of quality.

14. The method as in claim 13, wherein the symbol indicates that the adjustment is to be inherited by each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality, and that sets of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the symbol.

15. The method as in claim 1 further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a symbol specifying settings of sub-elements derived from a corresponding parent element in the rendition of the signal at the first level of quality, the symbol in the second set of reconstruction data being an inherit marker indicating that the sub-elements inherit the adjustment value settings assigned to the corresponding parent element.

16. The method as in claim 1, wherein the symbol is selected from multiple symbols, each symbol in a first set of the multiple symbols configured to indicate a different respective adjustment value in a range of adjustment values, each symbol in a second set of adjustment values configured to indicate different respective adjustment values in the range;

assignment of a respective symbol in the first set of symbols indicating that each of the multiple sub-elements and all further divisions of the multiple sub-elements derived from the parent element into smaller sub-elements at higher levels of quality is assigned different adjustment values as specified by symbols in sets of reconstruction data indicating how to reconstruct the signal at levels of quality higher than the first level of quality; and

assignment of a respective symbol in the second set of symbols indicating that each of the multiple sub-elements and all further divisions of the multiple sub-elements derived from the parent element into smaller sub-elements at higher levels of quality are assigned the same value as the respective symbol and that strings of reconstruction data to reconstruct the signal at levels of quality higher than the first level of quality do not include a transmission or duplication of the respective adjustment values associated to each of the multiple sub-elements.

17. The method as in claim 1 further comprising:

wherein the first set of reconstruction data includes a first symbol specifying an attribute setting of a first parent element in the rendition of the signal at the first level of quality, the first set of reconstruction data including a second symbol specifying an attribute setting of a second parent element in the rendition of the signal at the first level of quality;

dividing the first parent element and the second parent element into respective multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality, a given sub-element of the multiple sub-elements including a portion of the first parent element and a portion of the second parent element; and

deriving an attribute setting for the given sub-element based on the first symbol and the second symbol.

18. The method as in claim 17, wherein the given sub-element inherits the attribute setting of the first parent element or the second parent element depending on which parent element has more area or volume in common with the given sub-element.

19. The method as in claim 1, wherein the attribute setting of the parent element as specified by the symbol is a first setting plane amongst multiple types of setting planes associated with each of the parent element and the respective sub-element, the method further comprising:

deriving a setting value for the first setting plane for the respective sub-element; and

deriving a setting value for a second setting plane for the respective sub-element based on the setting value in the first setting plane in lieu of directly receiving setting information for the second setting plane from the second set of reconstruction data.

20. Computer readable hardware storage having instructions stored thereon, the instructions, when carried out by a processing device, causing the processing device to perform operations of:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment value to apply to a preliminary setting of a parent element to produce a modified setting for the parent element during reconstruction of the signal at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

21. A computer system comprising:

a processor;

a memory unit that stores instructions associated with an application executed by the processor; and

an interconnect coupling the processor and the memory unit, causing the computer system to execute the application and perform operations of:

receiving a first set of reconstruction data to reconstruct the signal at a first level of quality, the first set of reconstruction data including a symbol indicating an adjustment

value to apply to a preliminary setting of a parent element to produce a modified setting of the parent element during reconstruction of the signal at the first level of quality;

combining the preliminary setting of the parent element and the adjustment value to produce the modified setting of the parent element at the first level of quality;

dividing the parent element into multiple sub-elements to reconstruct the signal at a second level of quality, the second level of quality higher than the first level of quality; and

utilizing the modified setting of the parent element to produce a setting for a respective sub-element in the multiple sub-elements.

22. The method as in claim 1, wherein reconstruction data to reconstruct the signal at each of multiple higher levels of quality above the first level of quality indicates a probability distribution of multiple symbols including a first set of symbols and a second set of symbols.

23. The method as in claim 1 further comprising: utilizing the adjustment value to modify upsampled sub-elements until a subsequent set of reconstruction data to reconstruct the signal at a higher level of quality specifies a different adjustment value for application to respective sub-elements.

24. The method as in claim 1, wherein reconstruction data received to reconstruct the second level of quality specifies adjustment values only for a subset of the elements of the rendition of the signal at the second level of quality, the method comprising:

reconstructing the signal at a first level of quality, wherein elements of said signal at the first level of quality are assigned either a symbol belonging to a first set of symbols or a symbol belonging to a second set of symbols;

generating a preliminary rendition of the signal at the second level of quality, wherein elements of said preliminary rendition at the second level of quality corresponding to a same parent element of the signal at the first level of quality are assigned a symbol as specified by the symbol of said parent element of the signal at the first level of quality;

receiving reconstruction data corresponding to adjustments of the preliminary rendition of the signal at the second level of quality;

only for elements of the preliminary rendition of the signal at the second level of quality that were assigned a symbol belonging to the second set of symbols, modifying the assigned symbol based on said received reconstruction data.

25. The method as in claim 1, wherein the signal represents an image.

26. The method as in claim 1, wherein the signal represents descriptive information on motion.

27. The method as in claim 1, wherein the signal represents information on indicating upsampling operations used to generate, based on a rendition of an image at a first level of quality, a preliminary rendition of the image at a second level of quality.

28. The method as in claim 1, wherein the signal is represents a three-dimensional volume.

29. The method as in claim 1, wherein the symbol is selected from multiple symbols, a first set of the multiple symbols configured to indicate assignment of a first class type, the second set of the multiple symbols allocated to indicate assignment to a second class type, the symbol assigned to the parent element indicating a class type of the parent element.

30. The method as in claim 29 further comprising:

utilizing the modified setting of the parent element to reconstruct a rendition of the signal at the first level of quality; and

responsive to detecting that the symbol belongs to the first class type, utilizing the adjustment value of the parent element as specified by the symbol to produce a default symbol of the first class type for adjustments to the multiple sub-elements.

31. The method as in claim 29, wherein the symbol specifies that each of the multiple sub-elements and all further divisions of the multiple sub-elements into smaller sub-elements at higher levels of quality have been assigned the adjustment value as indicated by the symbol assigned to the parent element at the first level of quality.

32. The method as in claim 31 further comprising:

receiving a second set of reconstruction data to reconstruct the signal at a second level of quality, the second set of reconstruction data indicating adjustment values only for sub-elements of corresponding parent elements that at the first level of quality were assigned a symbol of the second class type; and

reconstructing a rendition of the signal at the second level of quality.

33. The method as in claim 1, wherein the reconstruction data indicates an entropy associated with symbols assigned to parent elements at the first level of quality, each of the symbols indicating a class to which the respective element belongs as well as which sub-elements derived from the respective parent element inherits same setting information as the parent.

34. The method as in claim 1, wherein the symbol indicating the adjustment value is a numerical value representing residual data, the numerical value specifying an amount in which to modify the preliminary setting of the parent element.

35. The method as in claim 34, wherein the numerical value specifies a polarity in which to modify the preliminary setting of the parent element.

36. The method as in claim 1, wherein the symbol is a first symbol, the method further comprising:

receiving a second set of reconstruction data to reconstruct the signal at the second level of quality, the second set of reconstruction data including a second symbol, the second symbol indicating an adjustment value to apply to a preliminary setting of a given sub-element of the multiple sub-elements to produce a modified setting for the given sub-element during reconstruction of the signal at the second level of quality;

dividing the given sub-element into multiple sub-sub-elements to reconstruct the signal at a third level of quality, the third level of quality higher than the second level of quality; and

utilizing the modified setting of the given sub-element as a default attribute setting for a respective sub-sub-element in the multiple sub-sub-elements.

37. The computer system as in claim 21, wherein execution of the application further comprises:

utilizing the symbol of the parent element to produce an adjustment value for the respective sub-element, the adjustment value indicating an adjustment to be made to the produced setting for the respective sub-element.

38. The computer system as in claim 21 further comprising:

combining the preliminary setting of the parent element and the adjustment value to produce the modified setting of the parent element at the first level of quality.

39. The method as in claim 1 further comprising:

utilizing the symbol of the parent element to produce an adjustment value for the respective sub-element, the adjustment value indicating an adjustment to be made to the produced setting for the respective sub-element; and

combining the produced setting for the respective sub-element and the adjustment value to produce a modified setting of the respective sub-element at the second level of quality.

40. The method as in claim 39, wherein the symbol indicates that the adjustment value has been assigned to the respective sub-element.

41. The method as in claim 40, wherein the parent element is a first parent element; and

wherein producing the setting of the sub-element includes: producing the setting of the sub-element to inherit settings associated with the first parent element and a second parent element at the first level of quality.