SMART PLANS

Cross-Reference to Related Applications

The present application is a Non-Provisional patent application, which claims benefit of U.S. Provisional Application Ser. No. 62/469,986 entitled "SMART PLANS," and filed on 10 March 2017, which is incorporated herein by reference in its entirety.

Background

Building information modeling (BIM) using computer aided design (CAD) software is an expensive and time consuming process. A user generally designs every aspect of a building including building units (e.g., apartment units, office suites, hotel room), structural components (e.g., columns, framing), equipment components (e.g., HVAC systems, plumbing). In some instances, equipment and/or structure may be designed on the fly at the building site.

Summary

This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter. Other features, details, utilities, and advantages of the claimed subject matter will be apparent from the following more particular written Detailed Description of various implementations and implementations as further illustrated in the accompanying drawings and defined in the appended claims.

According to a first aspect of the present invention, there is provided a method for designing a structure, the method comprising: receiving a selection of one or more predesigned elements and placement of the one or more predesigned elements on a designated geometric grid; integrating the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one

or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and identifying a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid, wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

According to a second aspect of the present invention, there is provided one or more tangible processor readable storage media encoding processor-executable instructions for executing on a computer system a process comprising: receiving a selection of one or more predesigned elements and placement of the one or more predesigned elements on a designated geometric grid; integrating the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and identifying a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid, wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

According to a third aspect of the present invention, there is provided a system for designing a structure, the system comprising: a library of elements providing one or more predesigned elements, each of the one or more predesigned elements presented for selection by a user; a structural component conversion module configured to receive a selection and a placement of one or more of the predesigned elements on a designated

geometric grid and to integrate the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and a geometric grid module to configured to receive the designation of the geometric grid and identify a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid, wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

Embodiments of the present application disclose smart plan portal that may be used in conjunction with a computer aided design (CAD) software application module for building information modeling (BIM). The smart plan portal provides a library of predesigned elements that are presented for selection and placement for building design. Each placed element automatically integrates with adjacent elements and the overall building design.

Claims

WHAT IS CLAIMED IS:

1. A method for designing a structure, the method comprising:

receiving a selection of one or more predesigned elements and placement of the one or more predesigned elements on a designated geometric grid;

integrating the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and

identifying a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid,

wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

2. The method of claim 1 wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises:

identifying shared structural components of the plurality of structural components based on a plurality of structural components included in the one or more predesigned elements and a plurality of structural components included in the one or more adjacent elements, the identifying be further based on a position and location of the one or more predesigned elements relative to the one or more adjacent elements.

3. The method of claim 1 wherein the plurality of structural components includes at least one of wall panels, trusses, and structural columns.

4. The method of claim 1 further comprising:

identifying one or more equipment components based on the identified and linked equipment layouts between the predesigned elements and the one or more adjacent elements; and

generating the digital identification for the identified one or more equipment components and associating the generated digital identification with the one or more identified equipment components, the digital identification for the identified one or more equipment components identifying at least the position and the location of the associated one or more equipment components relative to the designated geometric grid.

5. The method of claim 1 wherein the one or more predesigned elements include at least one of a predesigned apartment layout, a predesigned office suite, an elevator, and a staircase.

6. One or more tangible processor readable storage media encoding processor-executable instructions for executing on a computer system a process comprising:

receiving a selection of one or more predesigned elements and placement of the one or more predesigned elements on a designated geometric grid;

integrating the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and

identifying a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid,

wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more

adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

7. The one or more tangible processor readable storage media of claim 6 wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises:

identifying shared structural components of the plurality of structural components based on a plurality of structural components included in the one or more predesigned elements and a plurality of structural components included in the one or more adjacent elements, the identifying be further based on a position and location of the one or more predesigned elements relative to the one or more adjacent elements.

8. The one or more tangible processor readable storage media of claim 6 wherein the plurality of structural components includes at least one of wall panels, trusses, and structural columns.

9. The one or more tangible processor readable storage media of claim 6 wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises:

identifying equipment layouts between the one or more predesigned elements and the one or more adjacent elements; and

linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

10. The one or more tangible processor readable storage media of claim 9 the computer process further comprising:

identifying one or more equipment components based on the identified and linked equipment layouts between the predesigned elements and the one or more adjacent elements; and

generating the digital identification for the identified one or more equipment components and associating the generated digital identification with the one or more identified equipment components, the digital identification for the identified one or more equipment components identifying at least the position and the location of the associated one or more equipment components relative to the designated geometric grid.

11. The one or more tangible processor readable storage media of claim 8 wherein the one or more predesigned elements include at least one of a predesigned apartment layout, a predesigned office suite, an elevator, and a staircase.

12. A system for designing a structure, the system comprising:

a library of elements providing one or more predesigned elements, each of the one or more predesigned elements presented for selection by a user;

a structural component conversion module configured to receive a selection and a placement of one or more of the predesigned elements on a designated geometric grid and to integrate the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid based on an identified spacing between the selected and placed one or more predesigned elements and the one or more adjacent elements, the generated one or more hallways including one or more of the plurality of structural components; and

a geometric grid module to configured to receive the designation of the geometric grid and identify a location and position of a plurality of structural components based on the integrated one or more predesigned elements and the one or more adjacent elements, each of the plurality of structural components associated with a digital identification identifying at least the position and the location of the structural component relative to the designated geometric grid,

wherein integrating the selected and placed one or more predesigned elements with the one or more adjacent elements on the designated geometric grid further comprises identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

13. The system of claim 12 wherein the geometric grid module integrates the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid by identifying shared structural components of the plurality of structural components based on a plurality of structural components included in the one or more predesigned elements and a plurality of structural components included in the one or more adjacent elements, the identifying be further based on a position and location of the one or more predesigned elements relative to the one or more adjacent elements.

14. The system of claim 12 wherein the geometric grid module integrates the selected and placed one or more predesigned elements with one or more adjacent elements on the designated geometric grid by identifying equipment layouts between the predesigned elements and the one or more adjacent elements and linking the equipment layouts between the predesigned elements and the one or more adjacent elements.

15. The system of claim 14 wherein identifying equipment layouts between the one or more predesigned elements further comprises identifying an optimal layout based on one or more equipment layout rules.

16. The system of claim 12 wherein the plurality of structural components includes at least one of wall panels, trusses, and structural columns.

17. The system of claim 12 wherein the one or more predesigned elements include at least one of a predesigned apartment layout, a predesigned office suite, an elevator, and a staircase.