[CLAIMS]

1. A user terminal device comprising:

a display unit for displaying an output result of a web application process;

a video output memory unit for storing the output result displayed on the display unit;

a memory unit for storing data including an intermediate operation result according to a process of a processor unit; and

the processor unit for executing processes including the web application process, parsing a provided web document created in a web description language and converting into a DOM tree data having a structure formed in a shape of a tree, creating a render tree data having a structure the same as that of the converted DOM tree data, in which non-output nodes excluding display output nodes corresponding to data that will be output on a display means are configured as void nodes, storing the render tree data in the video output memory unit, and providing the render tree data to the web application process.

2. The apparatus according to claim 1, wherein the processor unit stores the DOM tree data in the memory unit having a speed lower than that of the video output memory unit.

3. The apparatus according to claim 1, wherein if a request for changing the data that will be output on the display unit is received from the web application process, the processor unit replaces non-output nodes which do not output on the display unit any more among the display output nodes of the render tree data with void nodes, copies data that will be output on the display means among the DOM tree data to the render tree data, and then providing the render tree data to the web application process.

4. The apparatus according to claim 1, wherein the processor unit inserts scroll mark nodes at data structure positions in the DOM tree data corresponding to the display output nodes of the render tree data.

5. The apparatus according to claim 4, wherein the scroll mark nodes are nodes different from each other, including a start scroll mark node and an end scroll mark node.

6. A user terminal device comprising:

a display unit for displaying an output result of a web application process;

a video output memory unit for storing the output result displayed on the display unit;

a memory unit for storing data including an intermediate operation result according to a process of a processor unit; and

the processor unit for executing processes including the web application process, parsing a provided web document created in a web description language and converting into a DOM tree data having a structure formed in a shape of a tree, determining a ratio of text in the provided web document, and if the ratio exceeds a preset value, creating a render tree data having a structure the same as that of the converted DOM tree data, in which nodes excluding display output nodes corresponding to data that will be output on a display means are configured as void nodes, storing the render tree data in the video output memory unit, and providing the render tree data to the web application process, and if the ratio of text in the web document does not exceed the preset value, providing the DOM tree data to the web application process.

7. The apparatus according to claim 6, wherein if the ratio of text in the web document exceeds the preset value, the processor

unit stores the DOM tree data in the memory unit having a speed lower than that of the video output memory unit.

8. The apparatus according to claim 6, wherein if the ratio of text in the web document exceeds the preset value, the processor unit inserts scroll mark nodes at data structure positions in the DOM tree data corresponding to the display output nodes of the render tree data.

9. The apparatus according to claim 8, wherein the scroll mark nodes are nodes different from each other, including a start scroll mark node and an end scroll mark node.

10. The apparatus according to claim 6, wherein in a case where the ratio of text in the web document exceeds the preset value, if a request for changing the data that will be output on the display unit is received from the web application process, the processor unit replaces non-output nodes which do not output on the display unit any more among the display output nodes of the render tree data with void nodes, copies data that will be output on the display means among the DOM tree data to the render tree data, and then providing the render tree data to the web application process.

11. A web scroll system including a user terminal device, the system comprising:

a web document providing apparatus for storing a web document created in a web description language and providing the web document to the user terminal device according to connection of the user terminal device; and

the user terminal device having a processor for connecting to the web document providing apparatus and receiving the web document, parsing the provided web document created in a web description

language and converting into a DOM tree data having a structure formed in a shape of a tree, creating a render tree data having a structure the same as that of the converted DOM tree data, in which non-output nodes excluding display output nodes corresponding to data that will be output on a display means are configured as void nodes, and providing the render tree data to a web application process.

12. The system according to claim 11, wherein the user terminal device

i) stores the display non-output nodes in a preset storage space and loads again the display non-output nodes on the DOM tree data when the web application process calls the display non-output nodes, or

ii) receives only the display non-output nodes from the web document providing apparatus and loads again on the DOM tree data when the web application process calls the display non-output nodes.

13. A web document scrolling method of a user terminal device, the method comprising the steps of:

(a) executing processes including a web application process and receiving a web document created in a web description language, by a processor unit;

(b) parsing the web document and converting into a DOM tree data having a structure formed in a shape of a tree, by the processor unit;

(c) creating a render tree data having a structure the same as that of the DOM tree data, in which non-output nodes excluding display output nodes corresponding to data that will be output on a display means are configured as void nodes, by the processor unit; and

(d) loading the render tree data in video buffer memory and providing the render tree data to the web application process, by the processor unit.

14. The method according to claim 13, wherein in the step (b), the processor unit additionally stores the converted DOM tree data in a memory unit having a speed lower than that of the video buffer memory.

15. The method according to claim 13, wherein in the step (c), the processor unit further inserts scroll mark nodes at data structure positions in the DOM tree data corresponding to the display output nodes of the render tree data.

16. The method according to claim 15, wherein the scroll mark nodes are nodes different from each other, including a start scroll mark node and an end scroll mark node.

17. The method according to claim 13, wherein in the step (d), if a request for changing the data that will be output on the display unit is received from the web application process, the processor unit replaces non-output nodes which do not output on the display unit any more among the display output nodes of the render tree data with void nodes, copies data that will be output on the display means among the DOM tree data to the render tree data, and then providing the render tree data to the web application process.

18. The method according to claim 13, wherein a ratio of text in the provided web document is determined, and the step (C) is performed when the ratio exceeds a preset value.