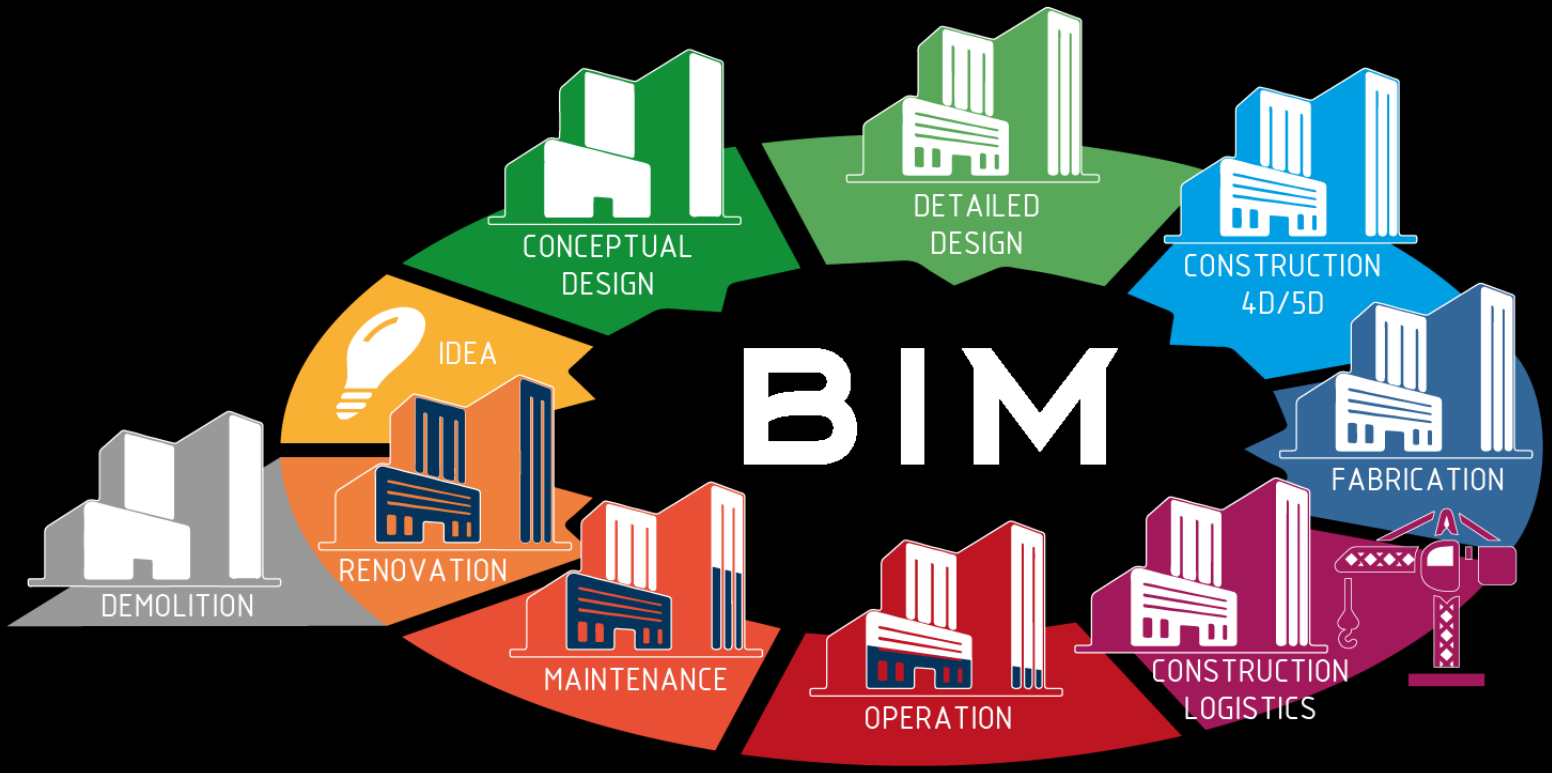
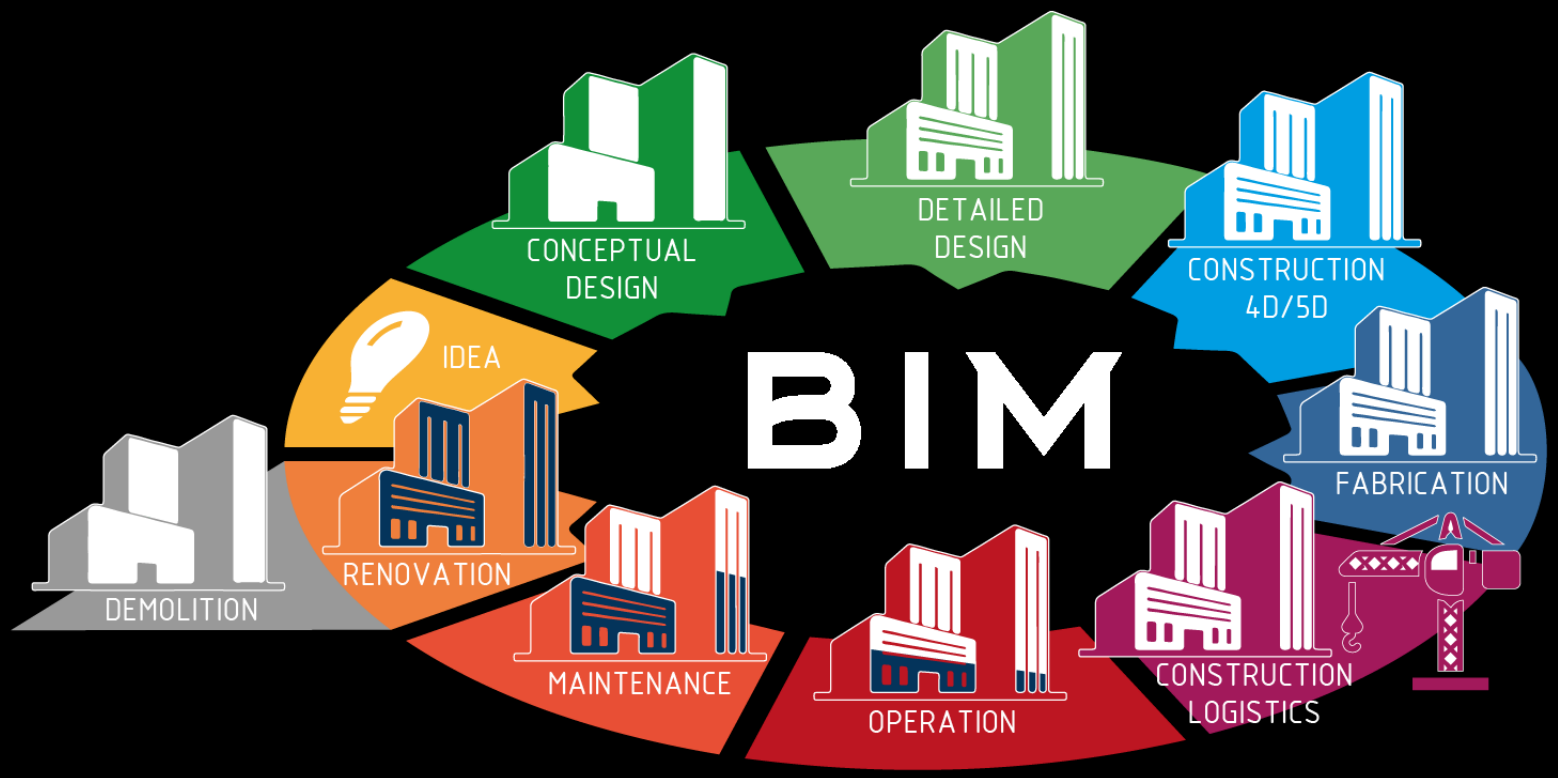
COLLABORATIVE ALGORITHMIC-BASED BUILDING INFORMATION MODELLING

SOFIA FEIST | BRUNO FERREIRA | ANTÓNIO MENEZES LEITÃO

ALGORITHMIC DESIGN



Original source: kokorosot.info/



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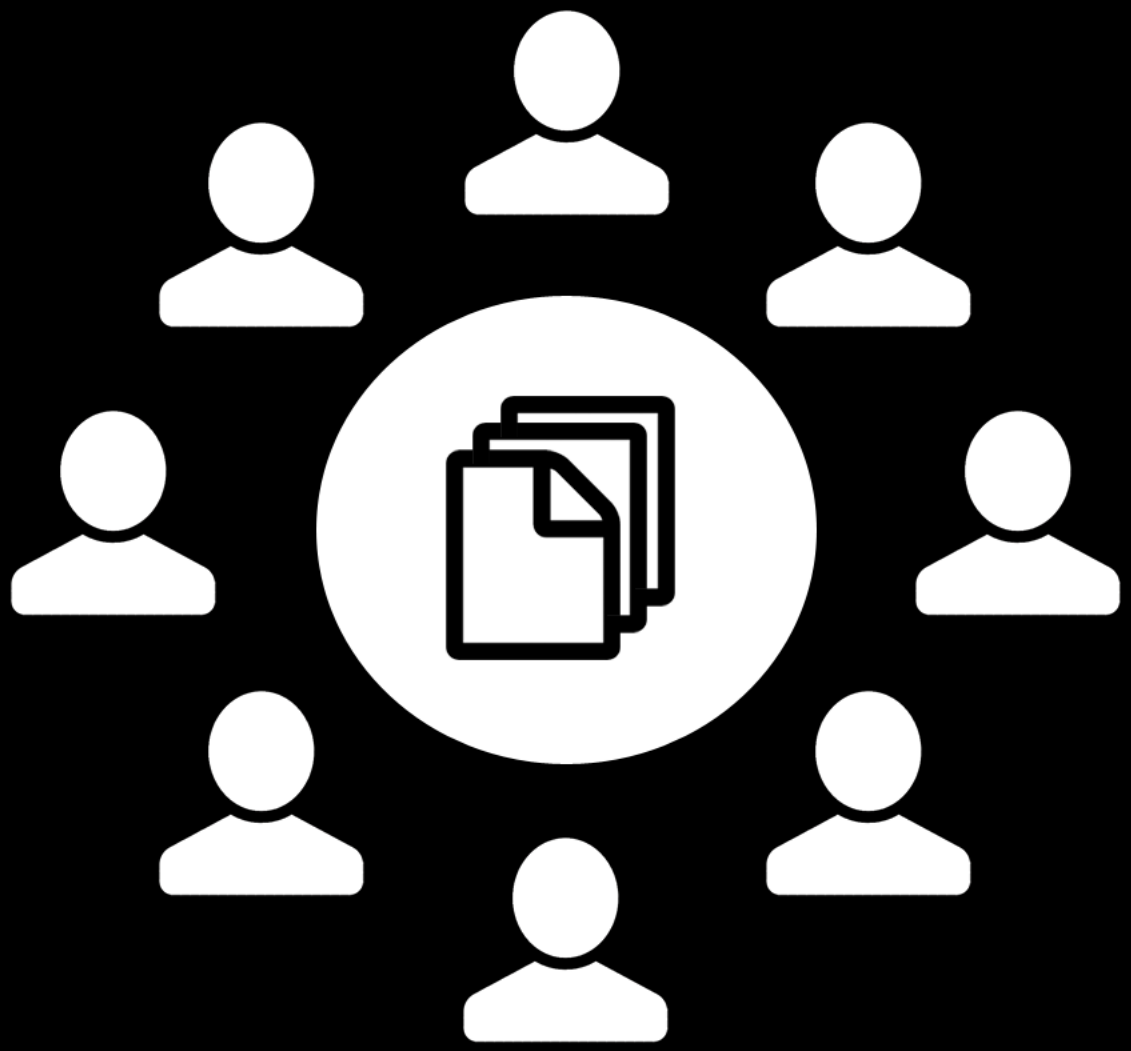


DEVELOPMENT OF COLLABORATIVE PROJECTS

AUTODESK VAULT

TRIMBLE CONNECT

VERSION CONTROL TOOLS

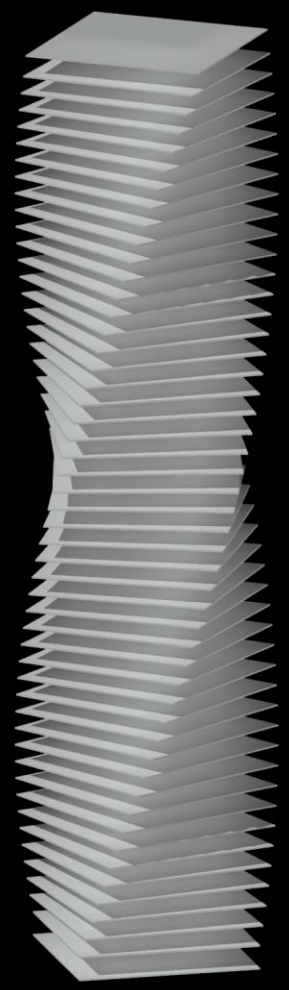
CODE-RELATED VERSION CONTROL

Absolute World Towers
MAD Architects

CASE STUDY

SCENARIO 1: PURSUING DEVELOPMENT OPPORTUNITIES

ORIGINAL SCRIPT



EXPERIMENT 1

SCENARIO 1: PURSUING DEVELOPMENT OPPORTUNITIES

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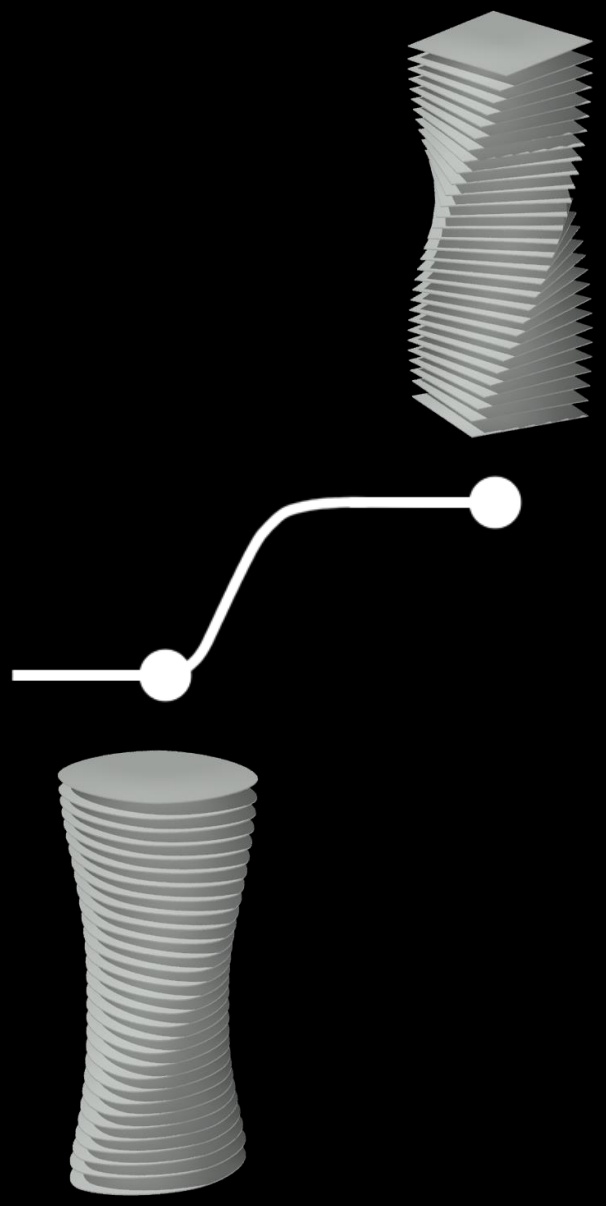

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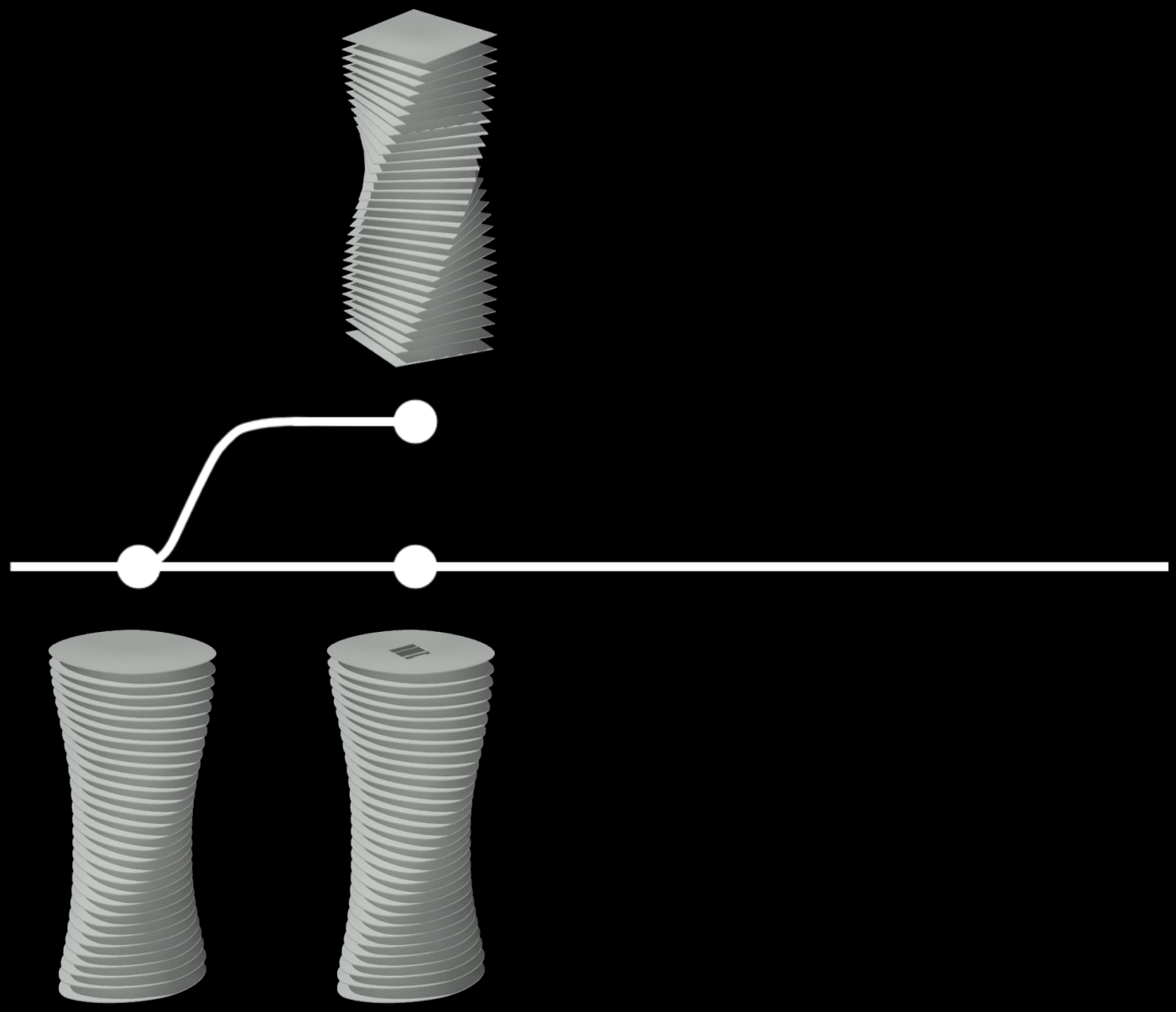

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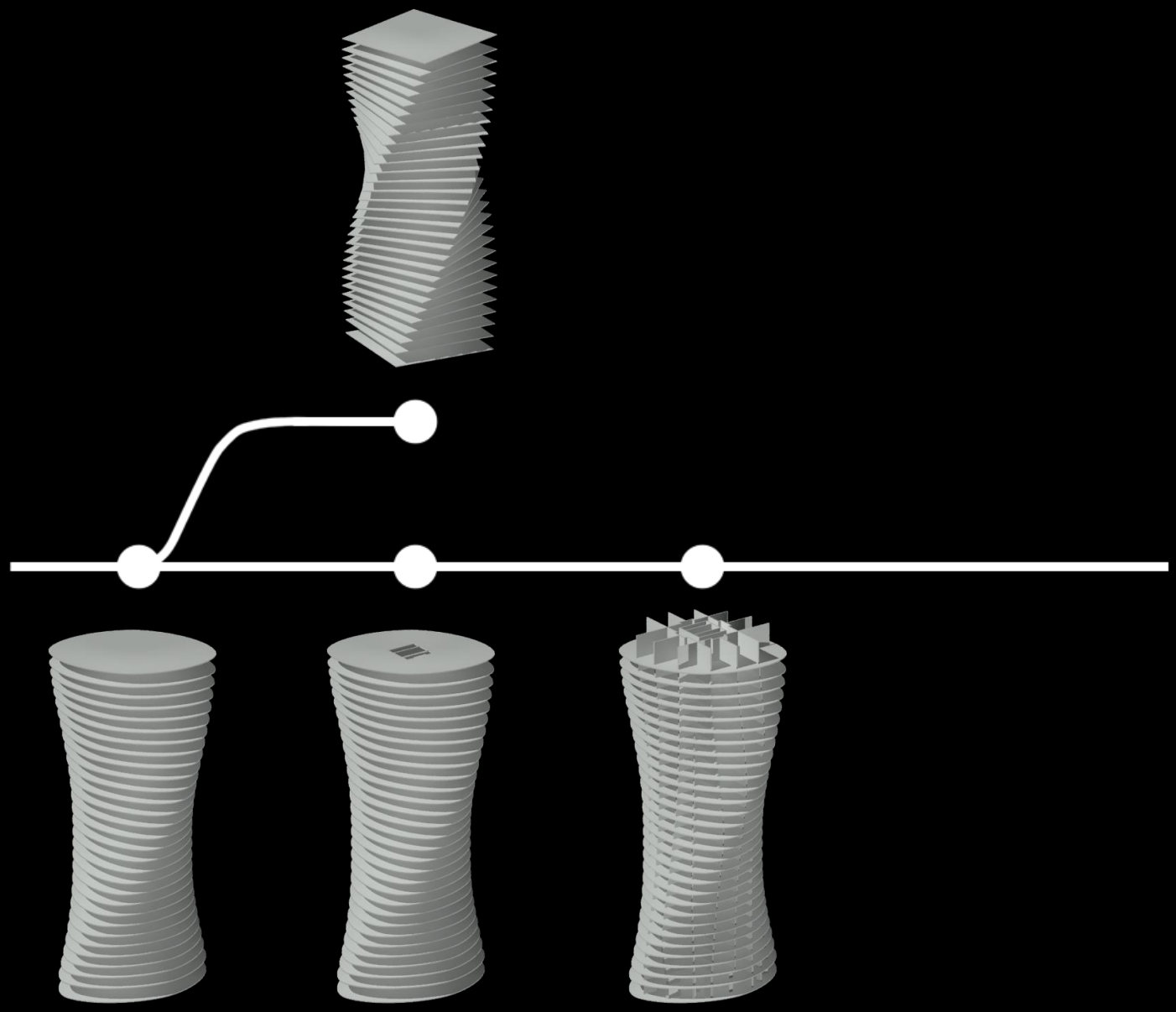

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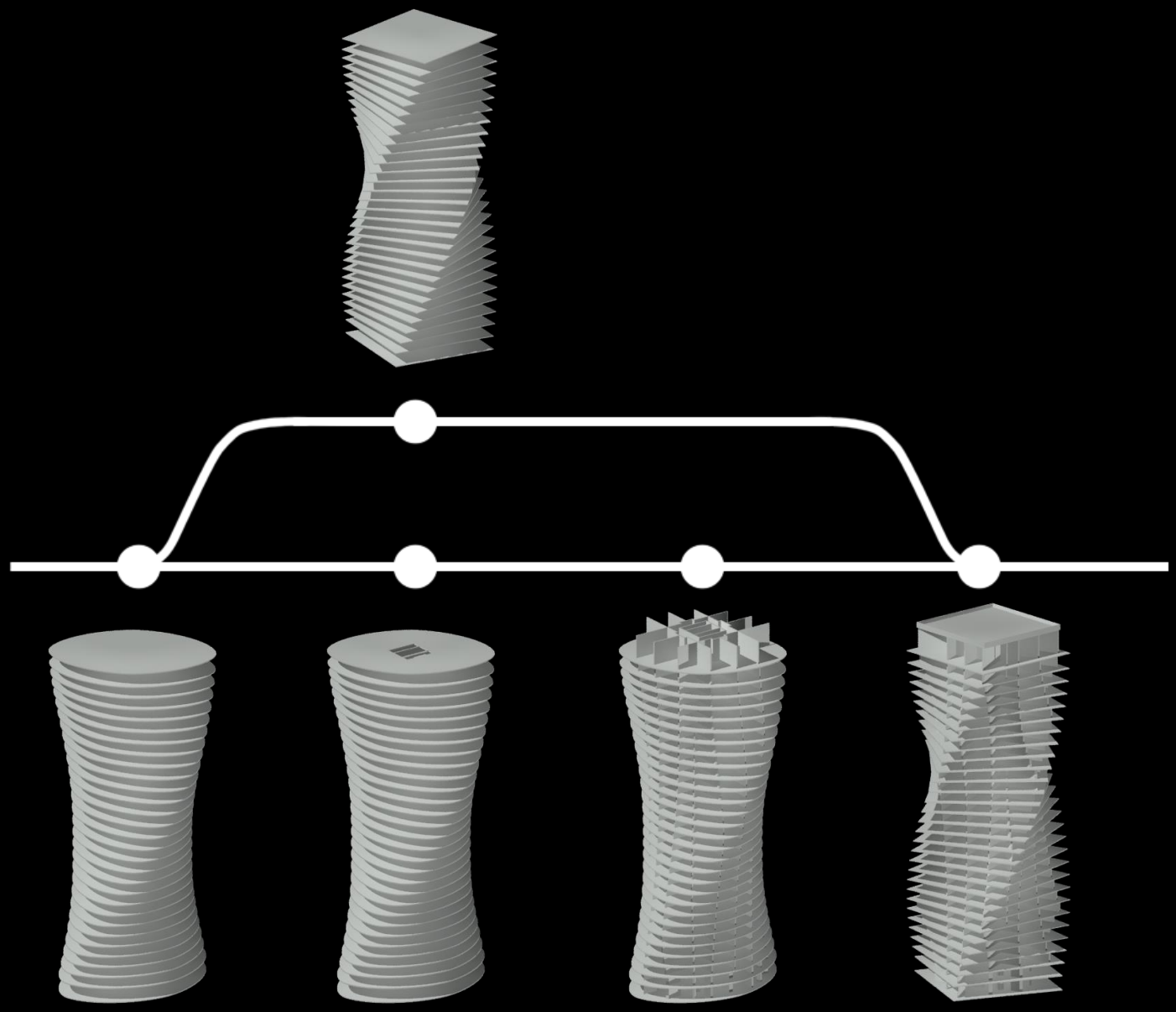

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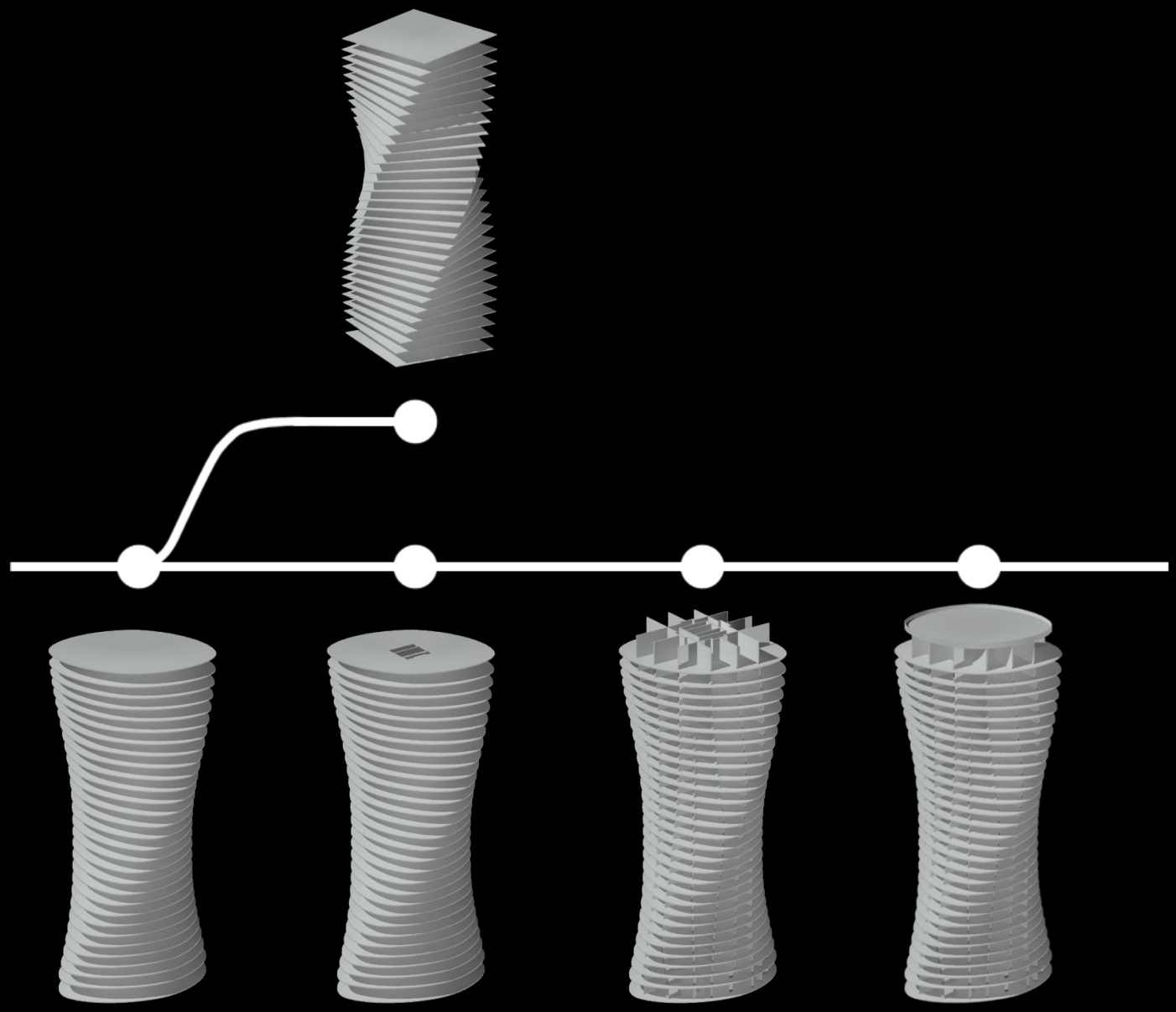
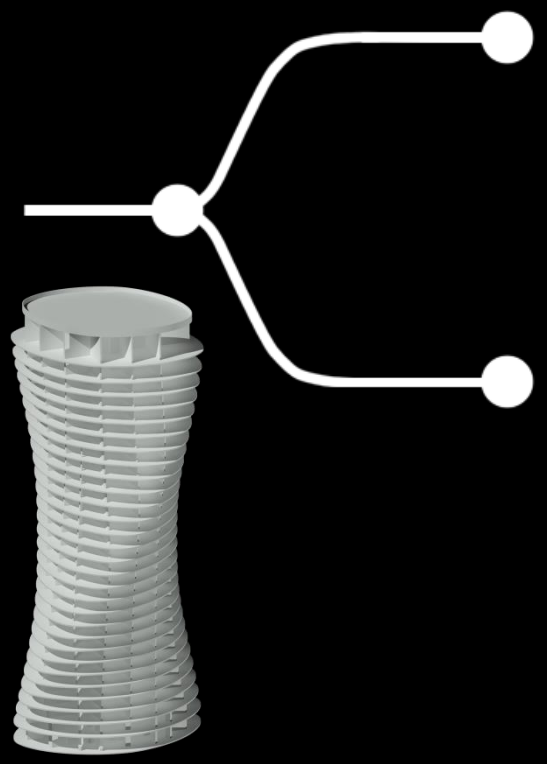


SCENARIO 1: PURSUING DEVELOPMENT OPPORTUNITIES

SCENARIO 2: FACILITATING CONCURRENT DEVELOPMENT



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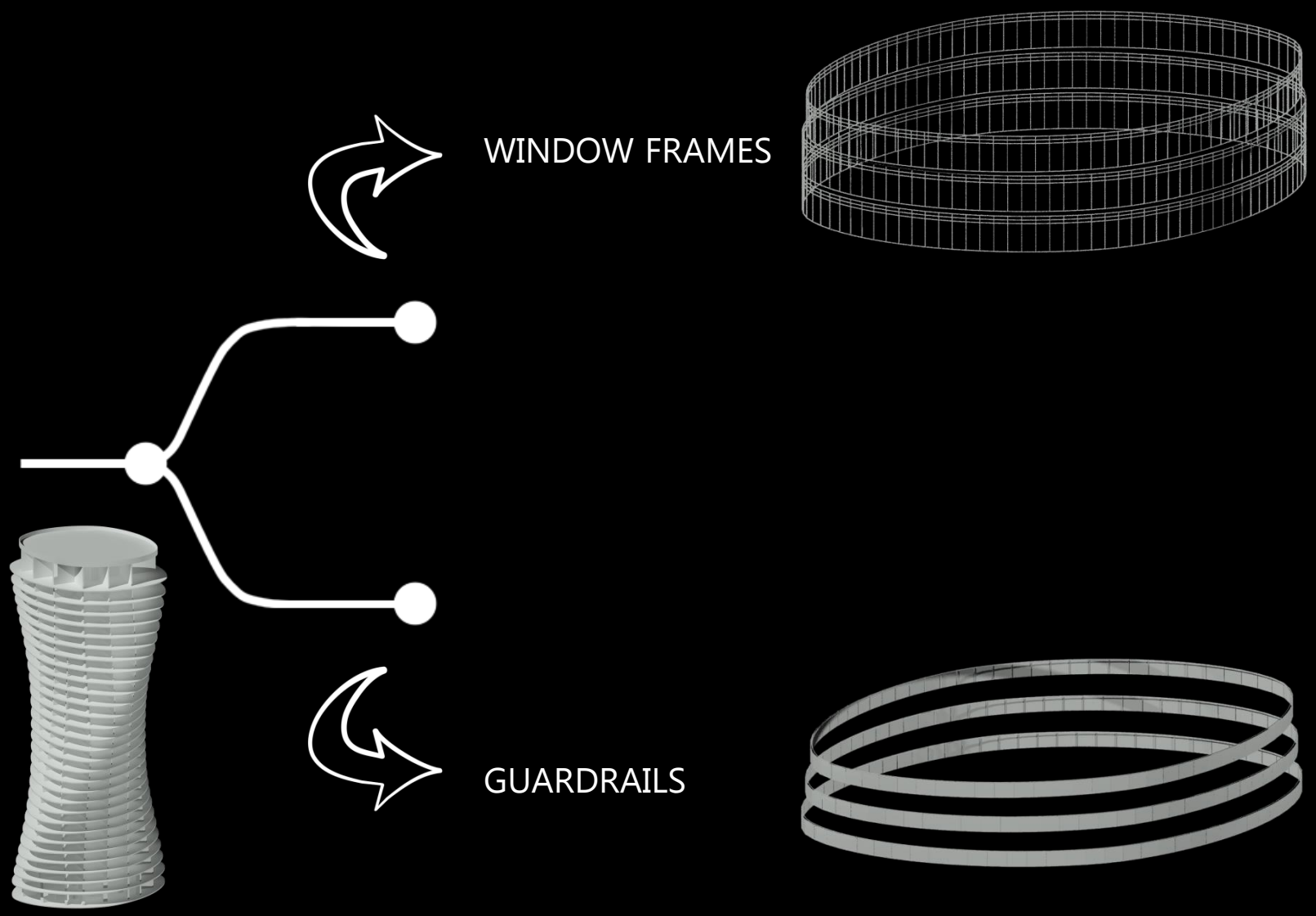

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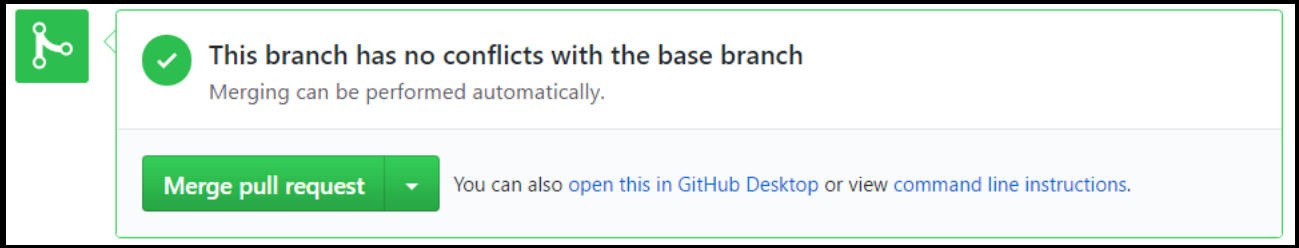

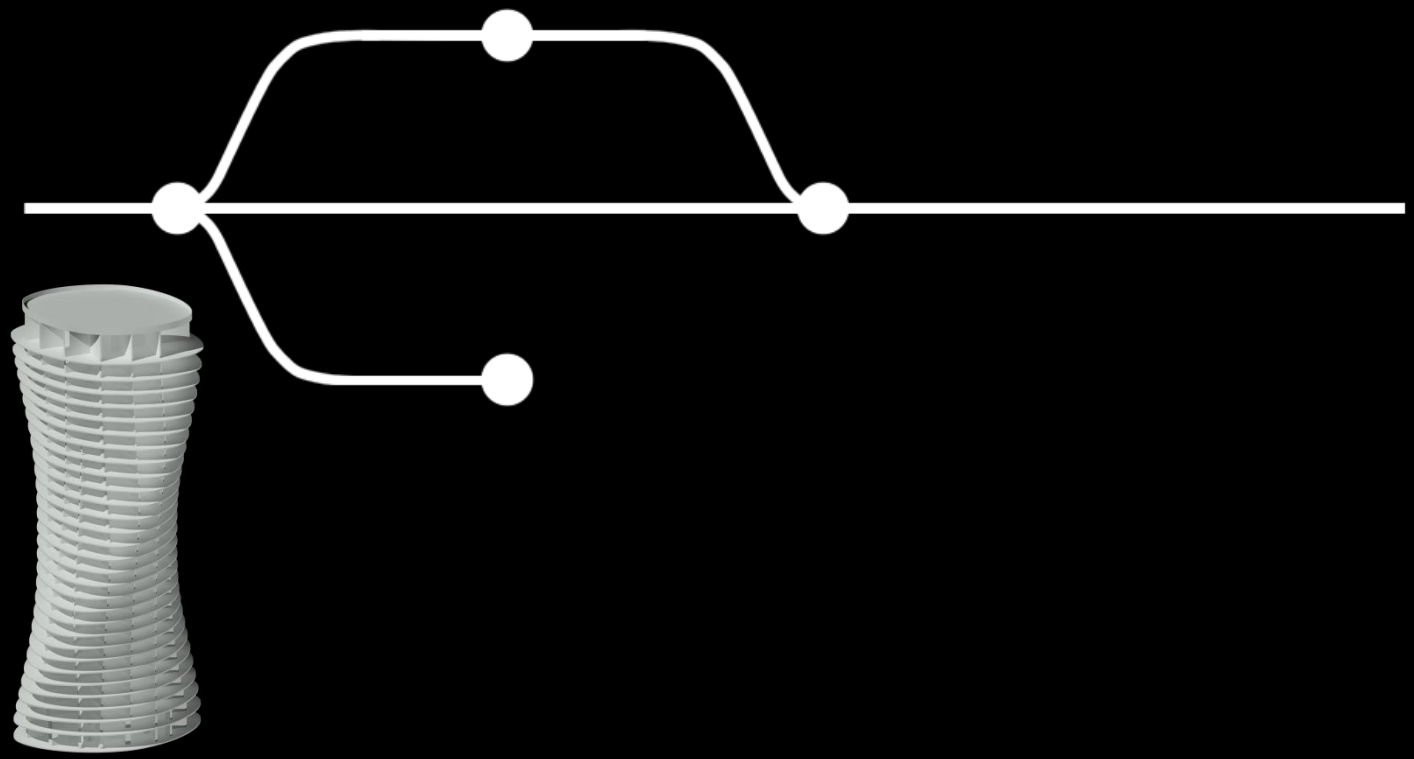

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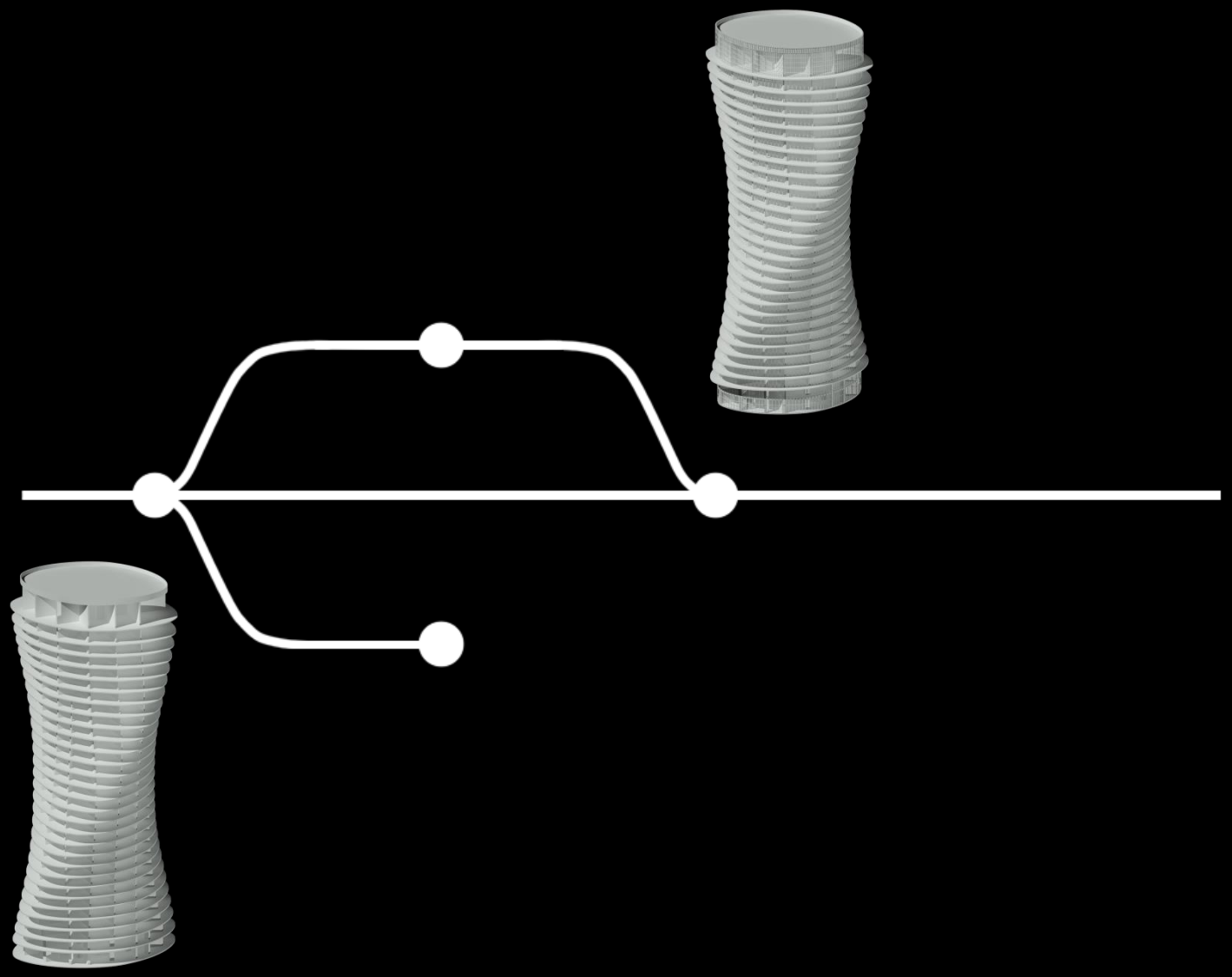

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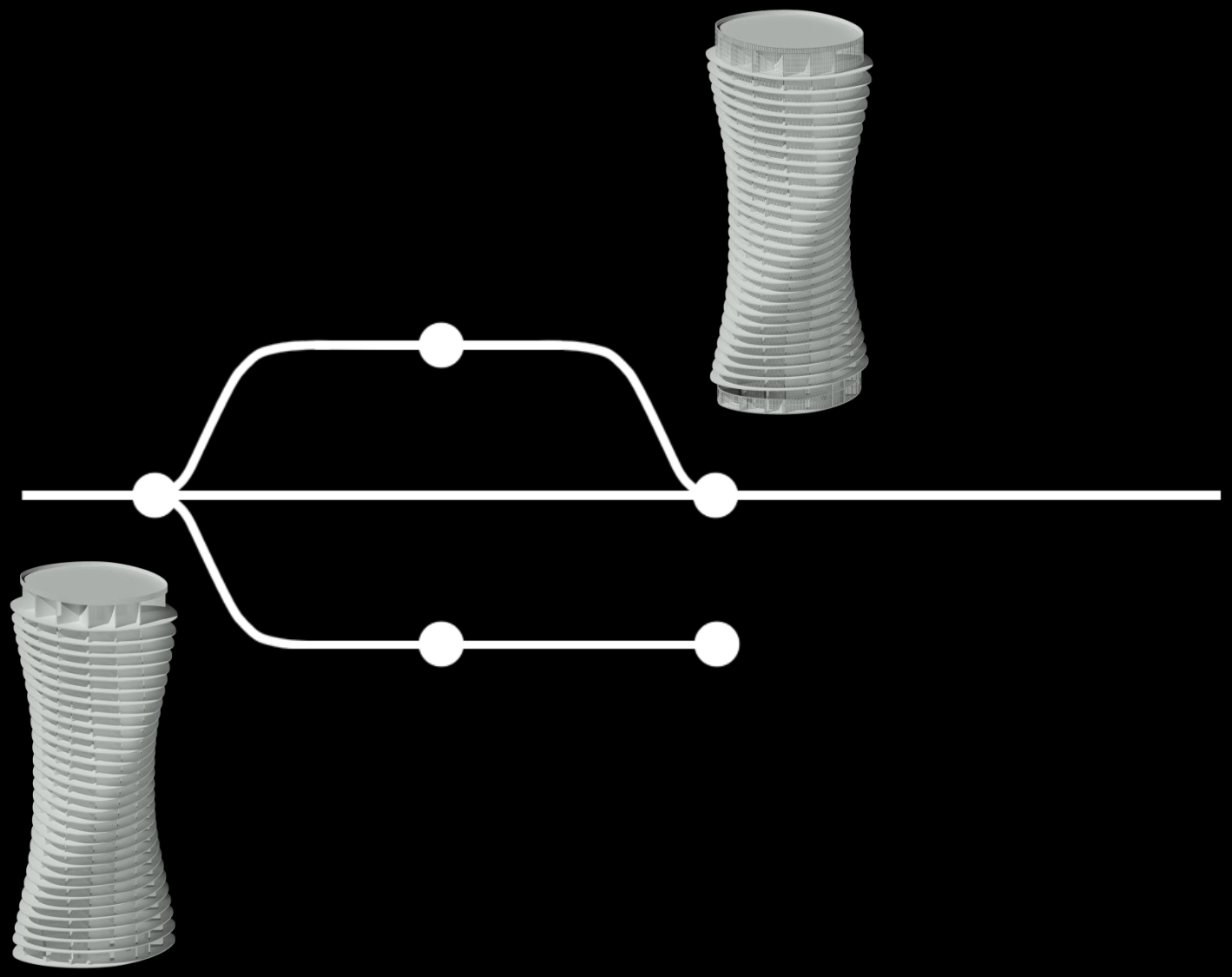

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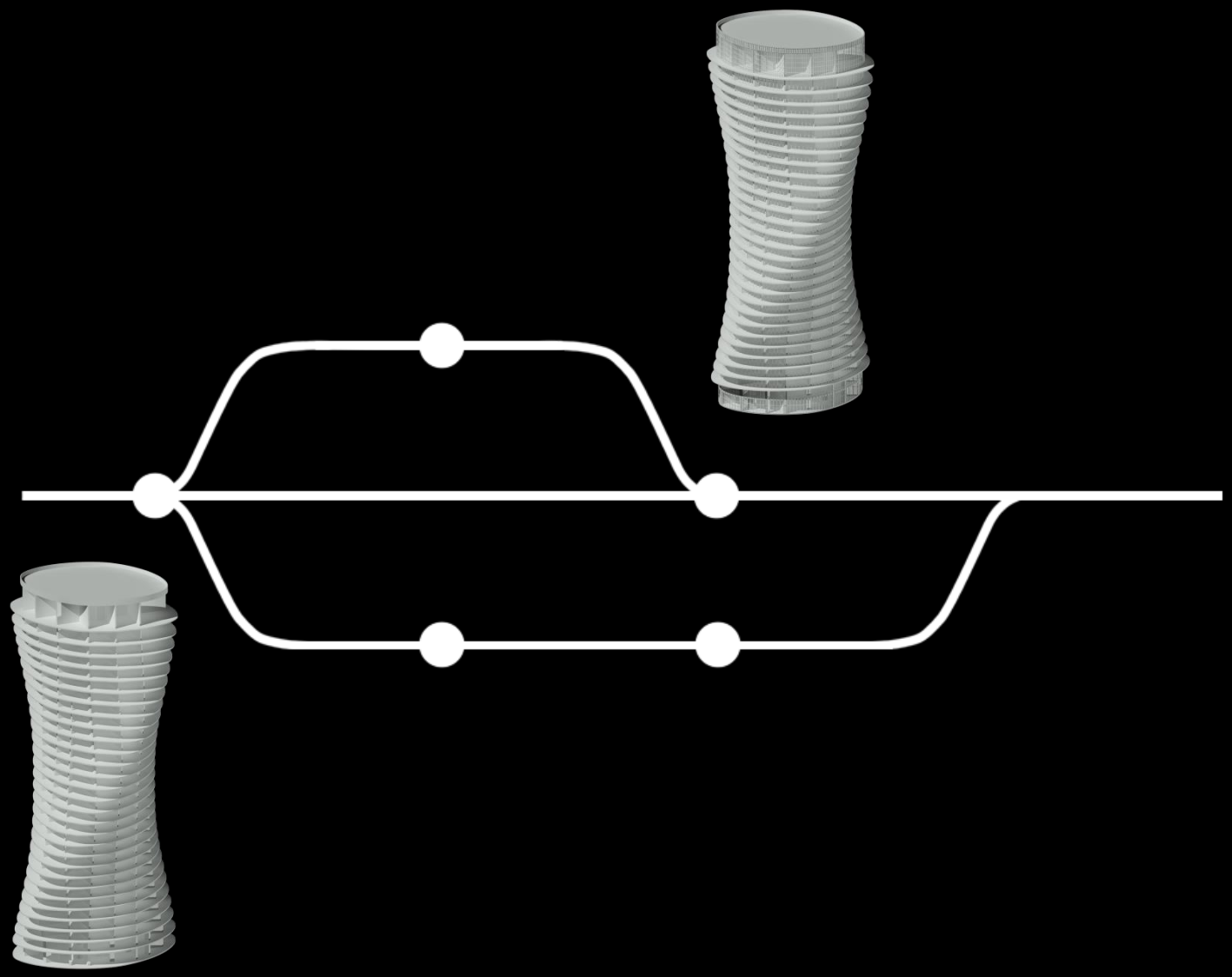

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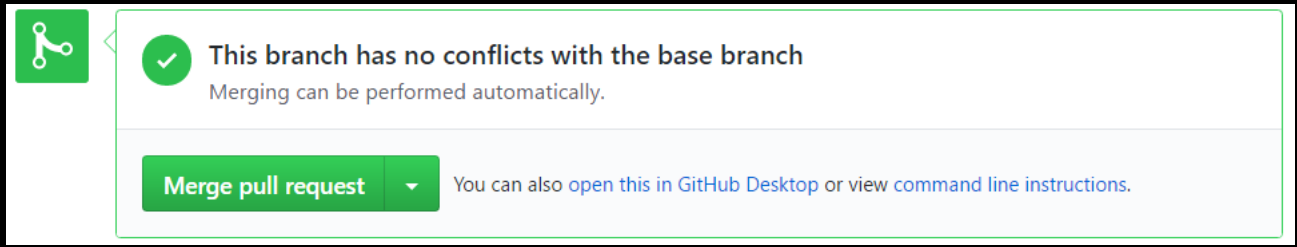

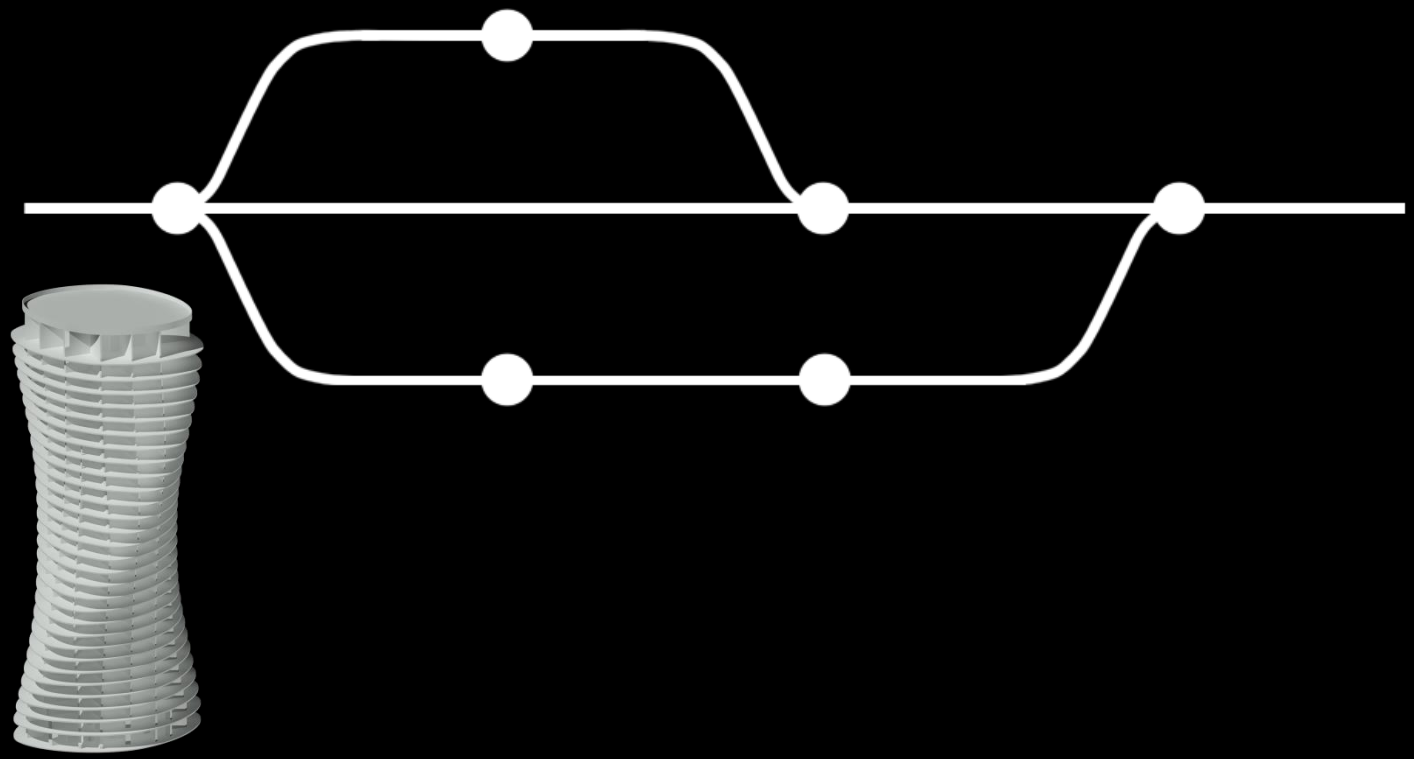

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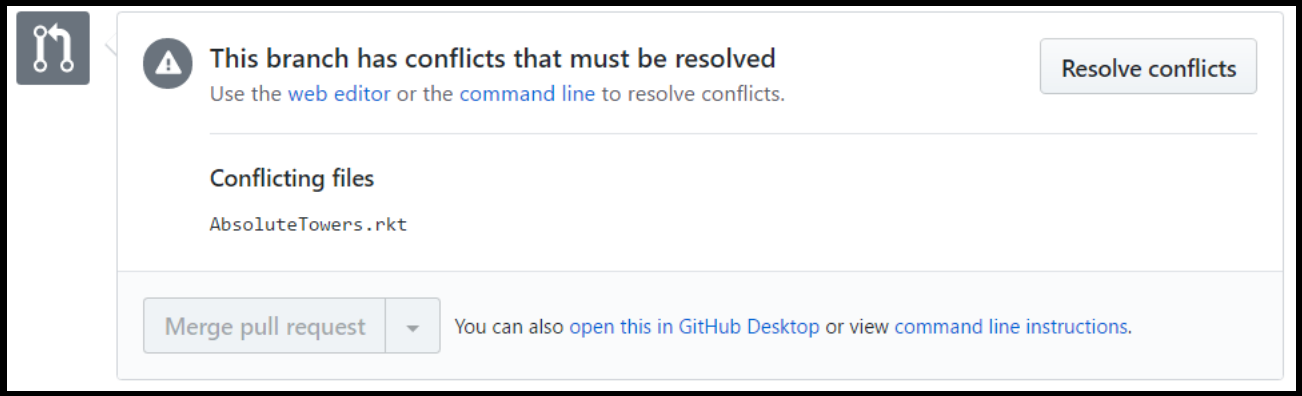
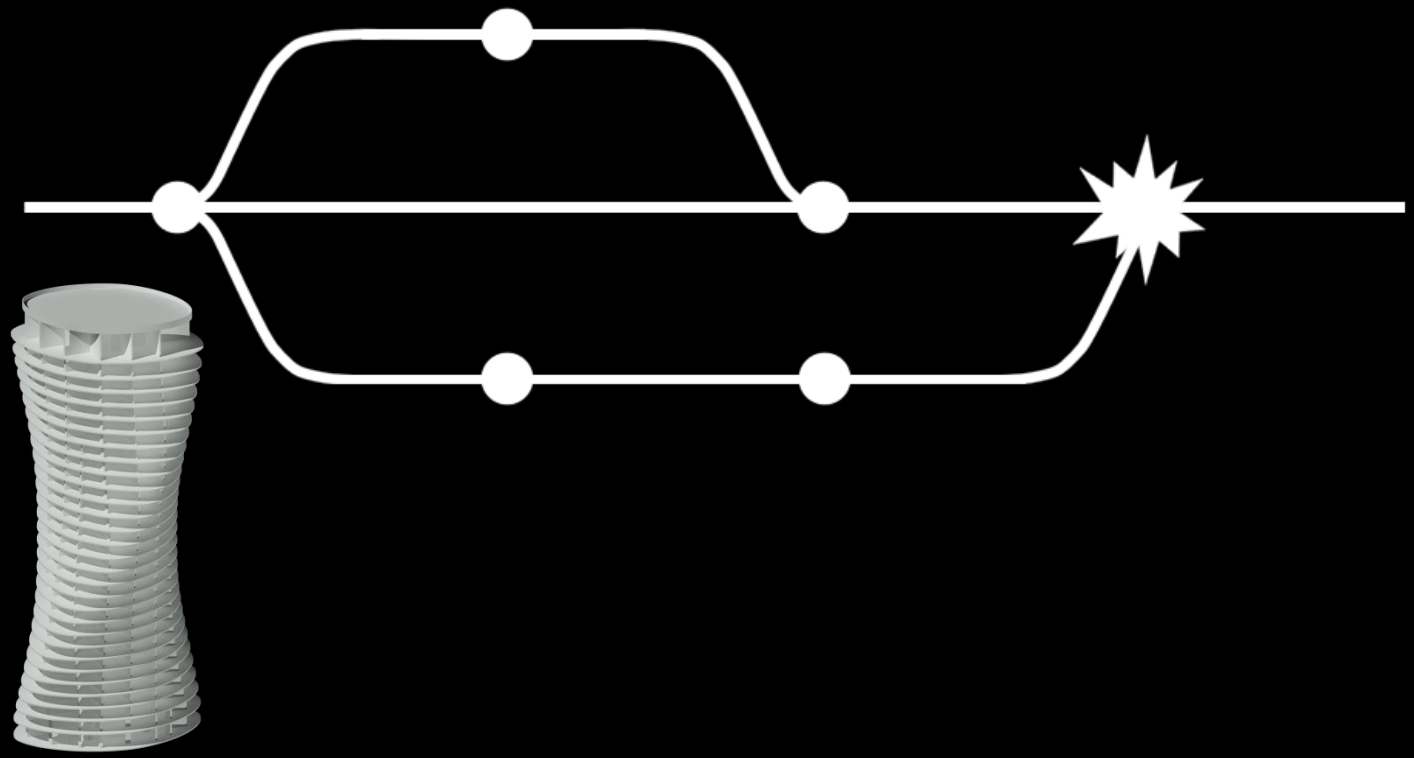
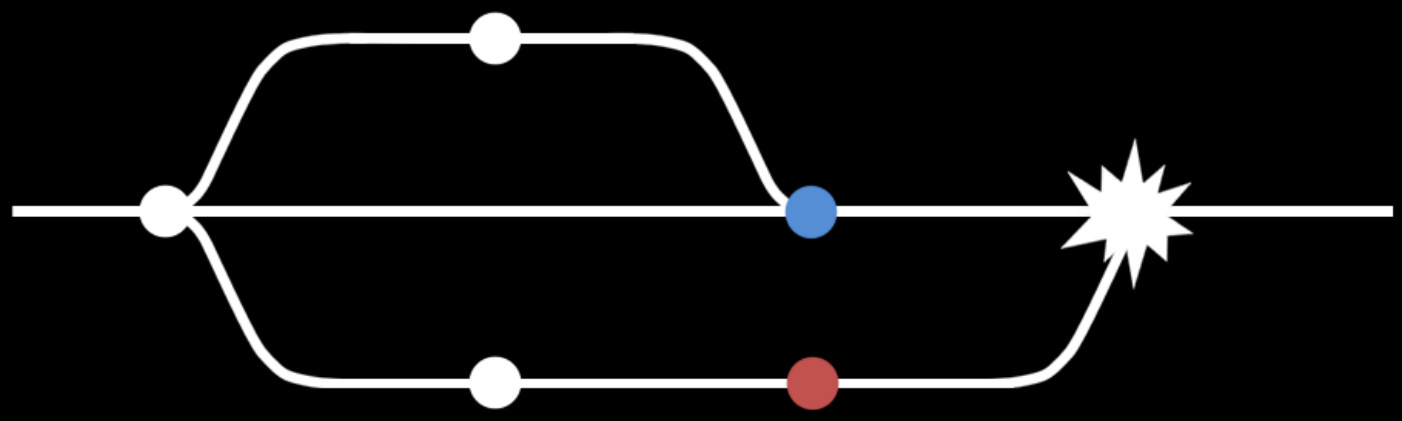




SCENARIO 3: RESOLVING CONFLICTING CHANGES

BRANCH: MASTER

```
guardrails = guardrail_glass(guardrail_shape, thickness, height, hs)
```



BRANCH: GUARDRAIL

```
guardrails = guardrail(guardrail_shape, rail, post, handrail, n_posts, h)
```

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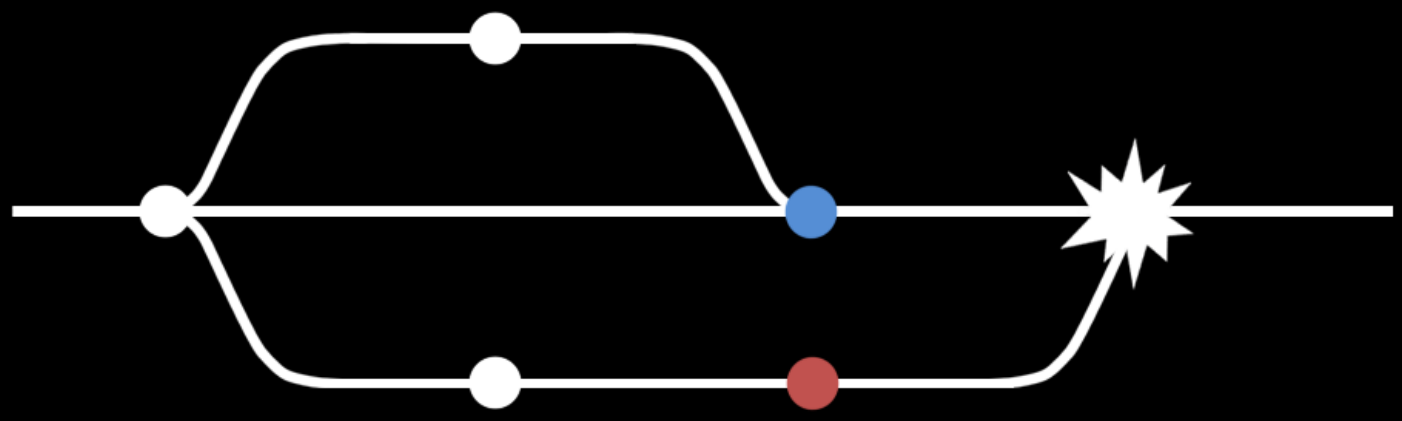

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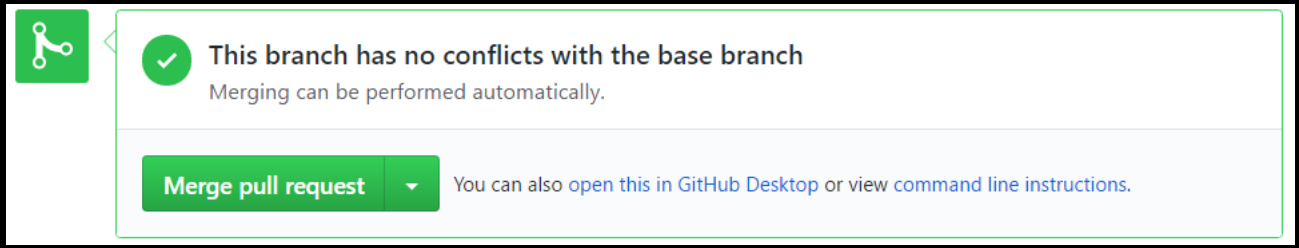

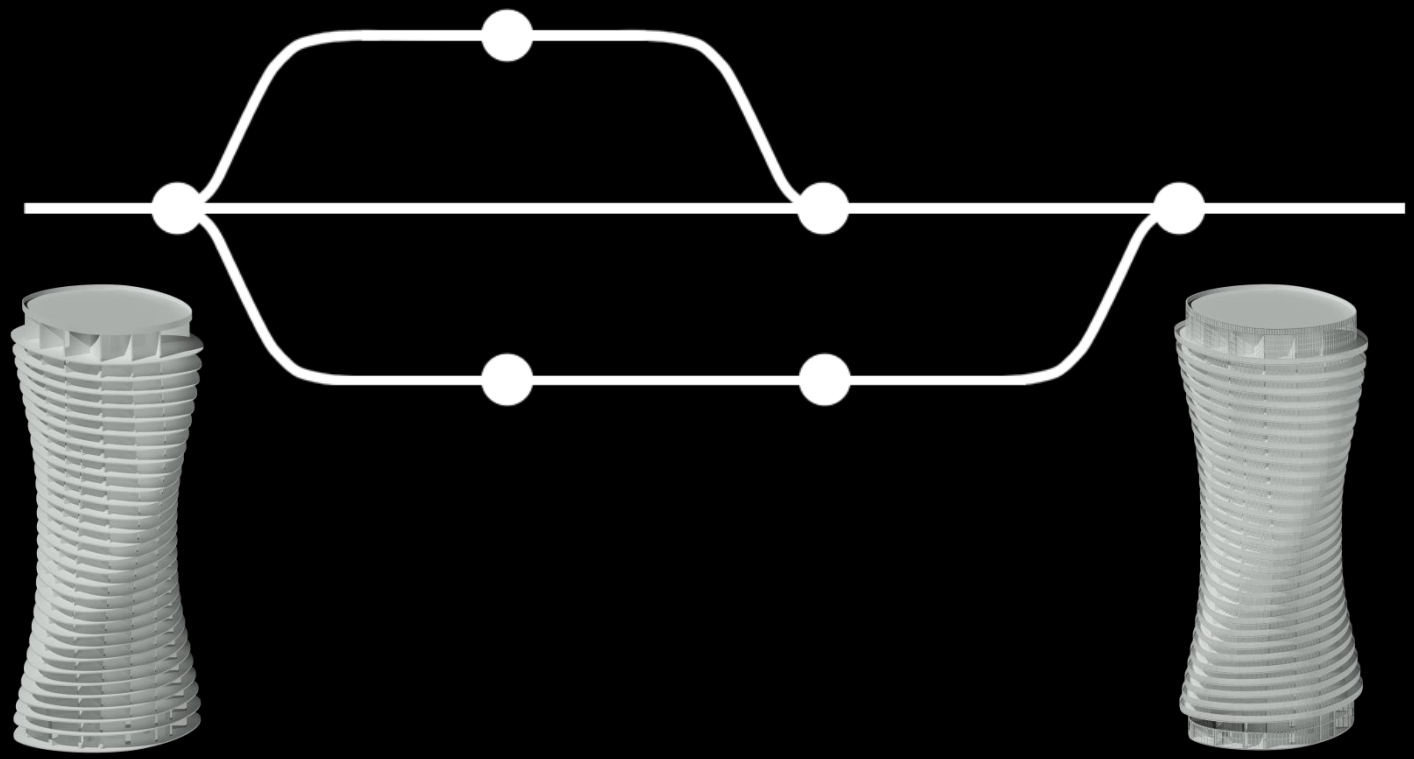

SCENARIO 3: RESOLVING CONFLICTING CHANGES

master | Changes | History | Pull request

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AbsoluteTowers

RosettaWeb

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master

Merge GuardrailDevelopment Branch into Master
16 minutes ago by Sofia Feist

Added Grid of the Walls of the Ground Floor
1 day ago by SofiaFeist

Walls update - MEP boxes
2 days ago by BrunoBFerreira

Added Roof Slab
5 days ago by SofiaFeist

Added guardrails
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Creation of the openings in both the slabs and the wa... 2
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Creation of the Slabs
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Added .gitattributes & .gitignore files

Merge GuardrailDevelopment Branch into Master

Sofia Feist 6d16940 GitHub Revert Collapse all

```
221  265                    #:interior-points interior-points
     266 +                  #:railing rail-shape
     267 +                  #:guardrail-post guardrail-post
     268 +                  #:handrail handrail-shape
222  269                    #:walls walls-grid
223  270                      ;;Distances
224  271                    #:distance-d [d 6.3]
225  272                    #:corridor-width [w-corridor 2.2]
226  273                    #:distance-d1 [d1 1.8]
     274 +                    ;;Number of Guardrail Posts
     275 +                  #:number-posts [n-posts 70]
227  276                      ;;Thicknesses
228  277                    #:slab-thickness [t-slab 0.3]
229  278                    #:roof-slab-thickness [t-roof-slab 0.5]
...  ...  @@ -240,7 +289,7 @@
240  289      (union (slab (interior-shape height) (- t-roof-slab))
241  290             (sweep (closed-spline (interior-points height))
242  291                    (surface-rectangle (x 0) t-parapet (* t-roof-slab 2)))))
243       -  (define guardrails (map (lambda (h) (guardrail-glass (guardrail-shape h) glass-thickness 1))
     292 +  (define guardrails (map (lambda (h) (guardrail C (guardrail-shape h) rail-shape guardrail-post handrail-
            shape n-posts))
244  293                                (cdr hs)))
245  294    (define walls
246  295      (begin
...  ...  @@ -279,6 +328,9 @@
279  328                                (define p (rotate-z (+c C (cyl 0 0 h))
280  329                                                    (rotation-angle h)))
281  330                                (points-superellipse p 18.5 13.6 1.75 50))
     331 +                #:railing (lambda (pt1 pt2) (right-cuboid (+y pt1 0.65) 0.005 1.3 (+y pt2 0.65)))
     332 +                #:guardrail-post (lambda (p) (cylinder p 0.02 (+y p 1.3)))
     333 +                #:handrail (surface-circle (x 0) 0.03)
282  334                  #:walls (lambda (lower-h upper-h) (grid-typical-floor (+z C lower-h) 6.3 2.2 1.8 13.6 0.3
                          upper-h))
283  335                  #:building-height 9
284  336                  #:number-of-floors 3))
```

SCENARIO 3: RESOLVING CONFLICTING CHANGES

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228  277                    #:slab-thickness [t-slab 0.3]
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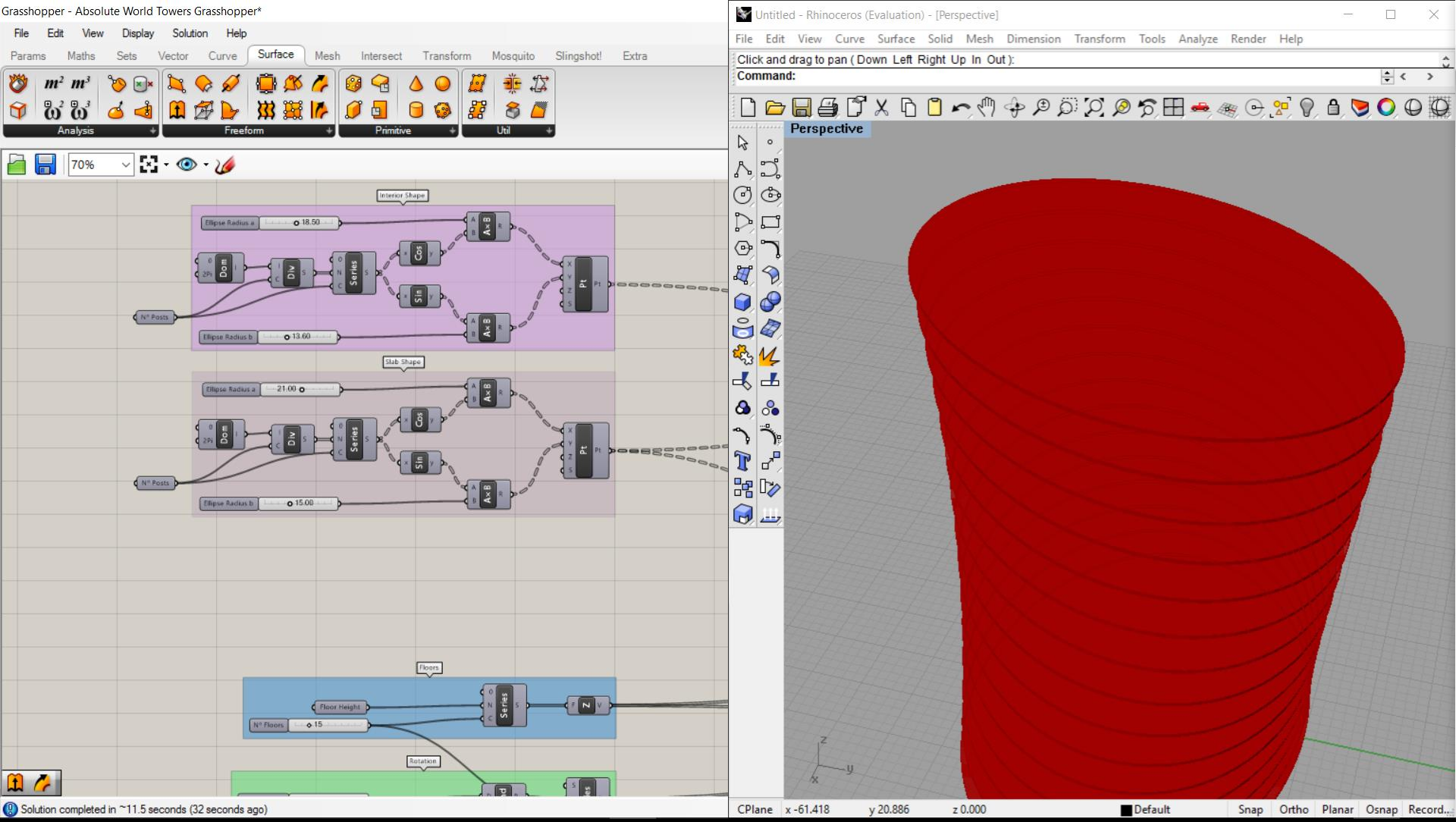
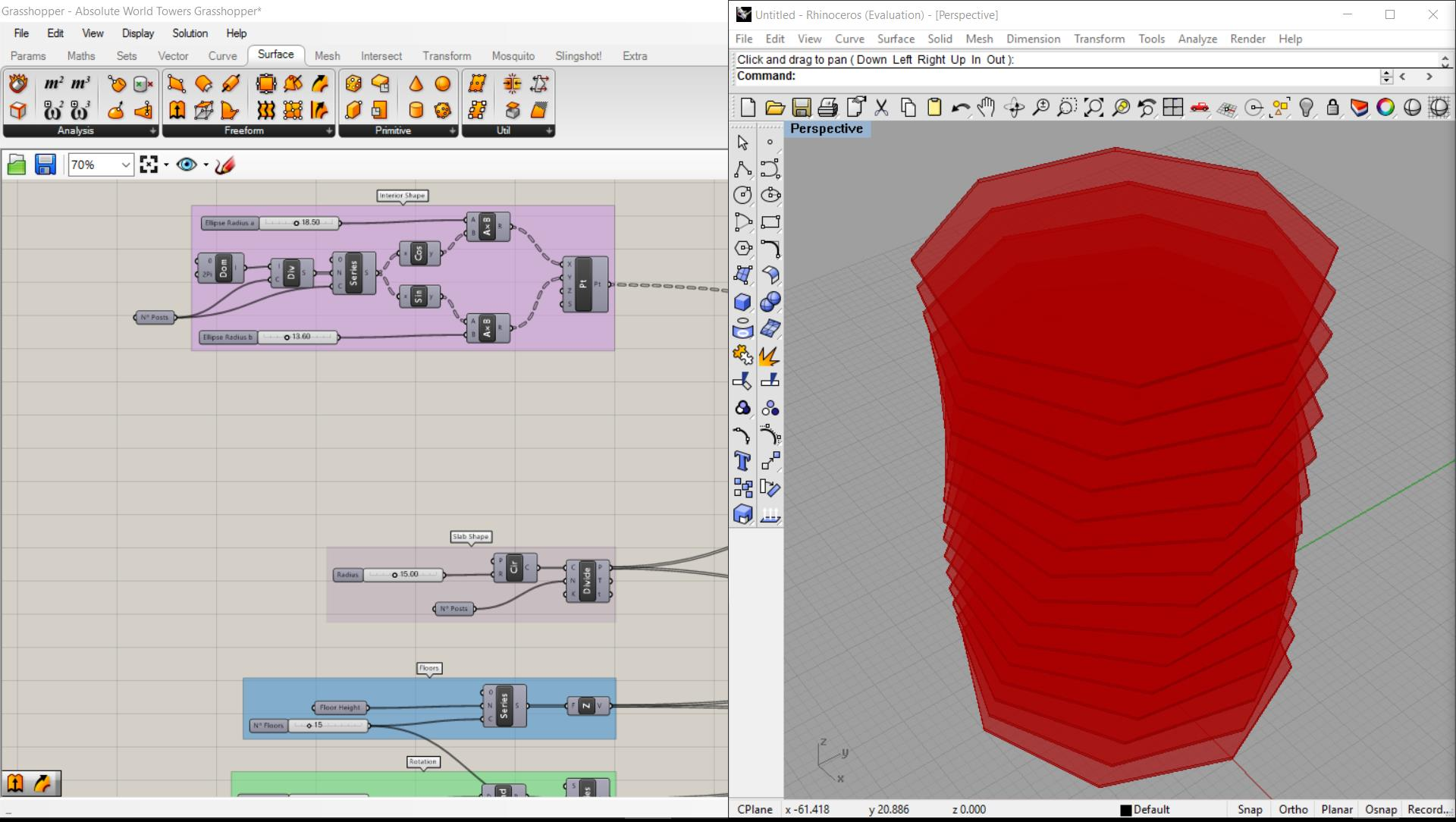


FUTURE WORK: VC FOR VISUAL PROGRAMMING LANGUAGES



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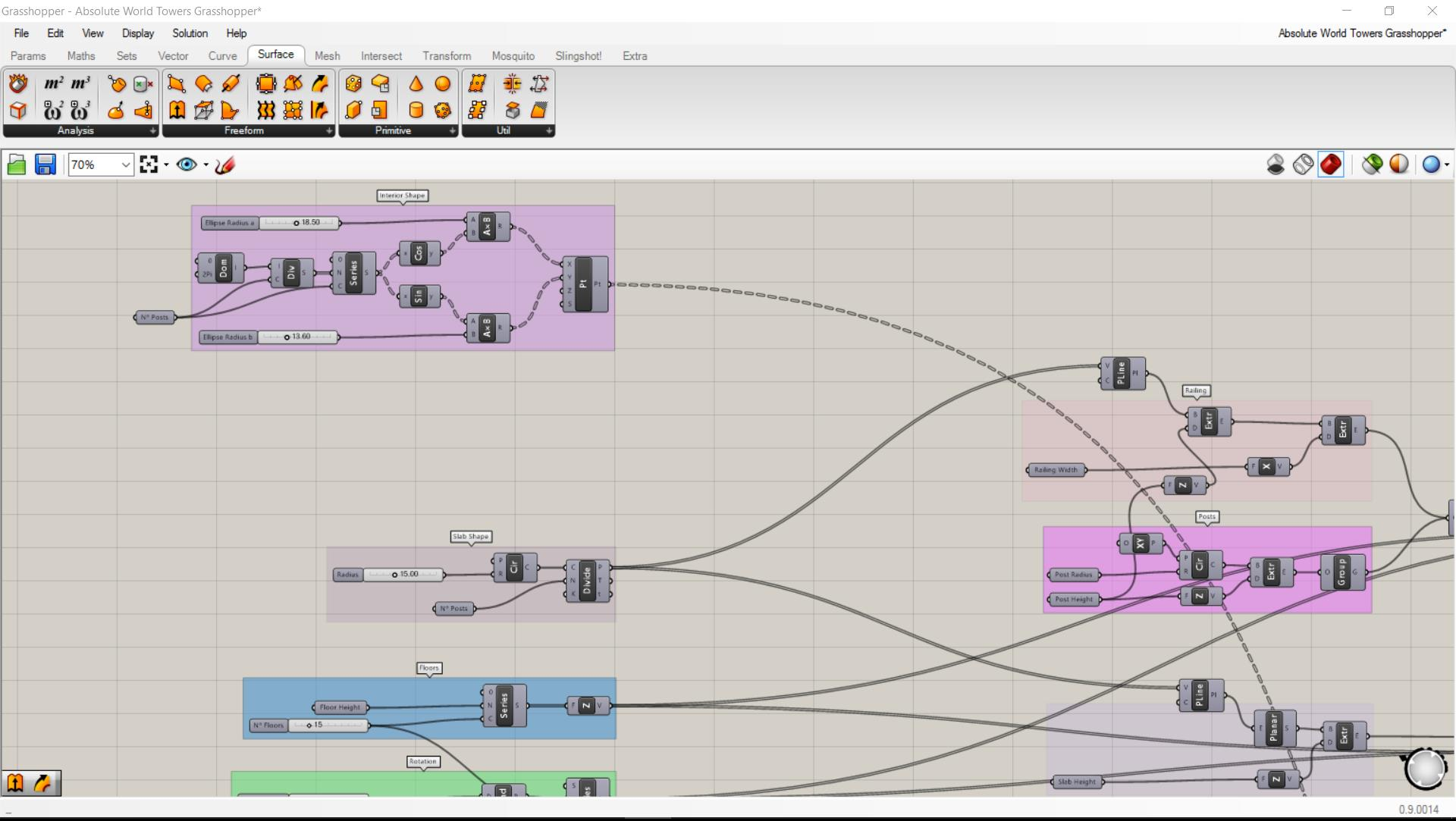

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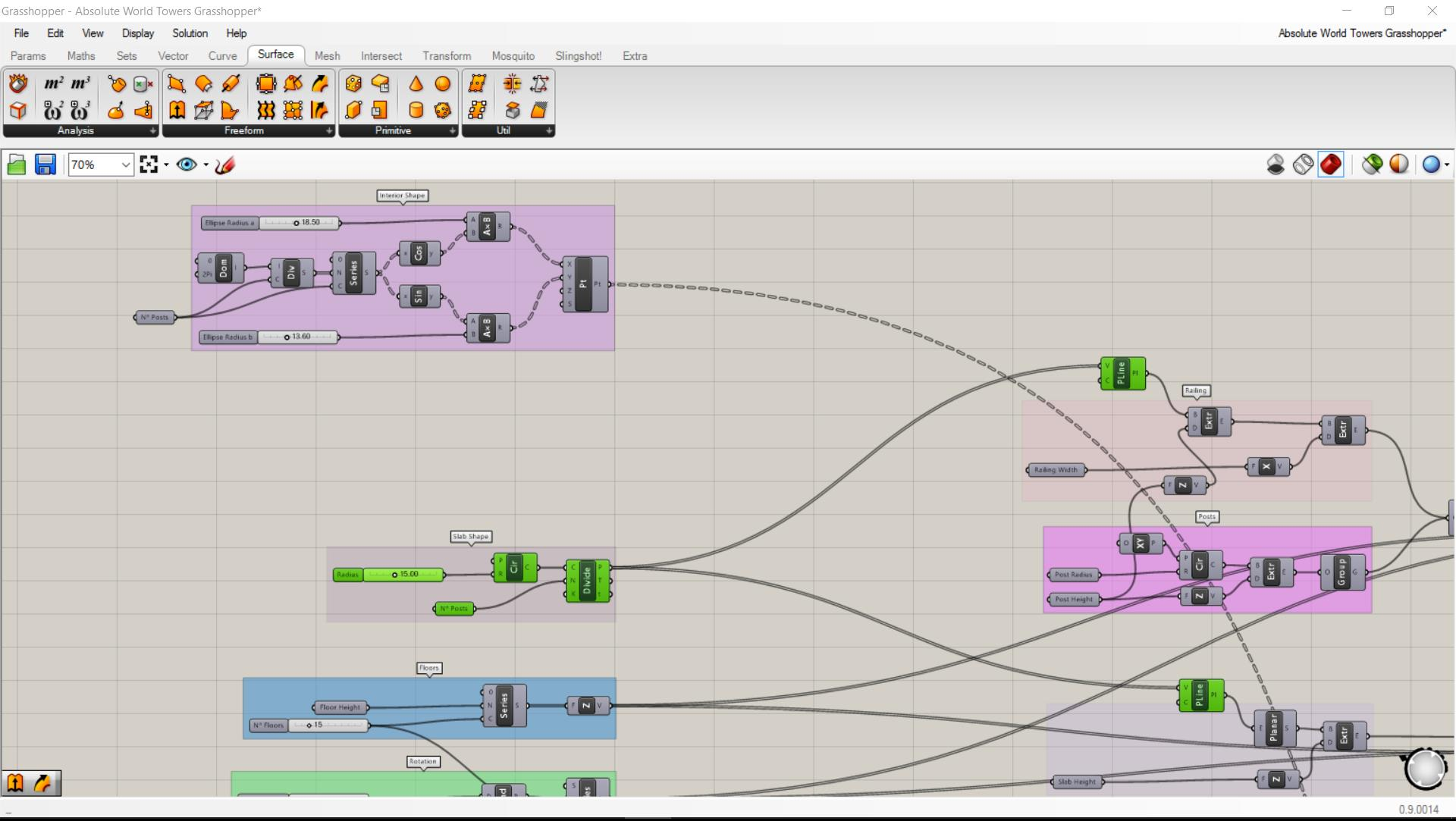

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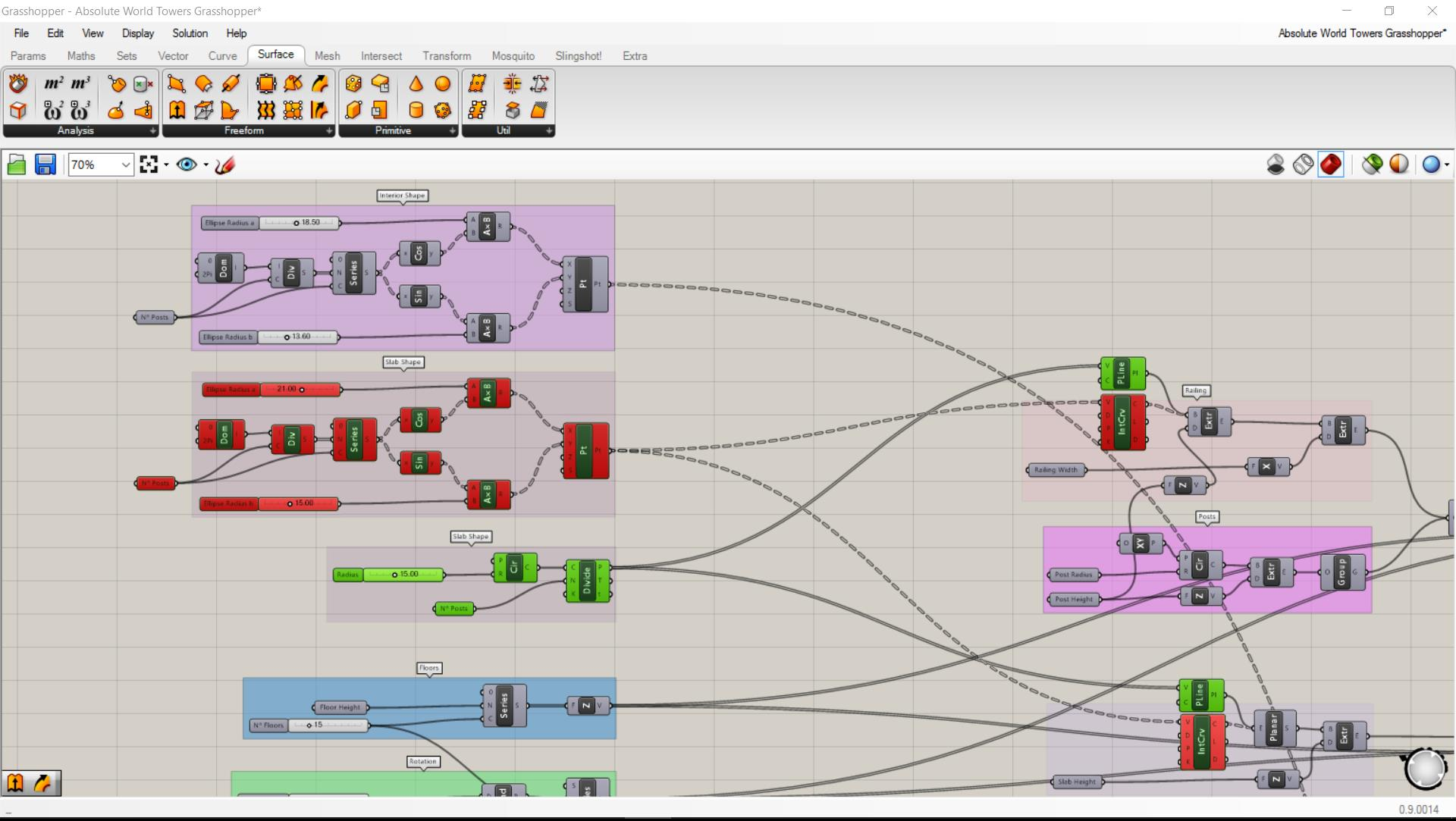

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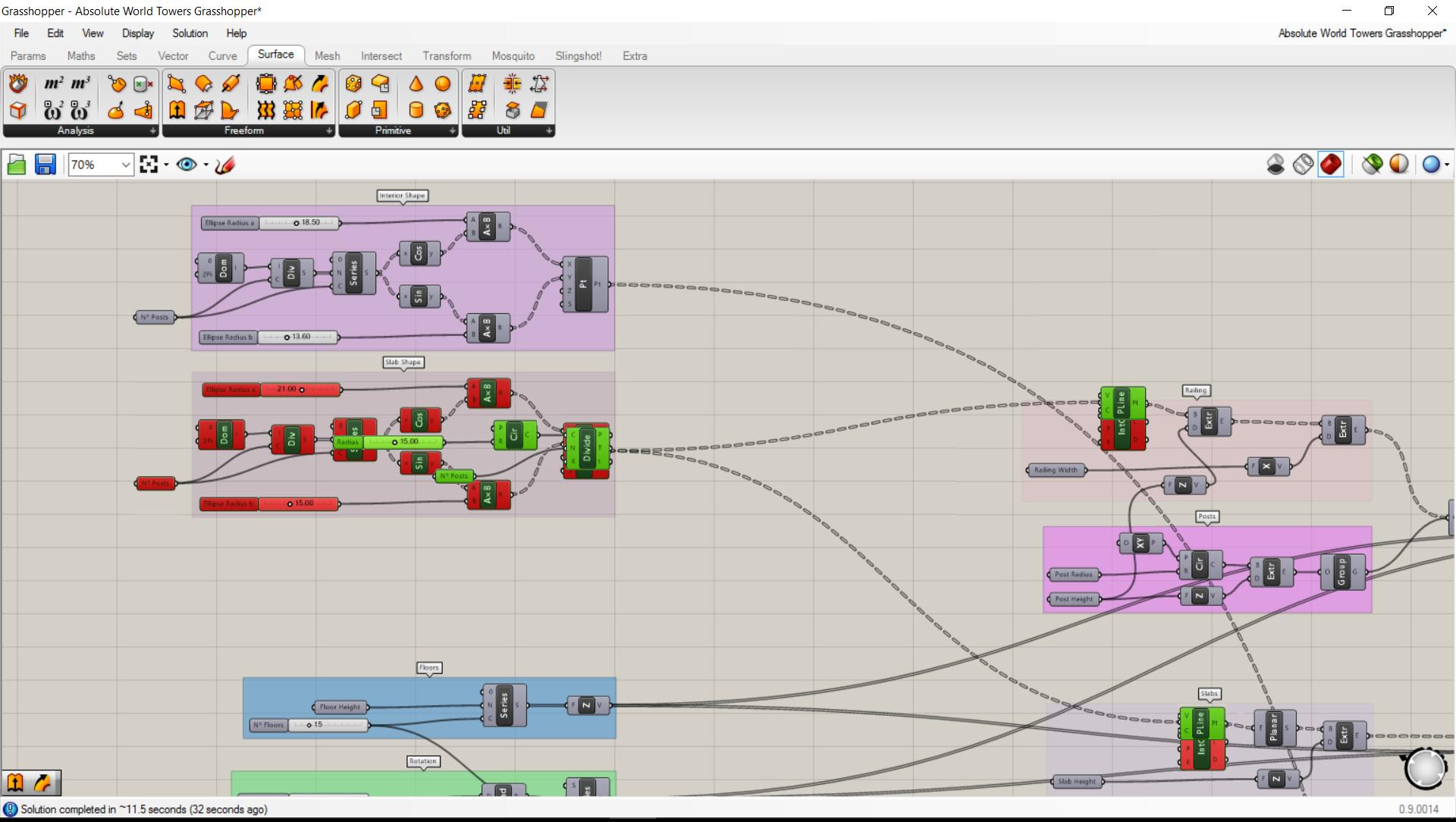

FUTURE WORK: VC FOR VISUAL PROGRAMMING LANGUAGES

Thank You!

Questions?

sofia.feist@tecnico.ulisboa.pt | bruno.b.ferreira@tecnico.ulisboa.pt | antonio.menezes.leitao@ist.utl.pt

master

Changes | History

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- RosettaWeb

Other

- CAADRIA 2017
- Tutorial

Compare

Sync

master

- Code Refactoring — just now by Sofia Feist
- Central Core with section-wall — 1 day ago by BrunoBFerreira
- Merge WindowFramesDevelopment branch into Master — 1 day ago by Sofia Feist
- Merge GuardrailDevelopment Branch into Master — 1 day ago by Sofia Feist
- Added Grid of the Walls of the Ground Floor — 2 days ago by SofiaFeist
- Walls update - MEP boxes — 4 days ago by BrunoBFerreira
- Added Roof Slab — 7 days ago by SofiaFeist
- Added guardrails — 7 days ago by BrunoBFerreira
- Creation of the openings in both the slabs and the wa... — 7 days ago by BrunoBFerreira (2)
- Propagation of the walls for the entire building — 8 days ago by SofiaFeist
- Creation of the typical wall grid — 8 days ago by SofiaFeist
- Update to new Rosetta — 8 days ago by SofiaFeist
- Removed unnecessary bak file — 10 days ago by BrunoBFerreira
- Update .gitignore

Code Refactoring

Sofia Feist 57b5382

GitHub Revert Collapse all

Refactoring building shapes.

AbsoluteTowers.rkt

```
...  ...  @@ -32,14 +32,10 @@
32   32          (* b (expt (expt (sin t) 2) (/ 1 n)) (sgn (sin t)))))
33   33
34   34   (define (points-superellipse p a b n n-points)
35       -   (map (lambda (t) (superellipse p a b n t))
36       -        (division -pi pi n-points #f)))
     35  +   (map-division (lambda (t) (superellipse p a b n t)) -pi pi n-points #f))
37   36
38       - (define (curve-superellipse p a b n n-points)
39       -   (closed-spline (points-superellipse p a b n n-points)))
40       -
41       - (define (surface-superellipse p a b n n-points)
42       -   (surface (curve-superellipse p a b n n-points)))
     37  + (define (points-to-surface points)
     38  +   (surface (closed-spline points)))
43   39
44   40   ;;Rotation
45   41   ;Allows us to rotate the coordinate system, enabling the rotation of the slab.
...  ...  @@ -55,7 +51,7 @@
55   51   ;;;Slab
56   52   ;Extrusion of a variable shape
57   53   (define (slab slab-shape t)
58       -   (extrusion slab-shape t))
     54  +   (extrusion (points-to-surface slab-shape) t))
59   55
60   56   ;;Elevator and stair shafts
61   57   ;To create the openings in the slabs
...  ...  @@ -348,10 +344,8 @@
348  344  ;;;Building
349  345  (define (building #:central-point C
350  346                     ;;Shapes
```

VERSION CONTROL

Resolve Conflicts · Pull Re

GitHub, Inc. [US] | https://github.com/SofiaFeist/AbsoluteTowers/pull/4/conflicts

1 conflicting file

AbsoluteTowers.rkt

AbsoluteTowers.rkt

AbsoluteTowers.rkt

2 conflicts Prev Next Mark as resolved

```
                        (walls-grid (last hs) (- height t-roof-slab (last hs))))))
    1)


;;;Absolute Towers Final
;In relation to a central point C

(define (absolute-towers C)
    (building #:central-point C
<<<<<<< TowerRotation
                #:slab (lambda (h alfa)
                         (define p (loc-from-o-phi (+c C (cyl 0 0 h))   ;changes in the cylindrical coordinates allows variations to the vertical axis
                                        alfa))                  ;alfa coordinate of rotate-z allows the slab's rotation
                         (surface-superellipse p 21 15 1.75 50))          ;chosen shape defines the shape of the slab / changes to the radius allows changes of s
                #:interior (lambda (h alfa)
                             (define p (loc-from-o-phi (+c C (cyl 0 0 h))   ;Only the radius changes -> interior radius = slab radius - l-balcony; also, a differ
                                            alfa))
                             (surface-superellipse p 18.5 13.6 1.75 50))
                #:guardrail (lambda (h alfa)
                         (define p (loc-from-o-phi (+c C (cyl 0 0 h))
                                        alfa))
                         (points-superellipse p 21 15 1.75 50))
                #:interior-points (lambda (h alfa)
                             (define p (loc-from-o-phi (+c C (cyl 0 0 h))
                                            alfa))
=======
                #:building (lambda (h)
                             (define p (rotate-z (+c C (cyl 0 0 h))   ;changes in the cylindrical coordinates allows variations to the vertical axis
                                        (rotation-angle h)))                ;alfa coordinate of rotate-z allows the slab's rotation
                             (points-superellipse p 21 15 1.75 50))          ;chosen shape defines the shape of the slab / changes to the radius allows changes o
                #:interior (lambda (h)
                             (define p (rotate-z (+c C (cyl 0 0 h))   ;Only the radius changes -> interior radius = slab radius - l-balcony; also, a different sh
                                            (rotation-angle h)))
>>>>>>> master
                             (points-superellipse p 18.5 13.6 1.75 50))
                #:railing (lambda (pt1 pt2) (right-cuboid (+y pt1 0.65) 0.005 1.3 (+y pt2 0.65)))
                #:guardrail-post (lambda (p) (cylinder p 0.02 (+y p 1.3)))
                #:handrail (surface-circle (x 0) 0.03)
                #:walls (lambda (lower-h upper-h) (grid-typical-floor (+z C lower-h) 6.3 2.2 1.8 13.6 0.3 upper-h))
                #:list-angles-rotation (lambda (n) (list-angles-tower2 n))
                #:building-height 9
```

SCENARIO 3: RESOLVING CONFLICTING CHANGES