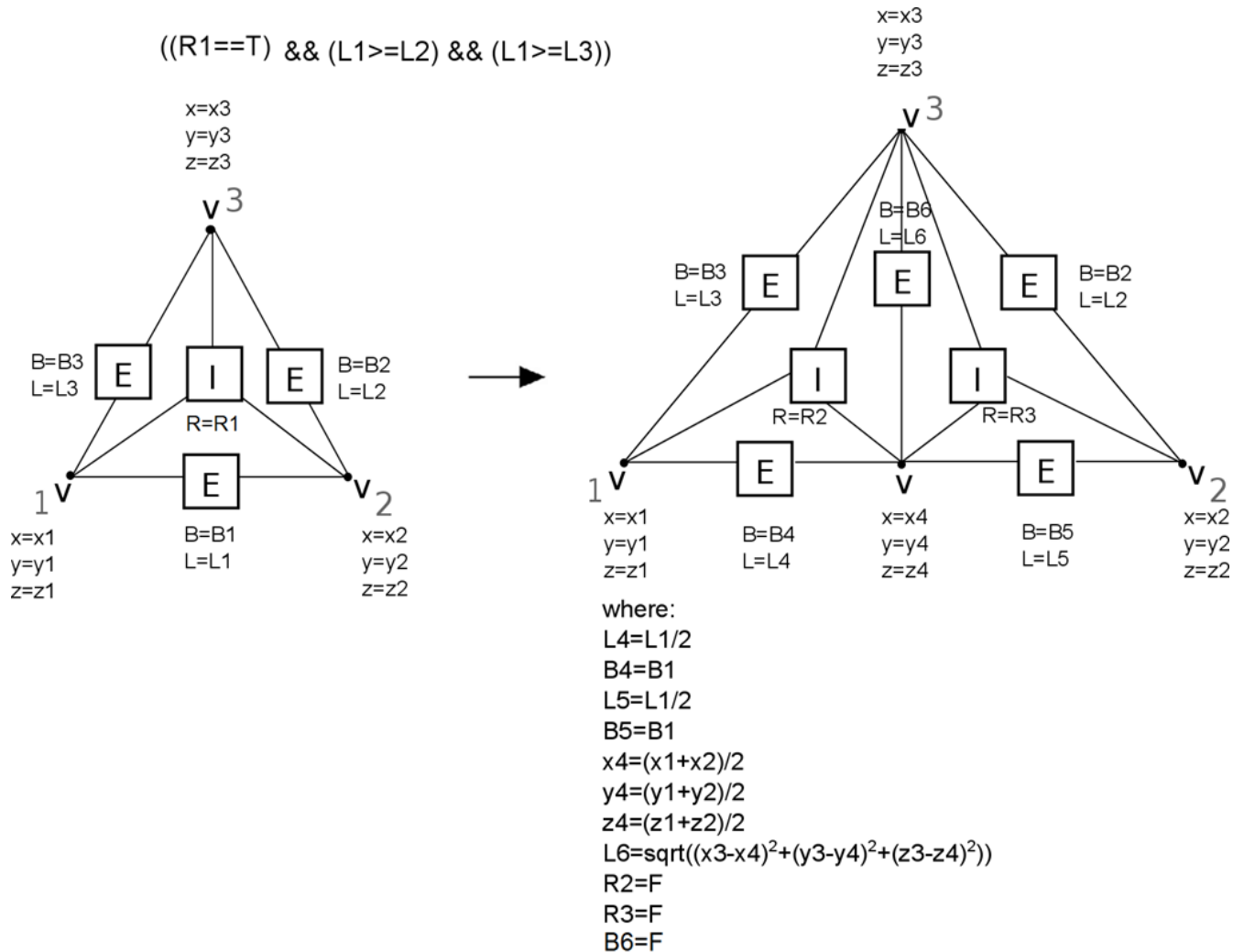


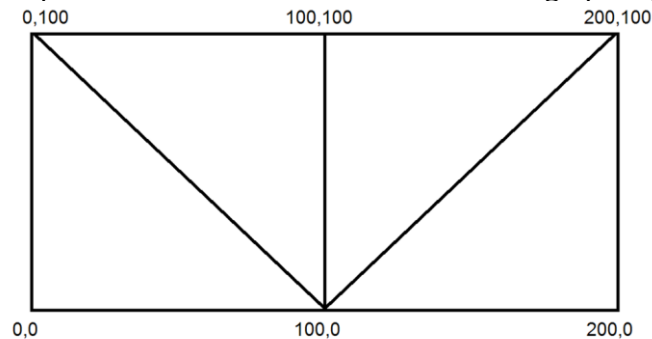
Graph grammar for modeling terrain topography
 Anna Paszynska & Maciej Paszynski & Krzysztof Podsiadło (c)

The call to each graph grammar production must pass the interior node I and the whole graph G
 The triangle on the left-hand side must be detected by the productions
 If it is not possible to localize the left-hand side, then the production exits without error.
 All graphs before and after the application of the projection must be plotted with proper coordinates of points.

1a. Please implement graph transformation (P1)

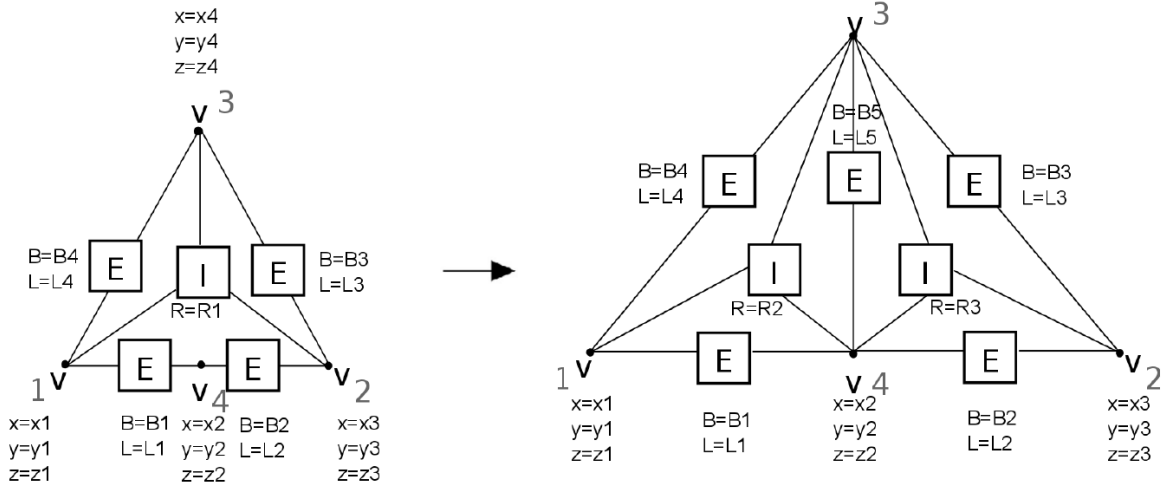


1b. Please try to execute this productions on all four elements of the graph representation of the mesh



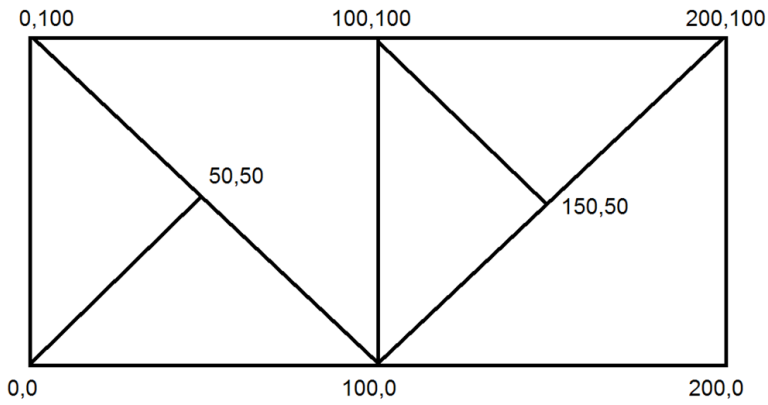
2a. Please implement graph transformation (P2)

$$(((L1+L2) \geq L3) \ \&\& \ ((L1+L2) \geq L4))$$

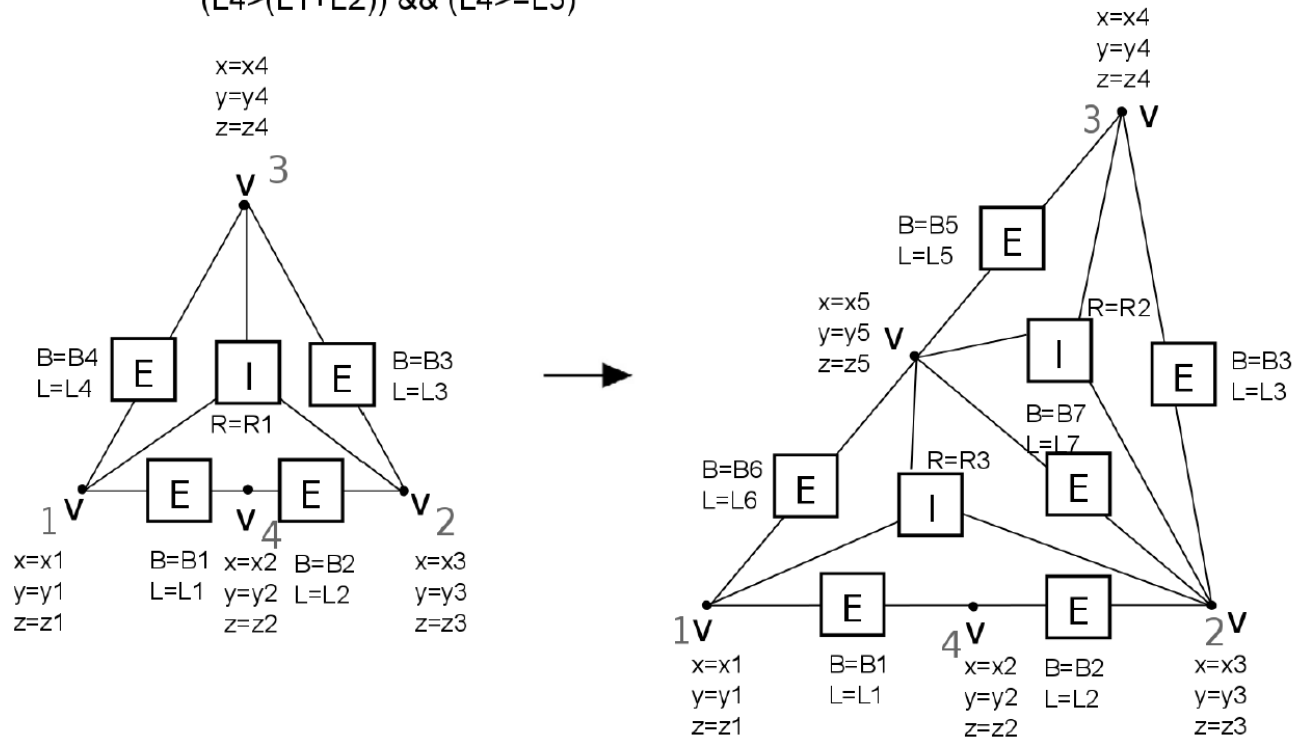


where:
 $R2=F$
 $R3=F$
 $L6=\sqrt{(x2-x4)^2+(y2-y4)^2+(z2-z4)^2}$
 $B6=F$

2b. Please try to execute this productions over all triangles in the graph representation of the mesh

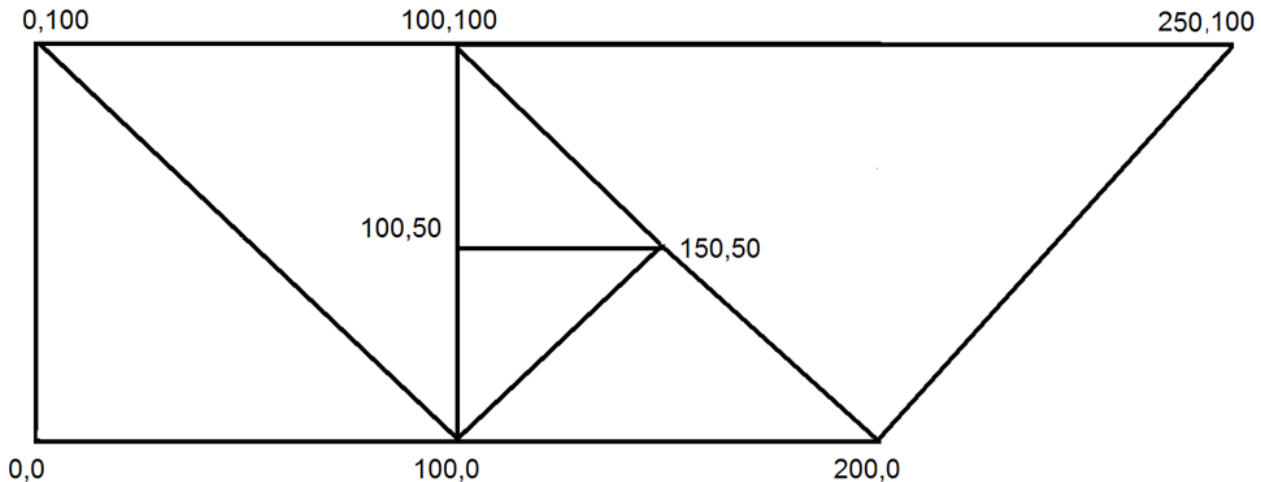


3a. Please implement graph transformation (P3)
 $(L4 > (L1 + L2)) \ \&\& \ (L4 \geq L3)$



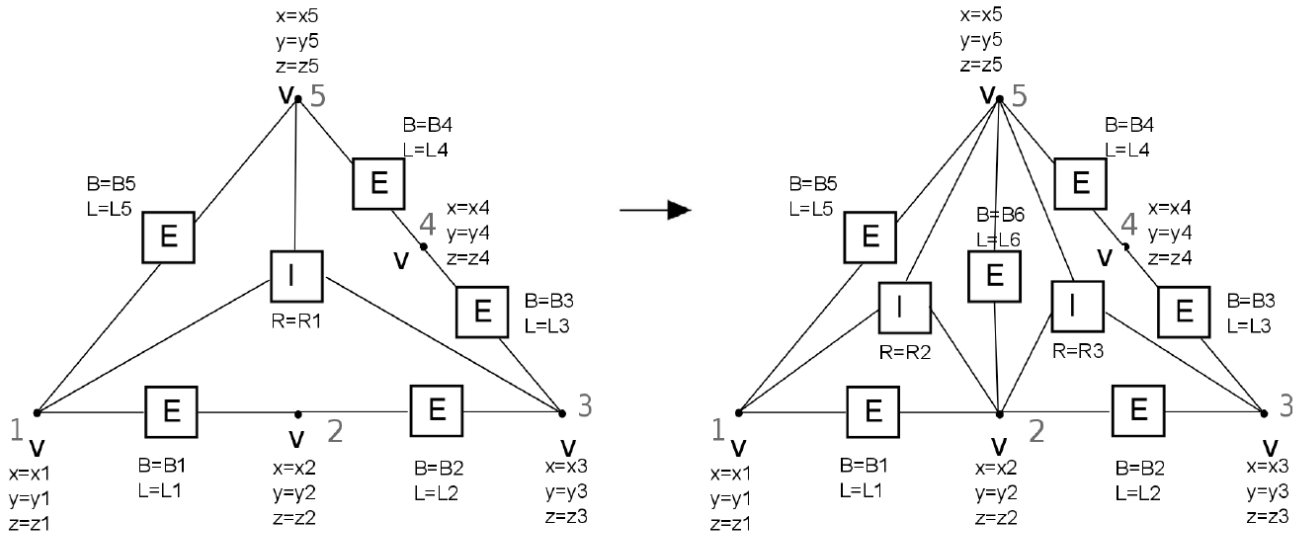
where:
 $L5 = L4/2$; $B5 = B4$
 $L6 = L4/2$; $B6 = B4$
 $x5 = (x1 + x4)/2$
 $y5 = (y1 + y4)/2$
 $z5 = (z1 + z4)/2$
 $L7 = \sqrt{(x3 - x5)^2 + (y3 - y5)^2 + (z3 - z5)^2}$
 $B7 = F$
 $R2 = F$
 $R3 = F$

3b. Please try to execute this productions over all triangles in the graph representation of the mesh



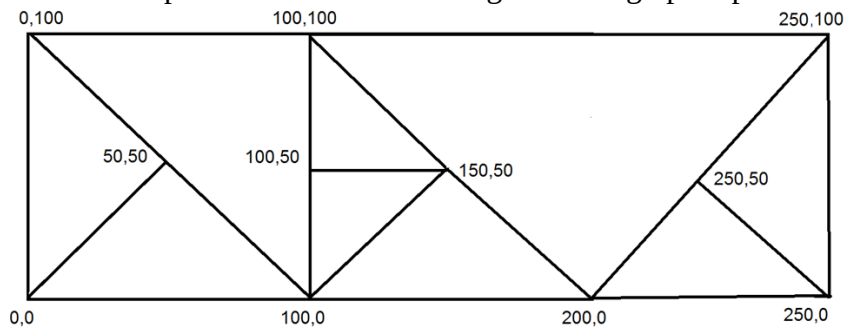
4a. Please implement graph transformation (P4)

$$((L1+L2) \geq (L3+L4)) \ \&\& \ ((L1+L2) \geq L5)$$



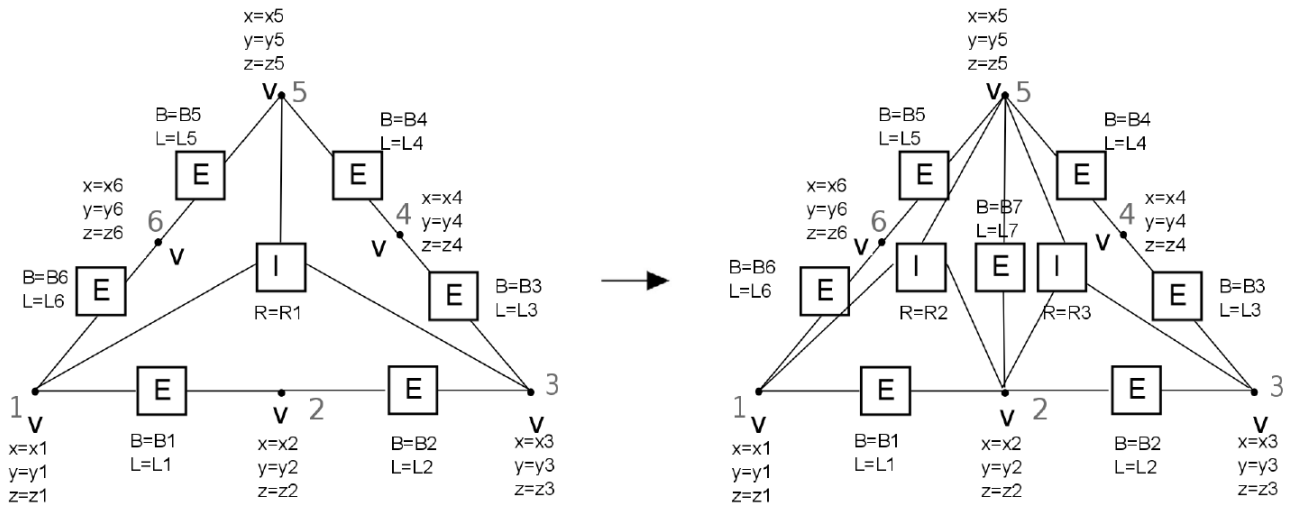
where:
 R2=F
 R3=F
 $L6 = \sqrt{(x2-x5)^2 + (y2-y5)^2 + (z2-z5)^2}$
 B6=F

4b. Please try to execute this productions over all triangles in the graph representation of the mesh



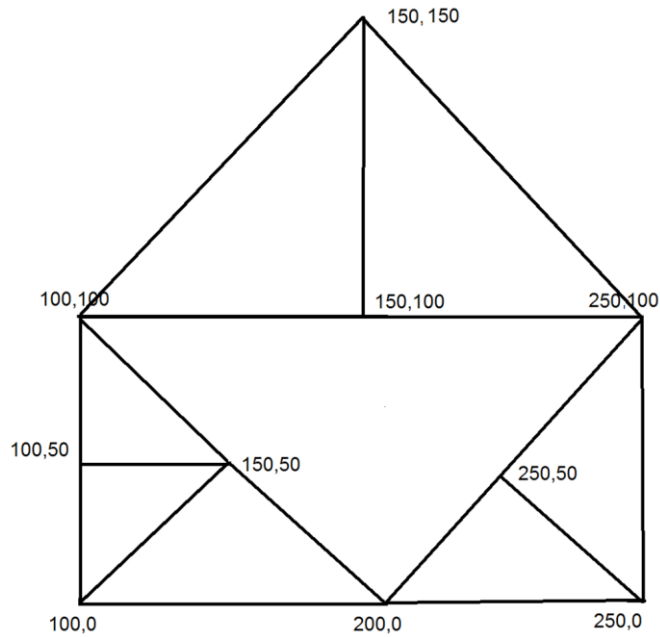
6a. Please implement graph transformation (P6).

$((L1+L2) \geq (L3+L4)) \ \&\& \ ((L1+L2) \geq (L5+L6))$



where:
 $B7 = F$
 $L7 = \sqrt{(x5-x2)^2 + (y5-y2)^2 + (z5-z2)^2}$

6b. Please try to execute this productions over all triangles in the graph representation of the mesh



Hint:
 Similar project in JAVA
<https://github.com/ra-v97/terrain-generator>