

CLAIMS

We claim:

- 5 1. A system to process at least one graphics polygon, comprising:
 a graphics processing unit;
 a module that determines a number of clipping planes against which a polygon
 is to be clipped;
 a first pipeline dedicated to single plane clipping; and
10 a second pipeline dedicated to multi-plane clipping.
2. The system of claim 1, further including a module associated with the
 first pipeline to:
 load coordinates of vertices of the polygon; and
15 assign barycentric values to the coordinates of the vertices.
3. The system of claim 2, further including a module associated with the
 first pipeline to calculate a distance of the single clipping plane to each of the vertices.
- 20 4. The system of claim 3, further including a module associated with the
 first pipeline to calculate distance ratios alpha and beta,
 wherein $\alpha = D_{out}/(D_{in} - D_{out})$;
 wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is
 the distance from an adjacent vertex to the clipping plane; and
25 wherein $\beta = 1 - \alpha$.
5. The system of claims 1-4, further including a module associated with
 the first pipeline to assign new barycentric values to points that lie at an intersection
 of the determined clipping plane and the polygon.
- 30 6. The system of claim 5, further including a module associated with the
 first pipeline to assign new values to points that lie at the intersection of the
 determined clipping plane and the polygon.

7. A method of processing at least one graphics polygon, comprising:
determining a number of clipping planes against which a polygon is to be
clipped; and

submitting, if there is only a single clipping plane, the polygon to a pipeline
5 dedicated to single plane clipping.

8. The method of claim 7, further including:
loading coordinates of vertices of the polygon; and
assigning barycentric values to the coordinates of the vertices.

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9. The method of claim 8, further including calculating a distance of the
single clipping plane to each of the vertices.

10. The method of claim 9, further including calculating distance ratios
15 alpha and beta,

wherein $\alpha = D_{out}/(D_{in} - D_{out})$;

wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is
the distance from an adjacent vertex to the clipping plane; and

wherein $\beta = 1 - \alpha$.

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11. The method of claim 10, further including normalizing the distance
between adjacent vertices.

12. The method of claims 7-11, further including assigning new
25 barycentric values to points that lie at an intersection of the determined clipping plane
and the polygon.

13. The method of claims 7-11, further including assigning new values to
points that lie at an intersection of the determined clipping plane and the polygon.

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14. The method of claims 7-11, wherein the polygon is a triangle.

15. The method of claim 7, further including submitting, if there is more than one clipping plane, the polygon to a second pipeline dedicated to multi-plane clipping.

5 16. An apparatus to process at least one graphics polygon, comprising:
a module that determines a number of clipping planes against which a polygon is to be clipped; and
a pipeline dedicated to single plane clipping.

10 17. The apparatus of claim 16, further including a module to:
load coordinates of vertices of the polygon; and
assign barycentric values to the coordinates of the vertices.

18. The apparatus of claim 17, further including a module to calculate a
15 distance of a single clipping plane to each of the vertices.

19. The apparatus of claims 16-18, further including a module to calculate distance ratios alpha and beta,
wherein $\alpha = D_{out}/(D_{in} - D_{out})$;
20 wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is the distance from an adjacent vertex to the clipping plane; and
wherein $\beta = 1 - \alpha$.

20. The apparatus of claims 16-18, further including a module to
25 normalize the distance between adjacent vertices.

21. The apparatus of claim 19, further including a module to assign new barycentric values to points that lie at an intersection of the determined clipping plane and the polygon.

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22. The apparatus of claim 21, further including a module to assign new values to points that lie at the intersection of the determined clipping plane and the polygon.

23. The apparatus of claim 17, wherein the polygon is a triangle.

24. The apparatus of claim 17, further comprising a second pipeline to handle cases in which there is more than one clipping plane.

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25. The apparatus of claim 24, wherein the modules are available to both pipelines.

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CLAIMS

We claim:

1. A system to process at least one graphics polygon, comprising:
a graphics processing unit;
a module that determines a number of clipping planes against which a polygon is to be clipped;
a first pipeline dedicated to single plane clipping; and
a second pipeline dedicated to multi-plane clipping.
2. The system of claim 1, further including a module associated with the first pipeline to:
load coordinates of vertices of the polygon; and
assign barycentric values to the coordinates of the vertices.
3. The system of claim 2, further including a module associated with the first pipeline to calculate a distance of the single clipping plane to each of the vertices.
4. The system of claim 3, further including a module associated with the first pipeline to calculate distance ratios alpha and beta,
wherein $\alpha = D_{out}/(D_{in} - D_{out})$;
wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is the distance from an adjacent vertex to the clipping plane; and
wherein $\beta = 1 - \alpha$.
5. The system of claim 4, further including a module associated with the first pipeline to assign new barycentric values to points that lie at an intersection of the determined clipping plane and the polygon.
6. The system of claim 5, further including a module associated with the first pipeline to assign new values to points that lie at the intersection of the determined clipping plane and the polygon.
7. A method of processing at least one graphics polygon, comprising:

determining a number of clipping planes against which a polygon is to be clipped; and submitting, if there is only a single clipping plane, the polygon to a pipeline dedicated to single plane clipping.

8. The method of claim 7, further including:
loading coordinates of vertices of the polygon; and
assigning barycentric values to the coordinates of the vertices.

9. The method of claim 8, further including calculating a distance of the single clipping plane to each of the vertices.

10. The method of claim 9, further including calculating distance ratios alpha and beta,
wherein $\alpha = D_{out}/(D_{in} - D_{out})$;
wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is the distance from an adjacent vertex to the clipping plane; and
wherein $\beta = 1 - \alpha$.

11. The method of claim 10, further including normalizing the distance between adjacent vertices.

12. The method of claim 11, further including assigning new barycentric values to points that lie at an intersection of the determined clipping plane and the polygon.

13. The method of claim 11, further including assigning new values to points that lie at an intersection of the determined clipping plane and the polygon.

14. The method of claim 7, wherein the polygon is a triangle.

15. The method of claim 7, further including submitting, if there is more than one clipping plane, the polygon to a second pipeline dedicated to multi-plane clipping.

16. An apparatus to process at least one graphics polygon, comprising:

a module that determines a number of clipping planes against which a polygon is to be clipped; and
a pipeline dedicated to single plane clipping.

17. The apparatus of claim 16, further including a module to:
load coordinates of vertices of the polygon; and
assign barycentric values to the coordinates of the vertices.

18. The apparatus of claim 17, further including a module to calculate a distance of a single clipping plane to each of the vertices.

19. The apparatus of claim 18, further including a module to calculate distance ratios alpha and beta,
wherein $\alpha = D_{out}/(D_{in} - D_{out})$;
wherein D_{out} is the distance from one vertex to the clipping plane and D_{in} is the distance from an adjacent vertex to the clipping plane; and
wherein $\beta = 1 - \alpha$.

20. The apparatus of claim 18, further including a module to normalize the distance between adjacent vertices.

21. The apparatus of claim 19, further including a module to assign new barycentric values to points that lie at an intersection of the determined clipping plane and the polygon.

22. The apparatus of claim 21, further including a module to assign new values to points that lie at the intersection of the determined clipping plane and the polygon.

23. The apparatus of claim 17, wherein the polygon is a triangle.

24. The apparatus of claim 17, further comprising a second pipeline to handle cases in which there is more than one clipping plane.

25. The apparatus of claim 24, wherein the modules are available to both pipelines.