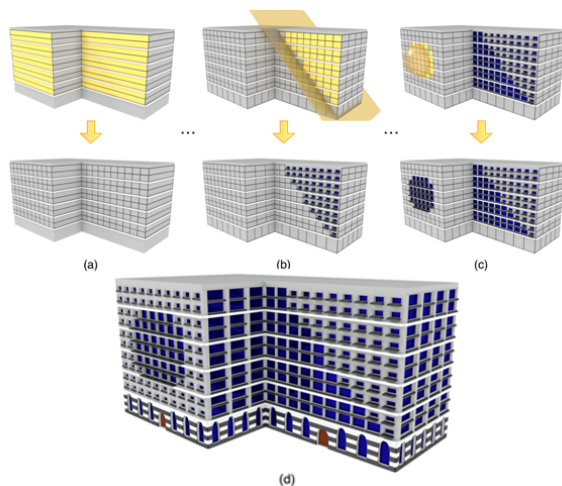


Generalized Selections for Direct Control in Procedural Buildings

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Procedural modeling techniques reduce the effort of creating large virtual cities. However, current methodologies do not allow direct user control over the generated models. Associated with this problem, we face the additional problem related to intrinsic ambiguity existing in user selections. In this paper, we propose to address this problem by using a genetic algorithm to generalize user-provided point-and-click selections of building elements. From a few user-selected elements, the system infers new sets of elements that potentially correspond to the users intention, including the ones manually selected. These sets are obtained by

queries over the shape trees generated by the procedural rules, thus exploiting shape semantics, hierarchy and geometric properties. Our system also provides a complete selection-action paradigm that allows users to edit procedurally generated buildings without necessarily explicitly writing queries. The pairs of user selections and procedural operations (the actions) are stored in a tree-like structure, which is easily evaluated. Results show that the selection inference is capable of generating sets of shapes that closely match the user intention and queries are able to perform complex selections that would be difficult to achieve in other systems. User studies confirm this result.