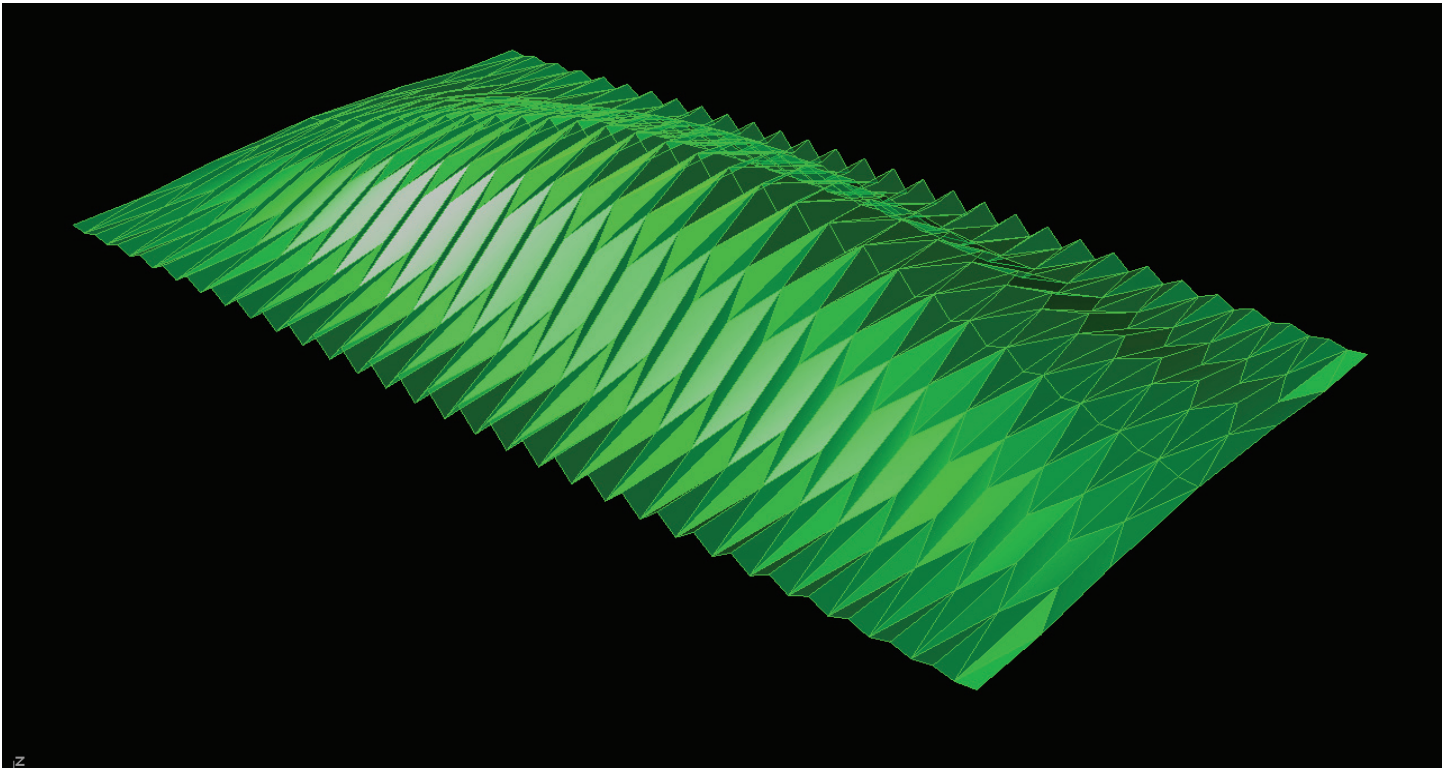
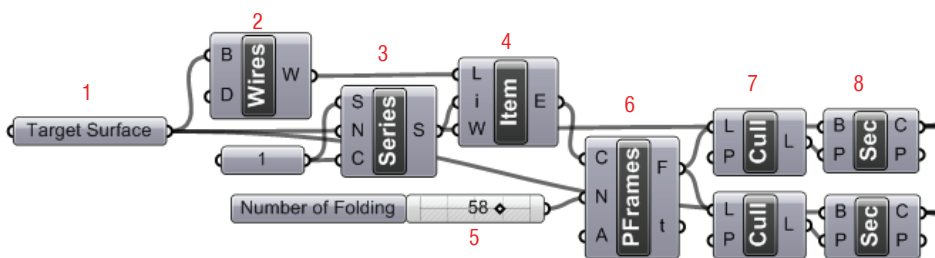
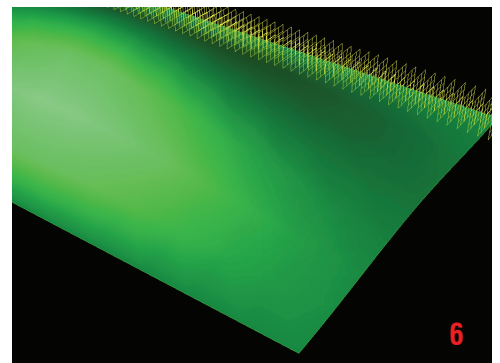
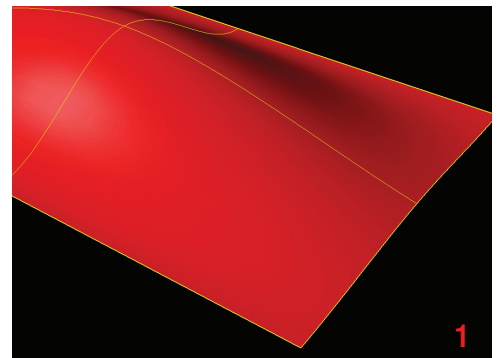


4_3 Origami Folding



Step1 : Dividing Curve by Length

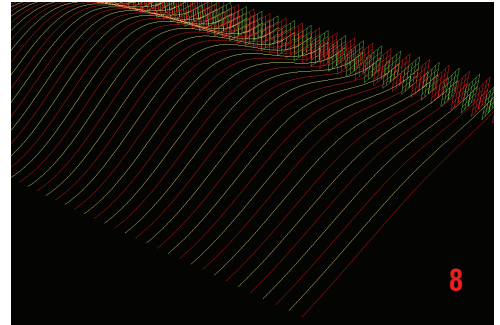
1. **Brep** (Params/Geometry/Brep) : "Target Surface"
 - Draw one convexed surface(symmetrical landscape surface) in Rhino scene
 - Right Click and Set one brep : click the target surface in Rhino scene
2. **Wires** (Surface/Anaysis/Brep Wireframe)
 - B: *Brep* (P"Target Surface")
 - D : Default value
3. **Series** (Logic/Sets/Series)
 - S : Integer "1"
 - C : Integer "1"
4. **Item** (Logic/List/List Item)
 - L : *Wires* (W)
 - I : *Series* (S)
5. **Slider** (Params/Special/Number Slider)
 - "Number of Folding" : Integer, Lower limit=1, Upper limit=80, Value=58
6. **PFrames** (Curve/Division/Perp Frames)
 - C : *Item* (E)
 - N : *Slider* ("Number of Folding")



- 7. **Cull** (Logic/Sets/Cull Pattern) x 2
 - L : *PFrames* (F) for both
 - P : False/True (top one) , True/False (bottom one)
- 8. **Sec** (Intersect/Mathematical/Brep | Plane)
 - B : *Brep* ("Target Surface")
 - P : *Cull* (False/True)
- 9. **Sec** (Intersect/Mathematical/Brep | Plane)
 - B : *Brep* ("Target Surface")
 - P : *Cull* (True/False)

-> Bottom Crv for Line A

-> Bottom Crv for Line B

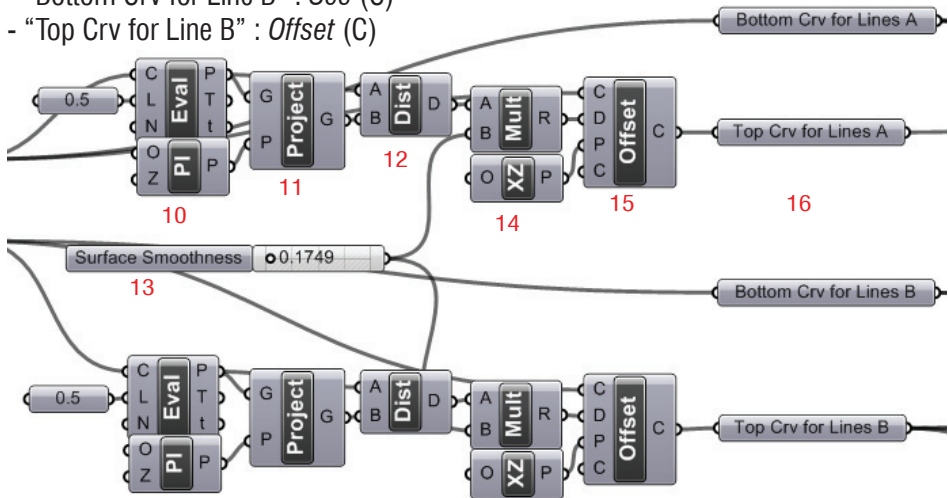
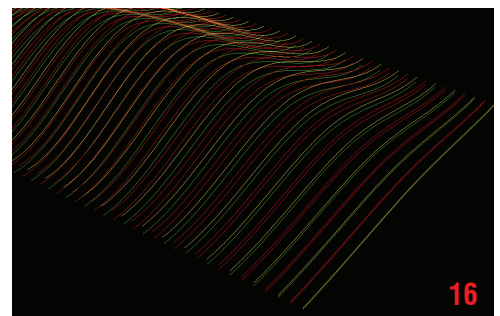
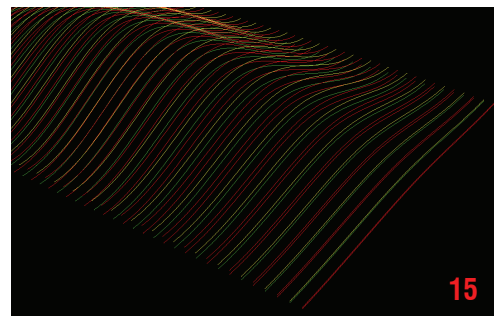
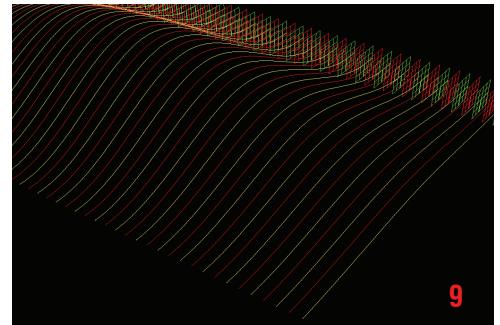


Step2 : Folding Depth following the Surface Curvature

- 10. **Eval** (Curve/Analysis/Evaluate Length) x 2
 - C : *Sec* (C) for each
 - L : *Number* = 0.5 for each
- 11. **Project** (XForm/Affine/Project) x 2
 - G : *Eval* (P) for each
 - P : *PI* (P) with default value for each
- 12. **Dist** (Vector/Point/Distance) x 2
 - A : *Eval* (P) for each
 - B : *Project* (G) for each
- 13. **Slider** (Params/Special/Number Slider)
 - "Smoothness" : Floating point, Lower limit=0, Upper limit=0.5, Value=0.17
- 14. **Mult** (Scalar/Operator/Multiplication) x 2
 - A : *Dist* (D) for each
 - B : *Slider* ("Smoothness") for each
- 15. **Offset** (Curve/Util/Offset)
 - C : *Sec* (C) from 8.
 - D : *Mult* (R)
 - P : *XZ Plane* (P)
- 16. **Offset** (Curve/Util/Offset)
 - C : *Sec* (C) from 9.
 - D : *Mult* (R)
 - P : *XZ Plane* (P)
- 17. **Curve** (Params/Geometry/Curve) x 4
 - "Bottom Crv for Line A" : *Sec* (C)
 - "Top Crv for Line A" : *Offset* (C)
 - "Bottom Crv for Line B" : *Sec* (C)
 - "Top Crv for Line B" : *Offset* (C)

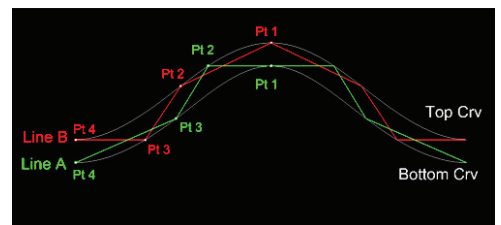
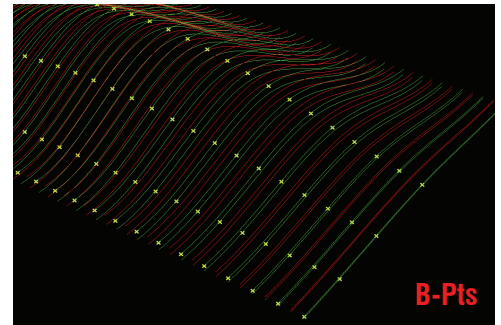
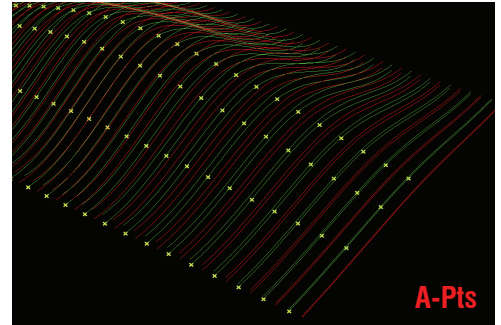
-> Top Crv for Line A

-> Top Crv for Line B

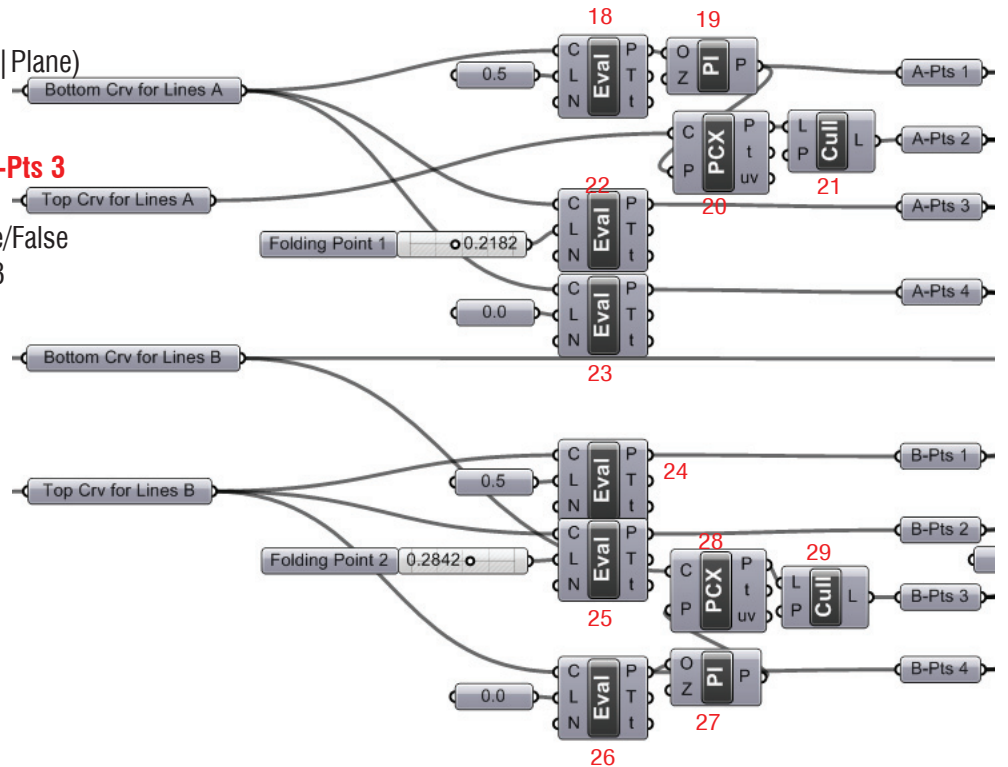


Step3 : Extracting Points for Surface

- 18. **Eval** (Curve/Analysis/Evaluate Length) -> **A-Pts 1**
 - C : Curve ("Bottom Crv for Line A")
 - L : Number = 0.5
- 19. **PI** (Vector/Plane/Plane Normal)
 - O : Eval (P)
- 20. **PCX** (Intersect/Mathematical/Curve | Plane)
 - C : Curve ("Top Crv for Line A")
 - P : PI (P)
- 21. **Cull** (Logic/Sets/Cull Pattern) -> **A-Pts 2**
 - L : PCX (P)
 - P: Right click and Manage boolean collection : True/False
- 22. **Eval** (Curve/Analysis/Evaluate Length) -> **A-Pts 3**
 - C : Curve ("Bottom Crv for Line A")
 - L : Slider = 0.2182 (Floating point,Upper limit=0.5, Lower limit=0)
- 23. **Eval** (Curve/Analysis/Evaluate Length) -> **A-Pts 4**
 - C : Curve ("Bottom Crv for Line A")
 - L : Number = 0.0
- 24. **Eval** (Curve/Analysis/Evaluate Length) -> **B-Pts 1**
 - C : Curve ("Top Crv for Line B")
 - L : Number = 0.5
- 25. **Eval** (Curve/Analysis/Evaluate Length) -> **B-Pts 2**
 - C : Curve ("Top Crv for Line B")
 - L : Slider = 0.2842 (Floating point,Upper limit=0.5, Lower limit=0)
- 26. **Eval** (Curve/Analysis/Evaluate Length) -> **B-Pts 4**
 - C : Curve ("Top Crv for Line B")
 - L : Number = 0.0
- 27. **PI** (Vector/Plane/Plane Normal)
 - O : Eval (P)
- 28. **PCX** (Intersect/Mathematical/Curve | Plane)
 - C : Curve ("Bottom Crv for Line B")
 - P : PI (P)
- 29. **Cull** (Logic/Sets/Cull Pattern) -> **B-Pts 3**
 - L : PCX (P)
 - P: Manage boolean collection -> True/False
- 30. **Point** (Params/Geometry/Point) x 8
 - "A-Pts 1" : Eval (P) -> Flatten!
 - "A-Pts 2" : Cull (L) -> Flatten!
 - "A-Pts 3" : Eval (P) -> Flatten!
 - "A-Pts 4" : Eval (P) -> Flatten!
 - "B-Pts 1" : Eval (P) -> Flatten!
 - "B-Pts 2" : Cull (L) -> Flatten!
 - "B-Pts 3" : Eval (P) -> Flatten!
 - "B-Pts 4" : Eval (P) -> Flatten!



Points Group Diagram



Step4 : Surface from Points

31. **Shift** (Logic/List/Shift List) x 4 x 2

- L : *Point* ("B-Pts 1") / *Point* ("B-Pts 2") / *Point* ("B-Pts 3") / *Point* ("B-Pts 4")

- S : *Integer* = -1 for each and 1 for each

32. **Srf4Pt** (Surface/Freeform/4Point Surface) x 2

-> **Surface group 1**

- A : *Point* ("A-Pts 1") for each

- B : *Point* ("A-Pts 2") for each

- C : *Shift* (-1 shift from "B-Pts 1") and *Shift* (1 shift from "B-Pts 1")

33. **Srf4Pt** (Surface/Freeform/4Point Surface) x 2

-> **Surface group 2**

- A : *Point* ("A-Pts 2") for each

- B : *Shift* (-1 shift from "B-Pts 1") and *Shift* (1 shift from "B-Pts 1")

- C : *Shift* (-1 shift from "B-Pts 2") and *Shift* (1 shift from "B-Pts 2")

34. **Srf4Pt** (Surface/Freeform/4Point Surface) x 2

-> **Surface group 3**

- A : *Point* ("A-Pts 2") for each

- B : *Point* ("A-Pts 3") for each

- C : *Shift* (-1 shift from "B-Pts 3") and *Shift* (1 shift from "B-Pts 3")

- D : *Shift* (-1 shift from "B-Pts 2") and *Shift* (1 shift from "B-Pts 2")

35. **Srf4Pt** (Surface/Freeform/4Point Surface) x 2

-> **Surface group 4**

- A : *Point* ("A-Pts 3") for each

- B : *Point* ("A-Pts 4") for each

- C : *Shift* (-1 shift from "B-Pts 3") and *Shift* (1 shift from "B-Pts 3")

36. **Srf4Pt** (Surface/Freeform/4Point Surface) x 2

-> **Surface group 5**

- A : *Point* ("A-Pts 4") for each

- B : *Shift* (-1 shift from "B-Pts 3") and *Shift* (1 shift from "B-Pts 3")

- C : *Shift* (-1 shift from "B-Pts 4") and *Shift* (1 shift from "B-Pts 4")

37. **Eval** (Curve/Analysis/Evaluate Length)

- C : *Curve* ("Bottom Crv for Line B") -> Flatten!

- L : *Number* = 0.5

39. **Mirror** (XForm/Euclidian/Mirror)

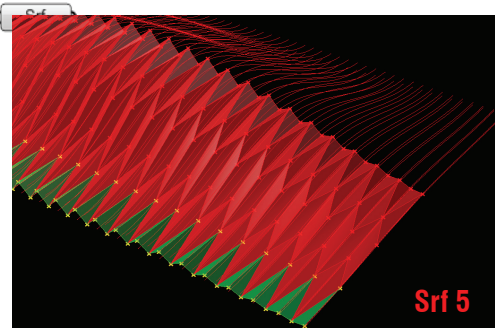
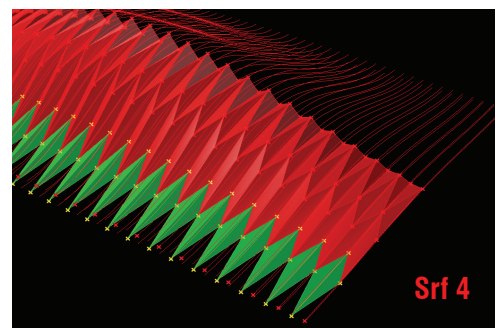
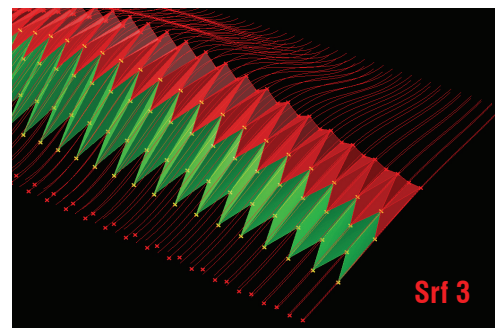
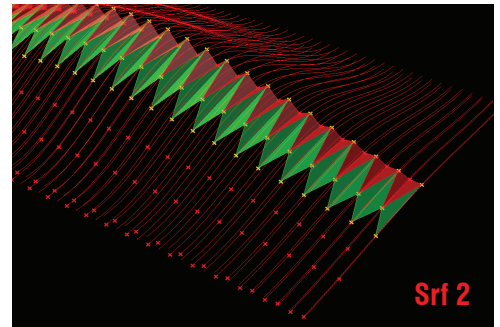
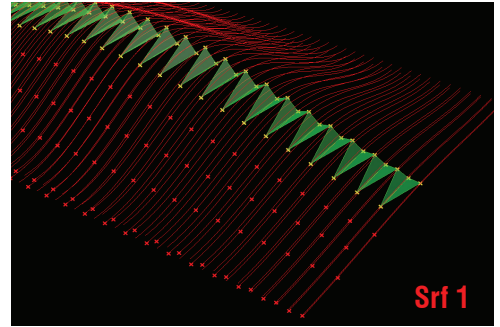
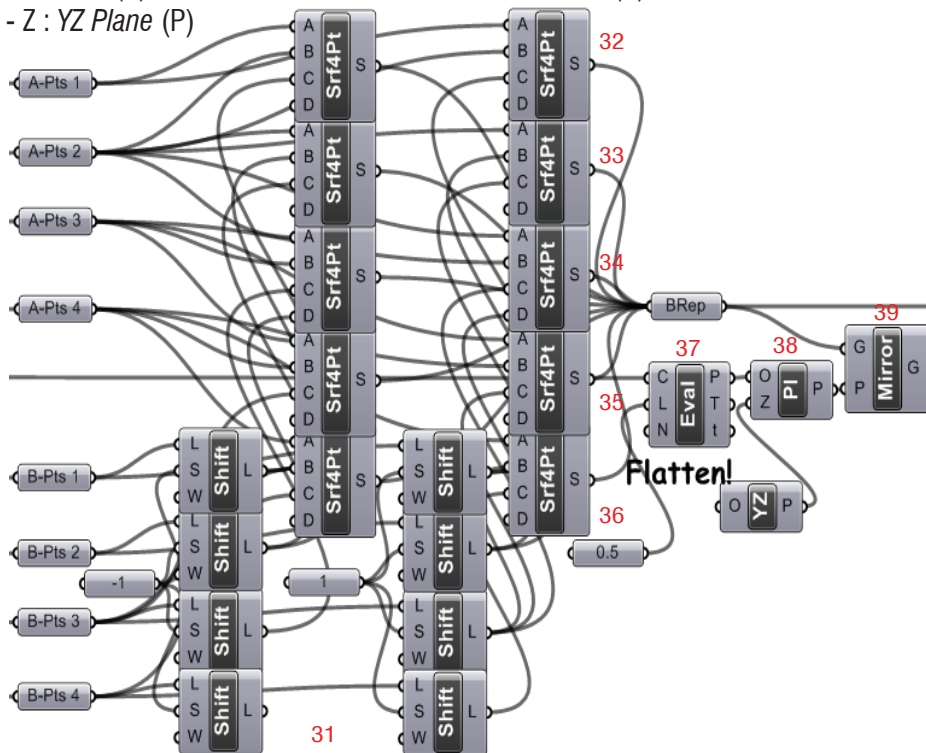
38. **PI** (Vector/Plane/Plane Normal)

- G : all Srf4Pt (S)

- O : *Eval* (P)

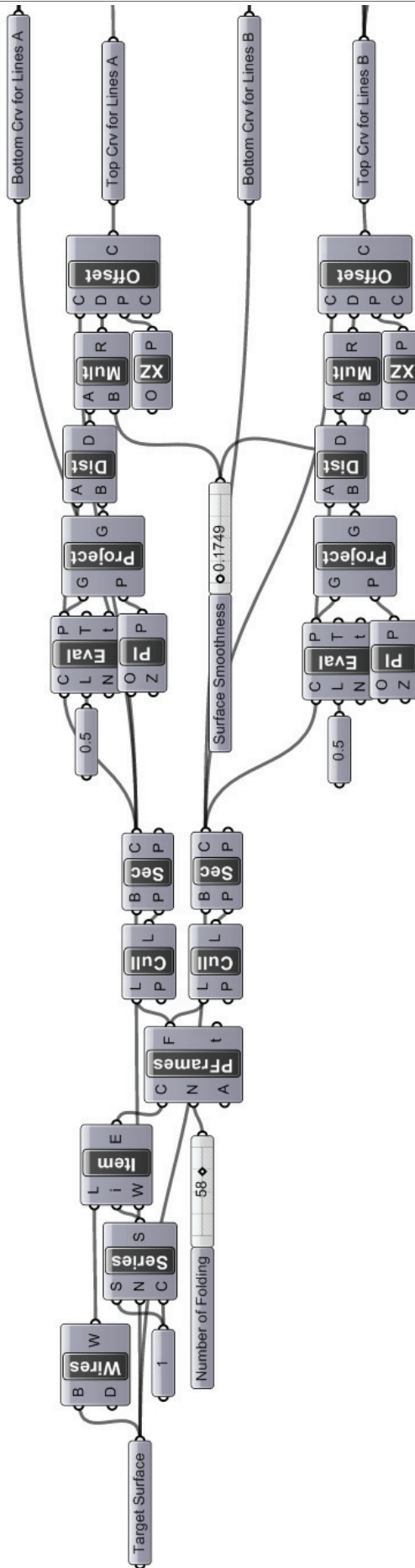
- P : *PI* (P)

- Z : *YZ Plane* (P)



Appendix

- Definition map 1



Appendix

- Definition map 2

