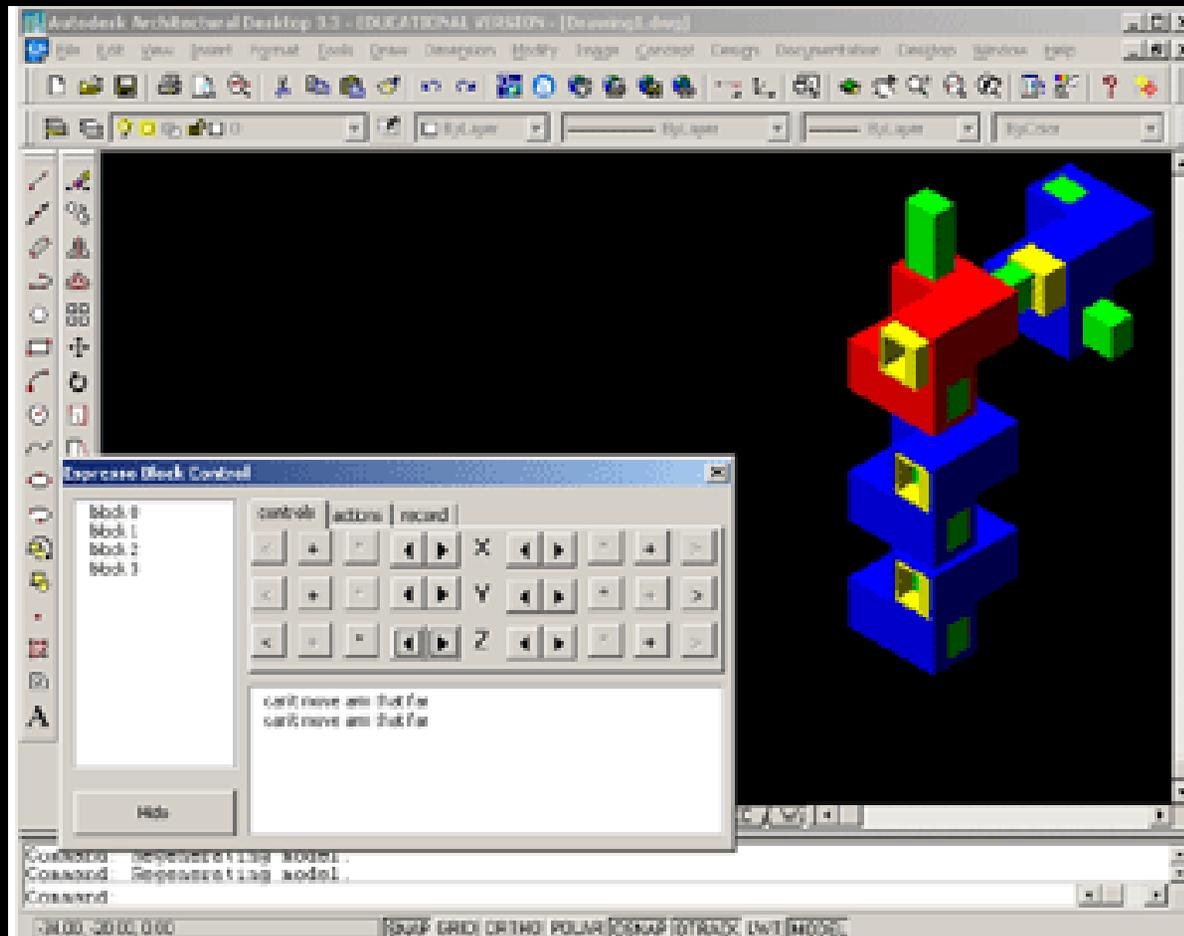
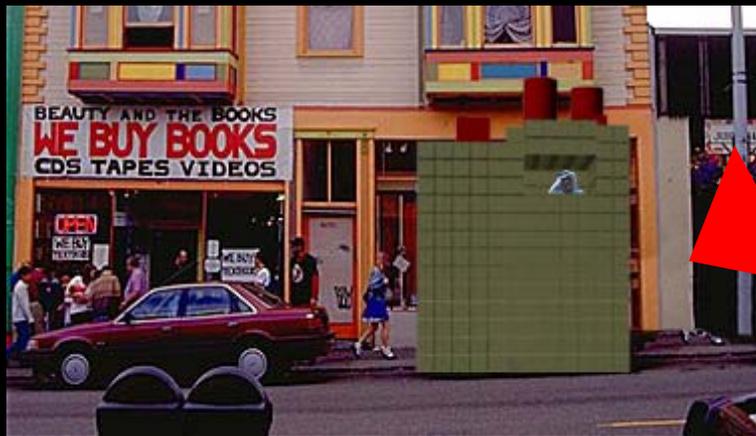


espressoCAD

*A System to Support the Design of
Dynamic Structure Configurations*



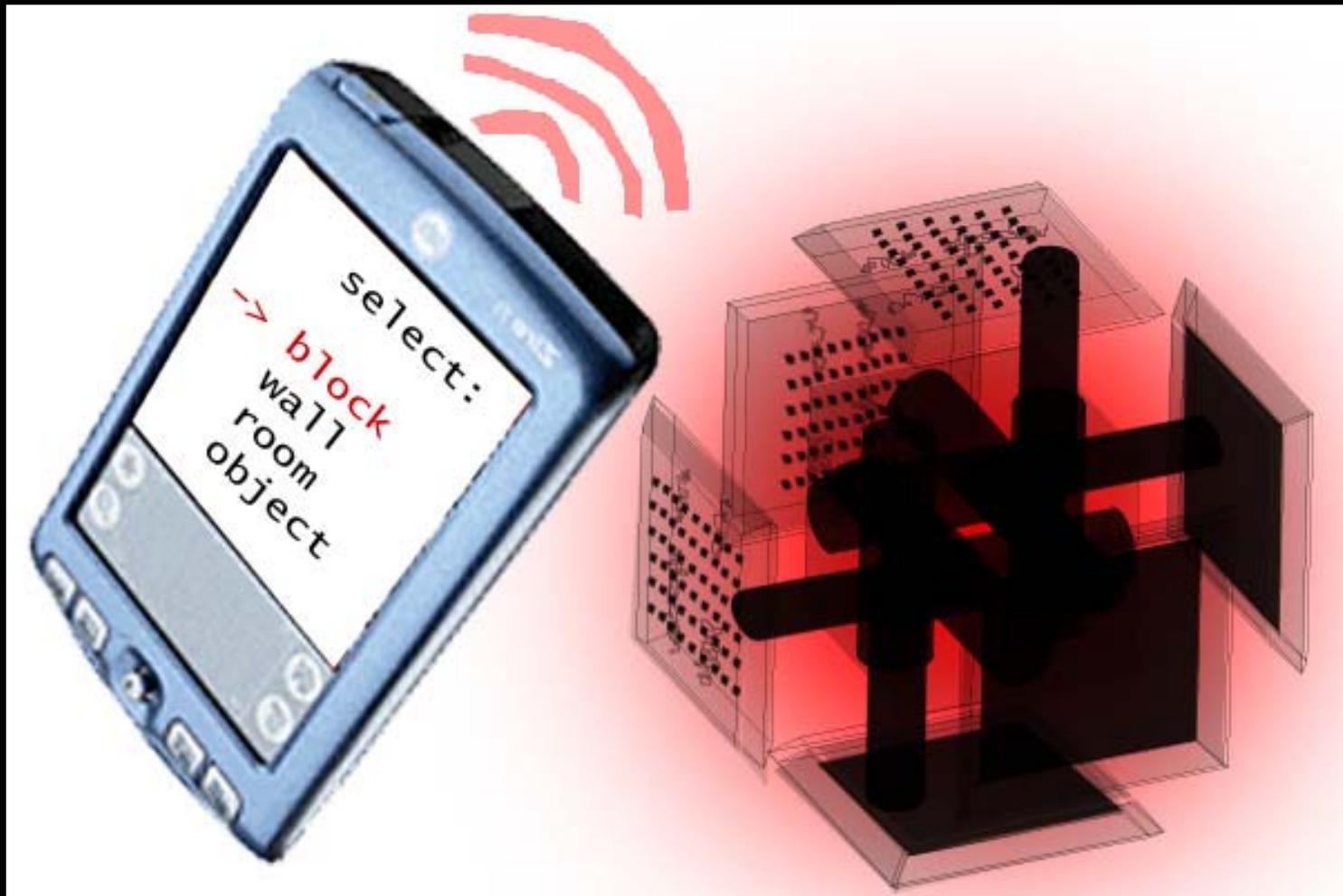
a dynamic structure: a live/work espresso stand



blocks delivered on pallets



remote control allows dynamic selection of configurations



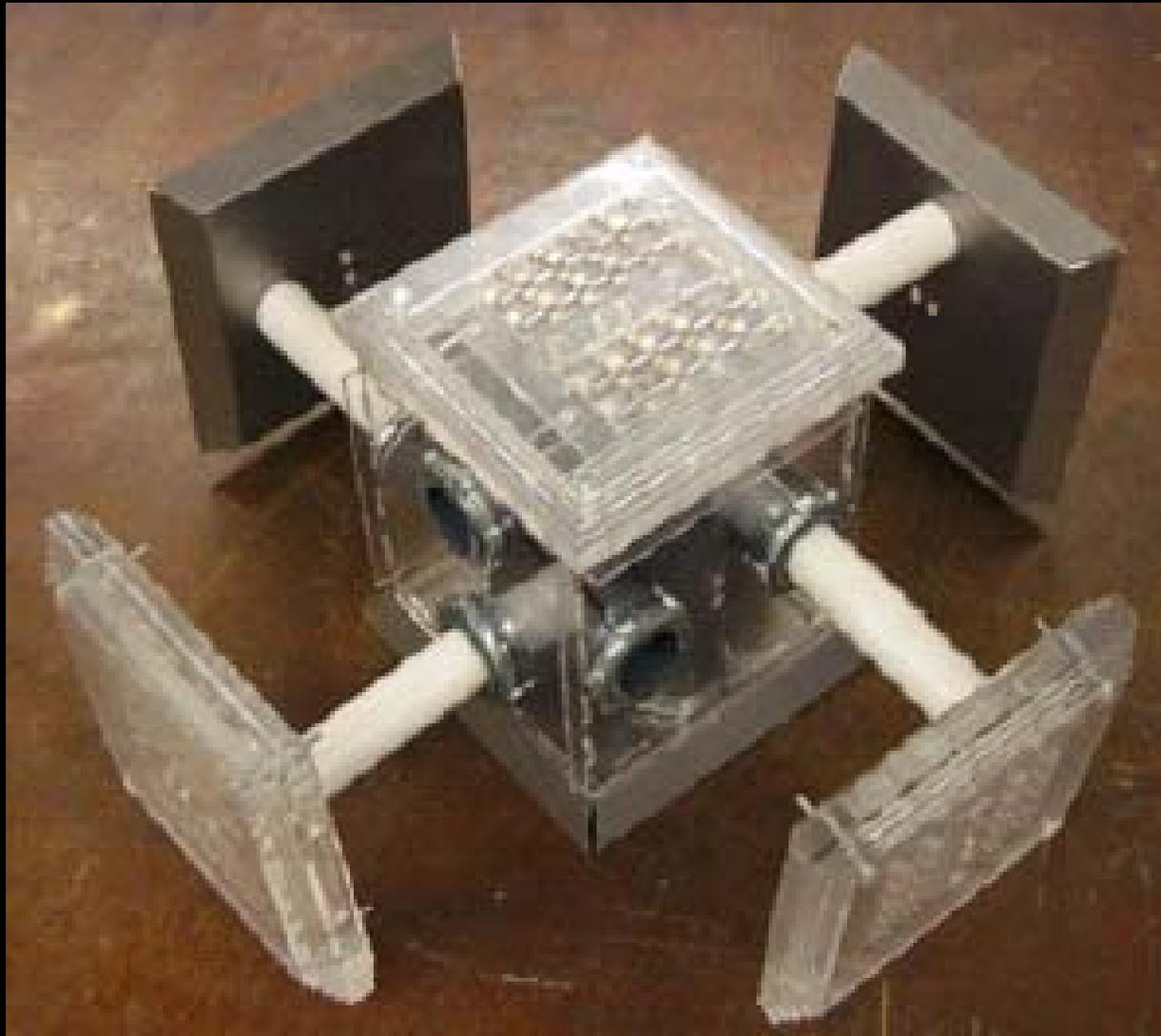
espresso stand configuration



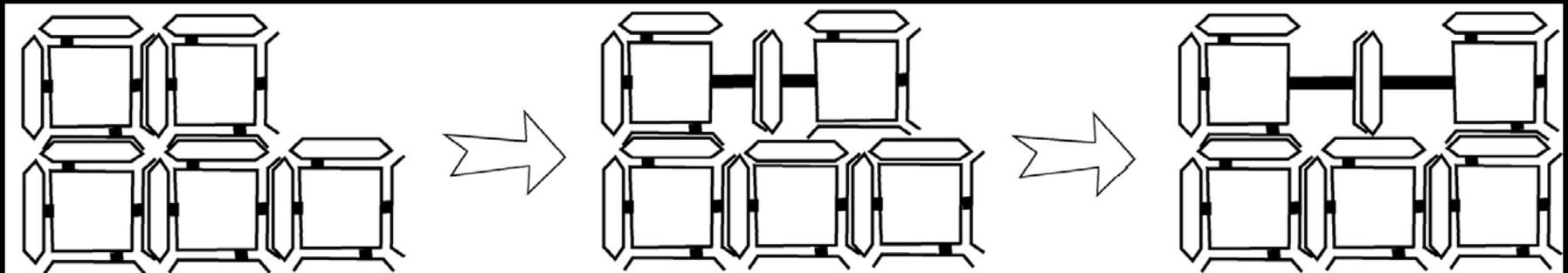
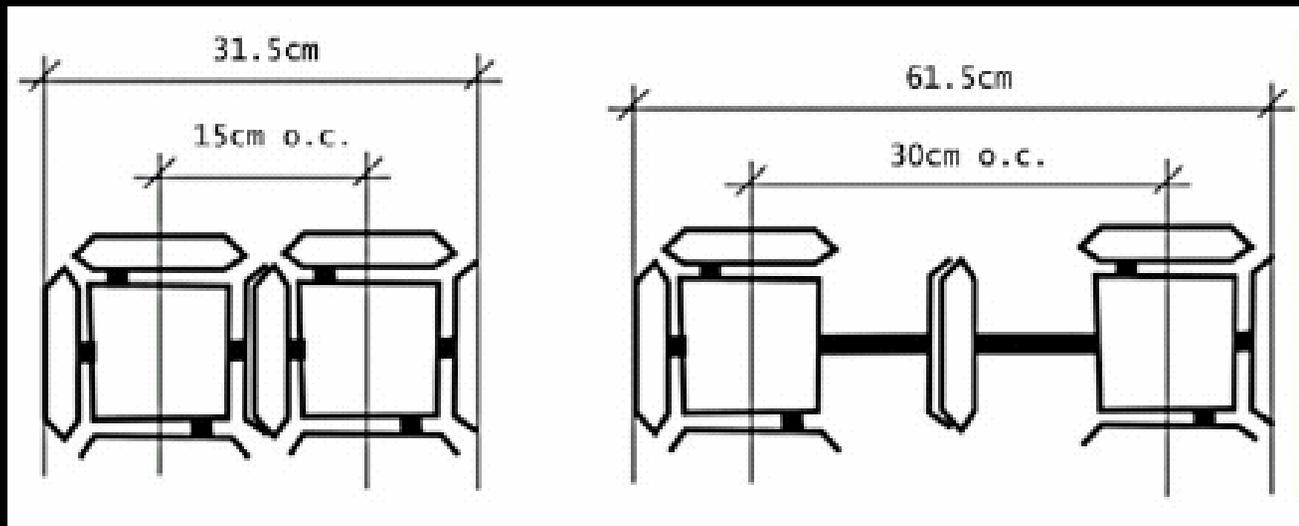
bedroom configuration



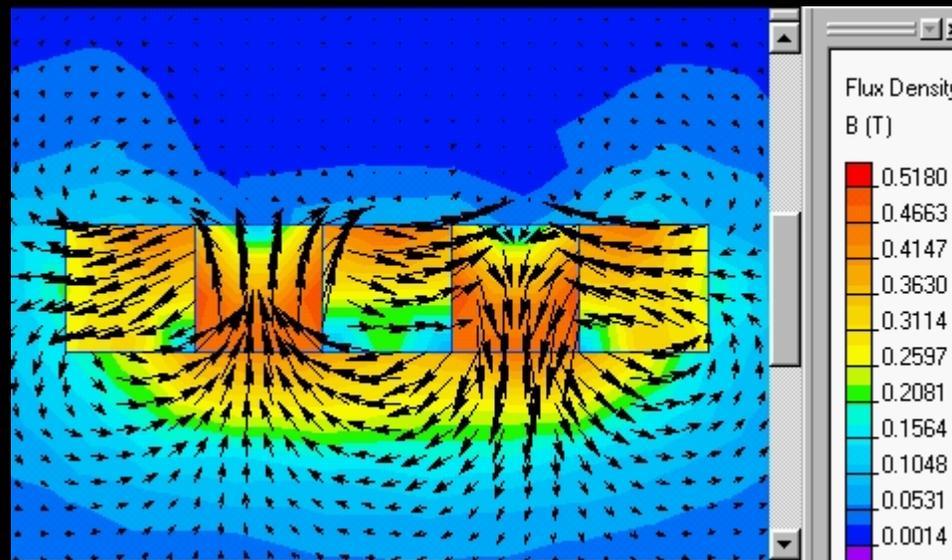
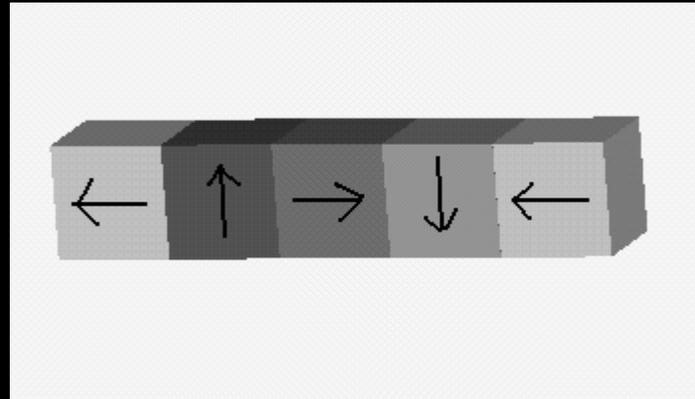
espresso block



block inchworm movement



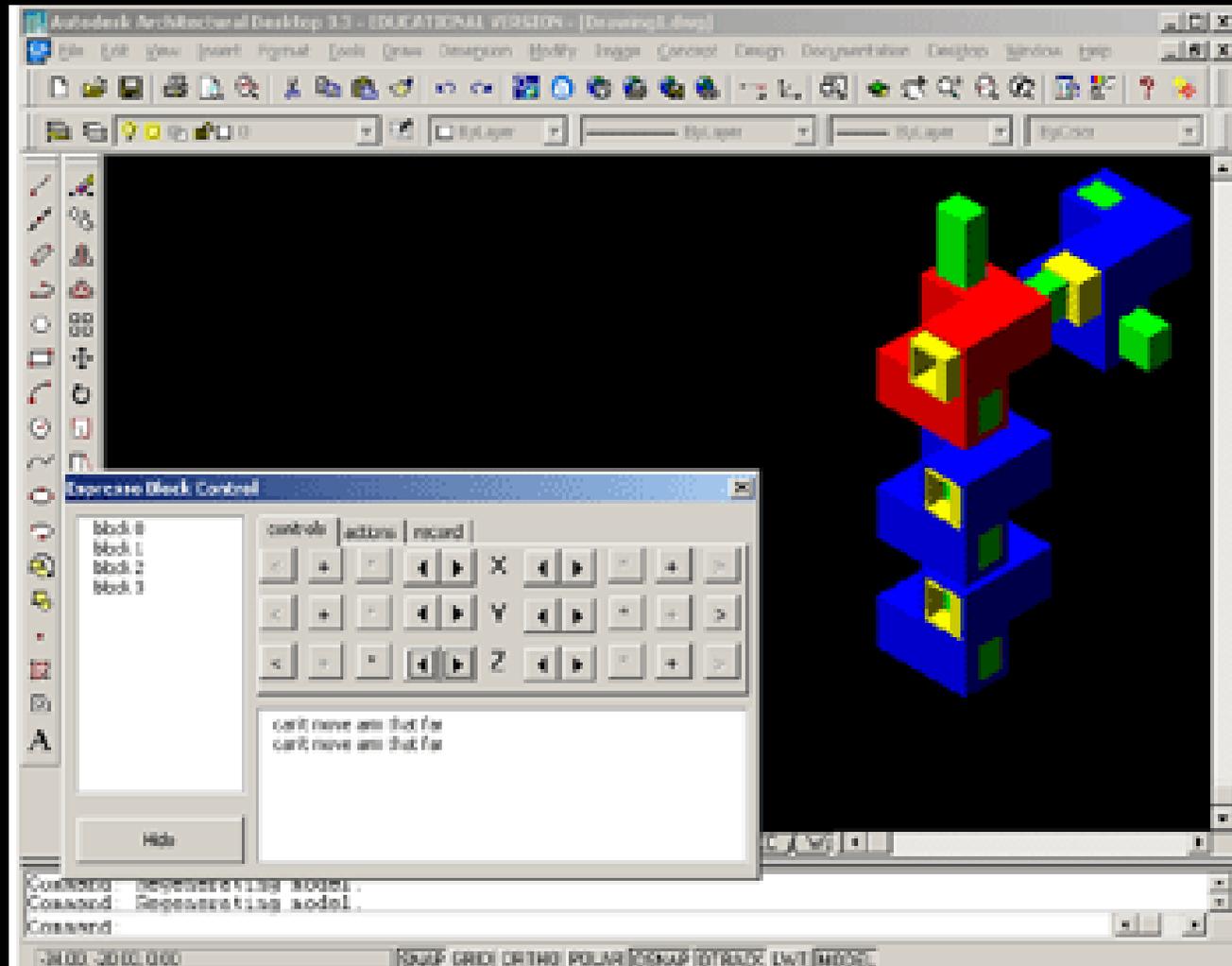
Halbach array



minimum requirements of CAD for dynamic structure configurations:

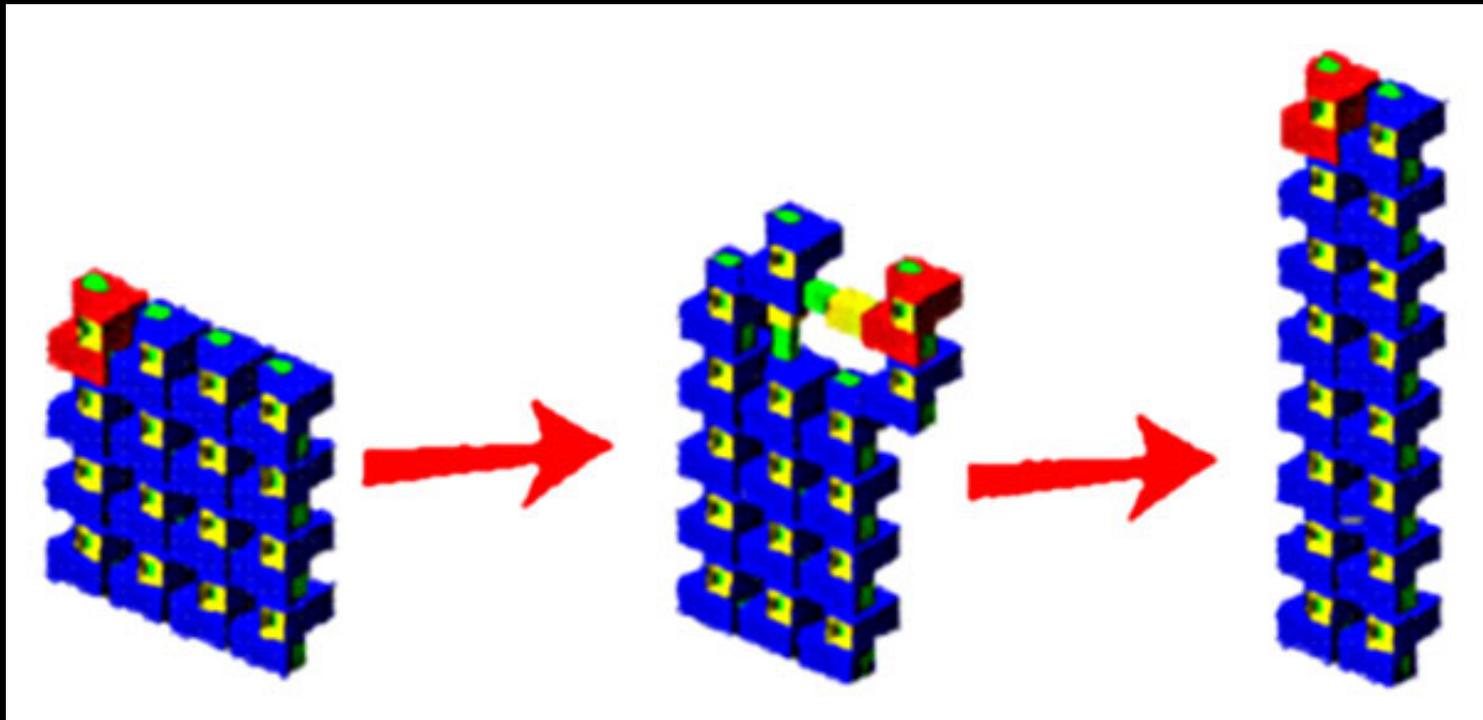
- (1) states and transitions
- (2) model DOF and topo constraints of block
- (3) block algorithms not construction docs

our minimal CAD system for Espresso Blocks: espressoCAD



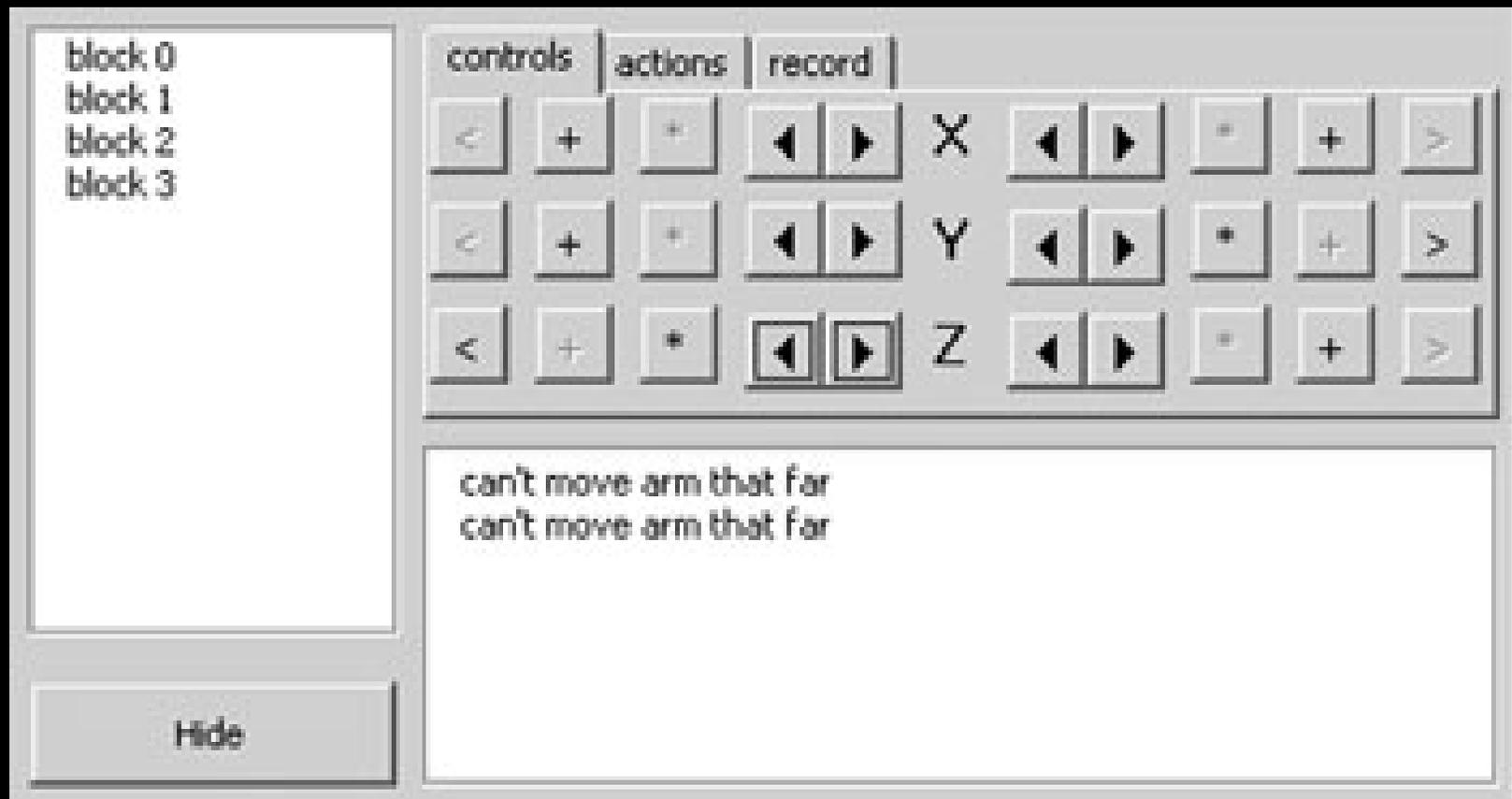
(1) states and transitions

transitions created with control panel by extending and retracting arms of one block at a time



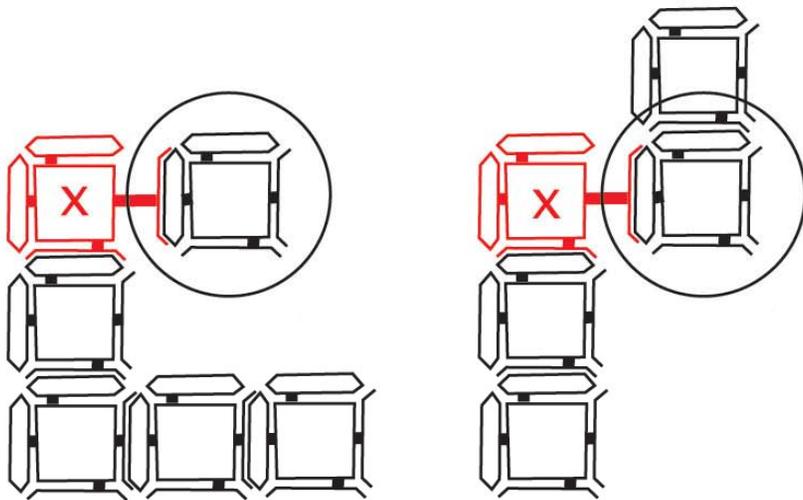
(2a) model DOF constraints of block

controls map to possible movements

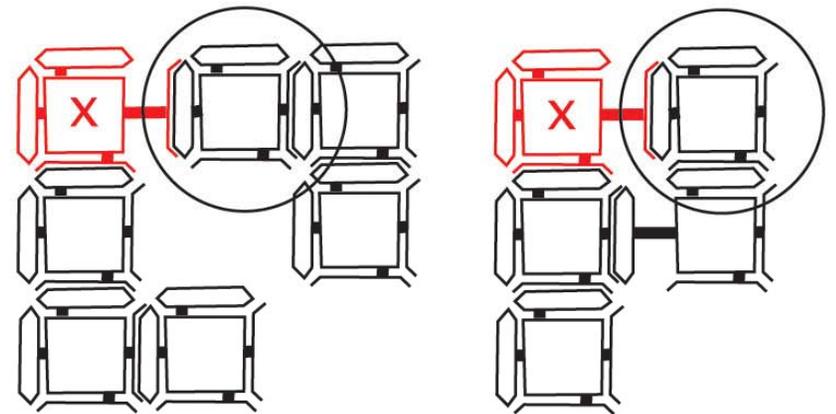


(2b) model topology constraints of block

block freedom condition constrains the topology of configurations



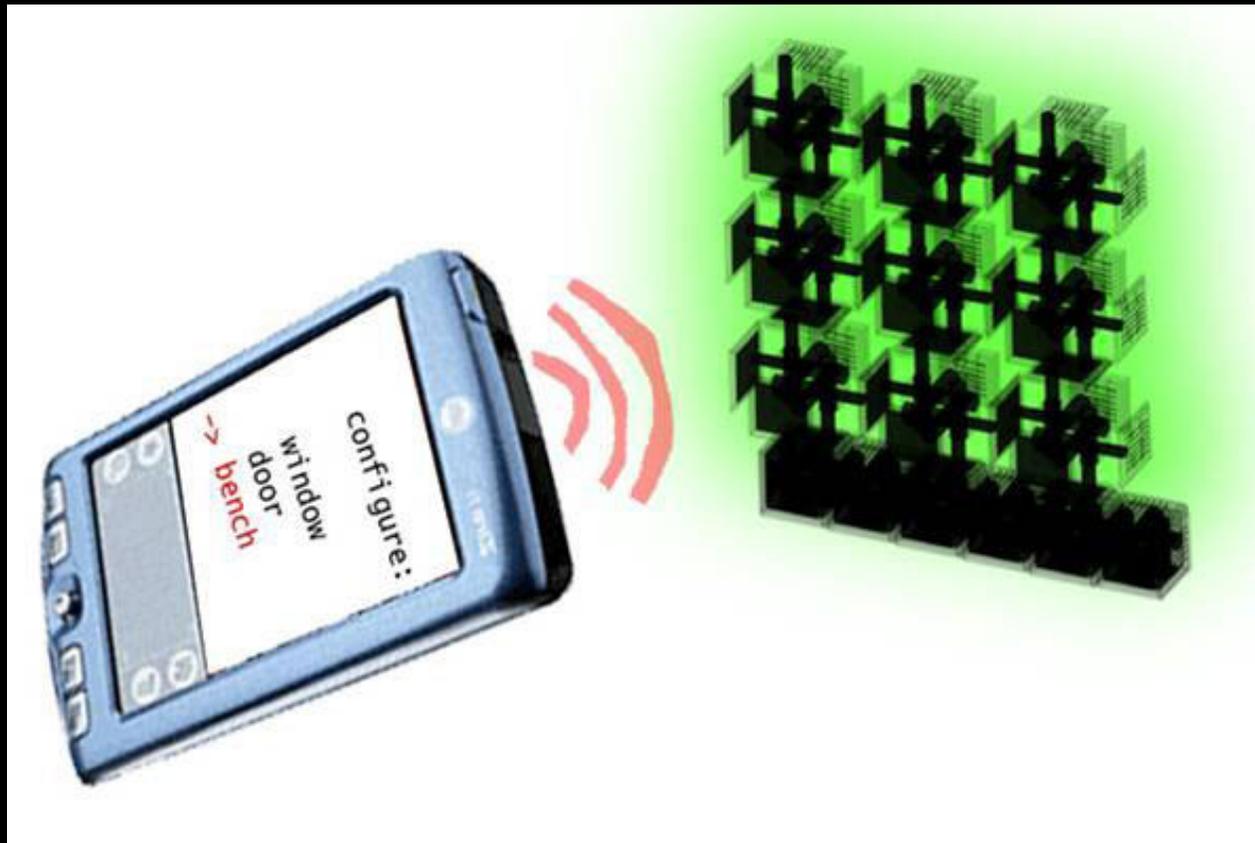
free



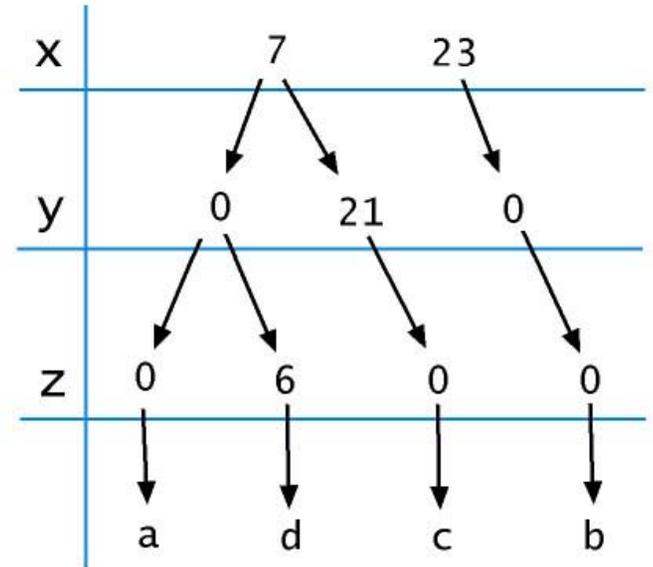
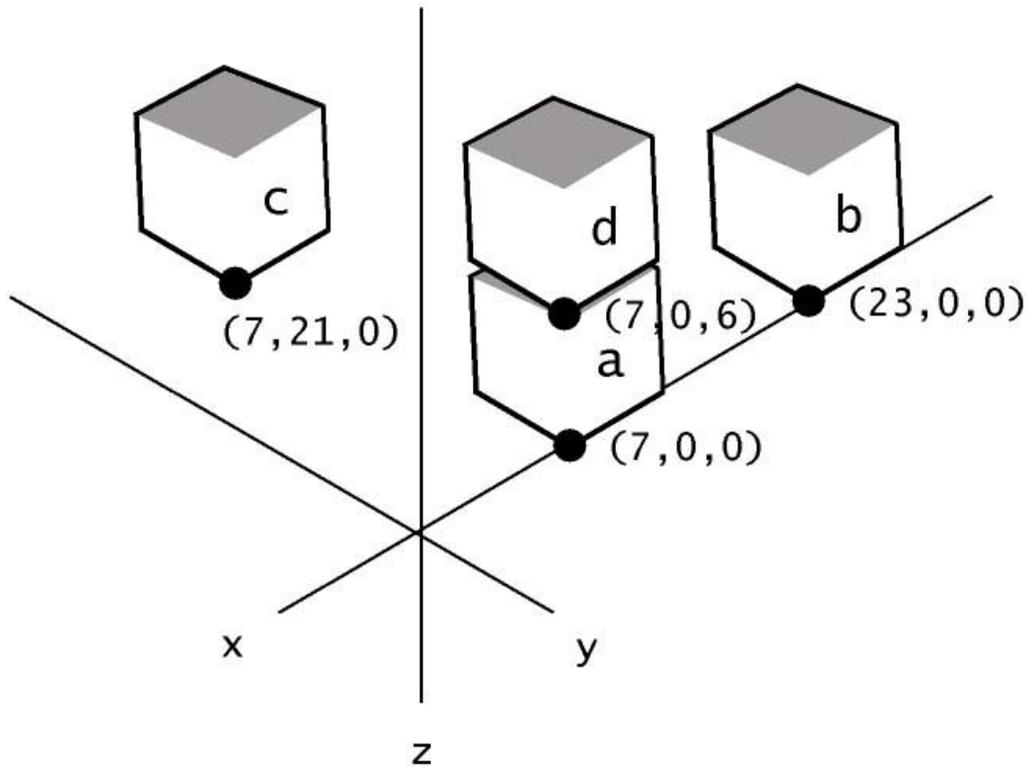
not free

(3) block algorithms not construction docs

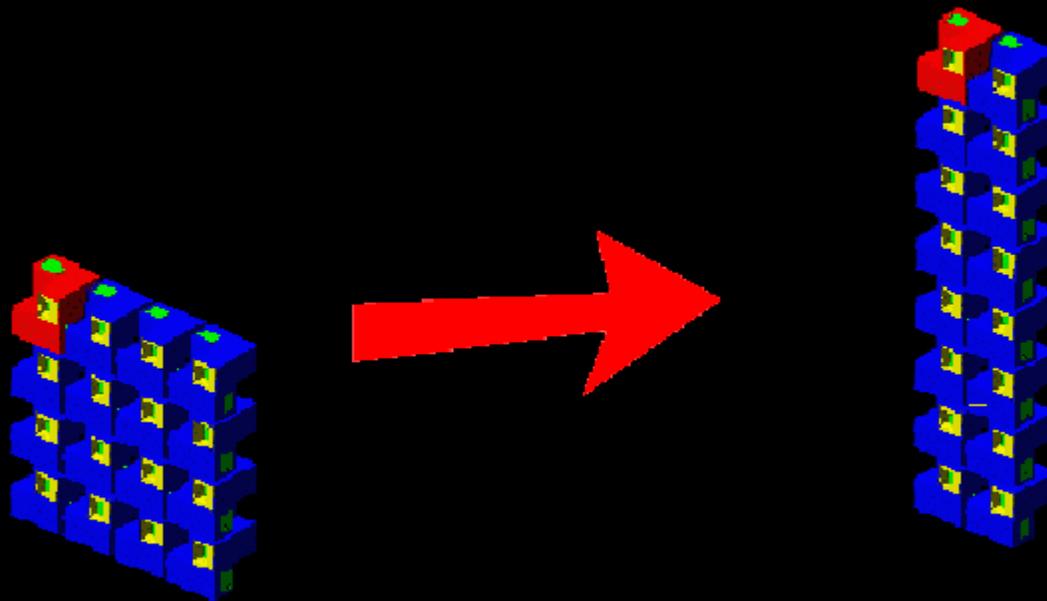
transitions can be recorded and could be played back on block modules

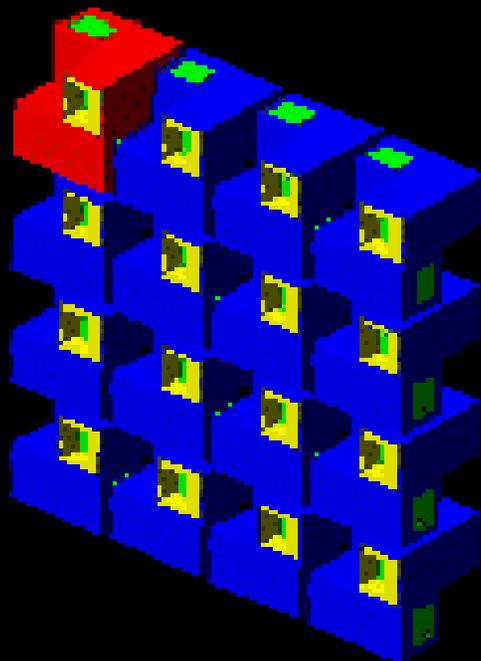


block position stored in x->y->z associative array structure

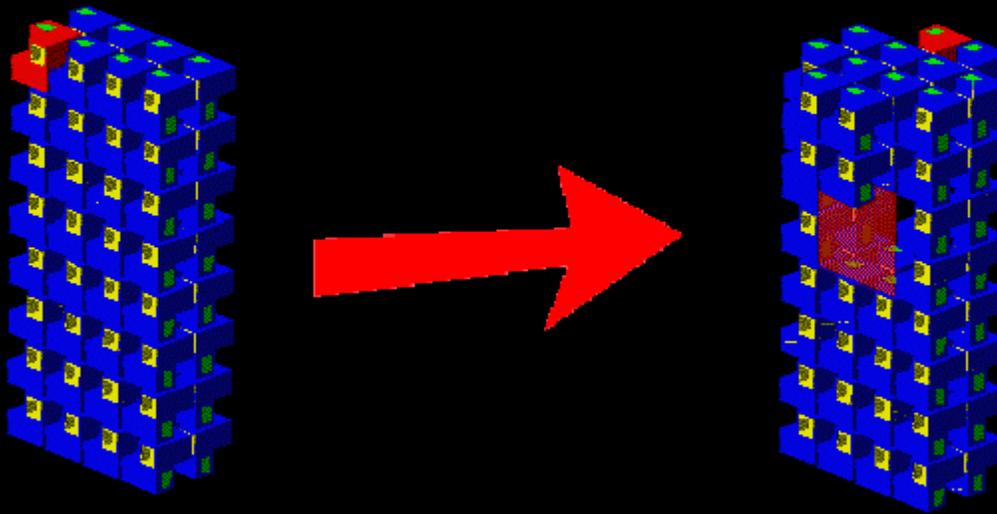


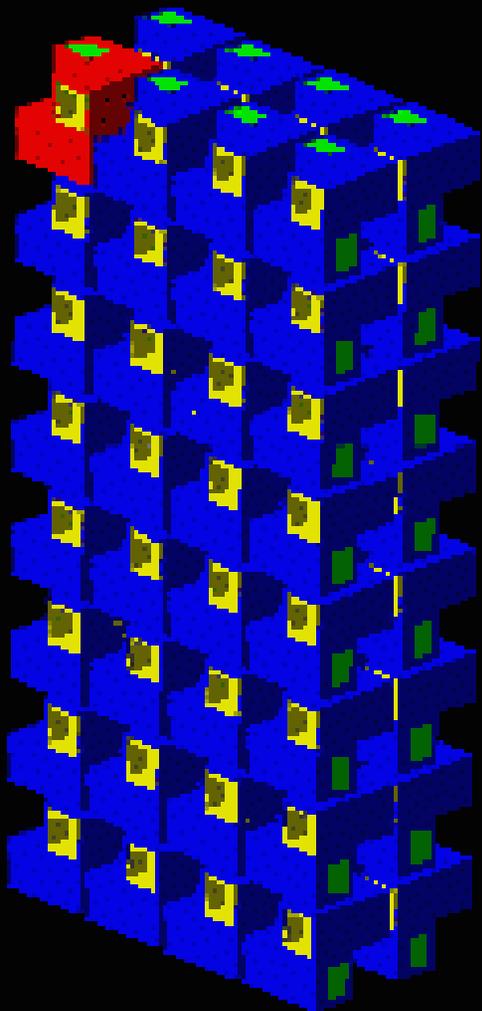
pallet to wall





wall to window





prototype blocks

future work

- set of blocks to run algorithms
- replace:
 - centralized push one block algorithm
 - + distributed solve for ruleset algorithm
- generate rulesets from state keyframes
- create tools to edit generated rulesets