

ALL (HTTP://PERMADI.COM/BLOG/)

TECHNOLOGY (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/TECHNOLOGY/)

PROGRAMMING (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/PROGRAMMING/)

HTML (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/HTML/)

BLOG (HTTP://PERMADI.COM/CATEGORY/BLOG/)

ADOBE FLASH (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/FLASH/)

GENERAL (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/GENERAL/)






ACTIONSCRIPT (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/FLASH/ACTIONSCRIPT/) (MORE)

GRAPHICS (HTTP://PERMADI.COM/CATEGORY/TUTORIALS/GRAPHICS/)

Ray Casting Tutorial – Part 9

May 17, 1996 By fpermadi

0 (http://permadi.com/1996/05/ray-casting-tutorial-9/#comments)

Share this:  (http://www.facebook.com/sharer.php?u=http://permadi.com/1996/05/ray-casting-tutorial-9/)  (http://twitter.com/share?url=http://permadi.com/1996/05/ray-casting-tutorial-9/&text=Ray+Casting+Tutorial+%E2%80%93+Part+9+)  (http://www.tumblr.com/share/link?url=permadi.com/1996/05/ray-casting-tutorial-9/&name=Ray+Casting+Tutorial+-+Part+9)   (https://plus.google.com/share?url=http://permadi.com/1996/05/ray-casting-tutorial-9/)

<<PREVIOUS (/1996/05/ray-casting-tutorial-8/) | TABLE OF CONTENTS (/1996/05/ray-casting-tutorial-table-of-contents) | CONTINUE >> (/1996/05/ray-casting-tutorial-10/)

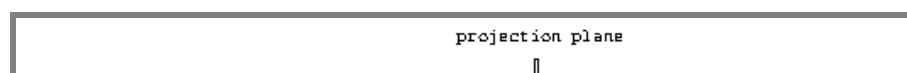
RAY-CASTING STEP 5: DRAWING WALLS

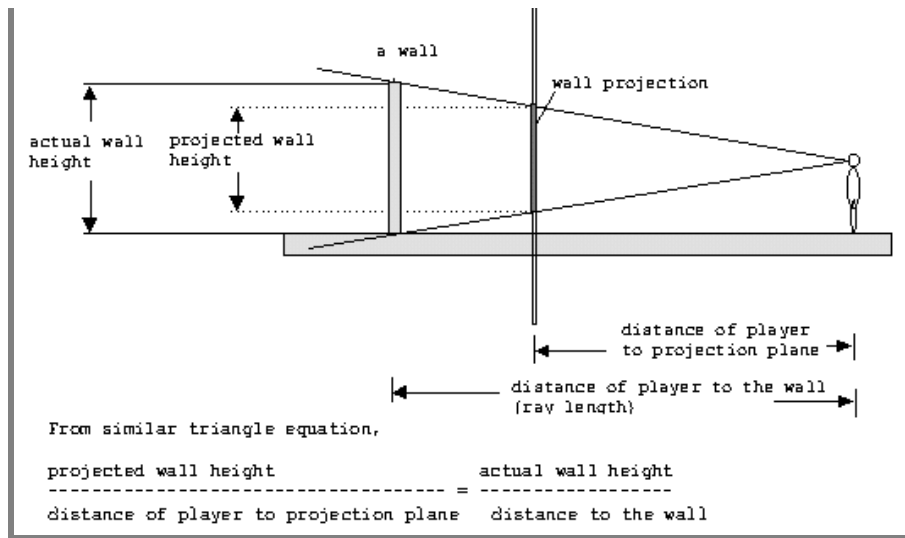
In the previous steps, 320 rays are casts, when each ray hits a wall, the distance to that wall is computed. Knowing the distance, the wall slice can then be projected onto the projection plane. To do this, the height of the projected wall slice need to be found. It turns out that this can be done with a simple formula:

$$\text{Projected Slice Height} = \frac{\text{Actual Slice Height}}{\text{Distance to the Slice}} * \text{Distance to Projection Plane}$$

The logic behind this formula is explained in the Figure 20 below.

Figure 20: The math behind wall scaling.





Our world consist cubes, where the dimension of each cube is 64x64x64 units, so the wall height is 64 units. We also already know the distance of the player to the projection plane (which is 277). Thus, the equation can be simplified to:

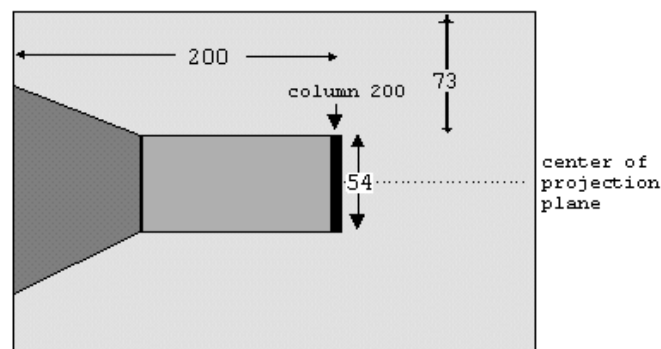
$$\text{Projected Slice Height} = 64 / \text{Distance to the Slice} * 277$$

In an actual implementation, several things can be considered:

- For instance, 64/277 can be pre-computed, since this will be a constant value. Once this is calculated, the wall slice can be drawn on the screen. This can be done by simply drawing a vertical line on the corresponding column on the projection plane (screen).
- Remember where the number 277 came from? This number can actually be deviated a bit without causing any huge impact. In fact, it will save time to use the value of **255** because the programmer can use shift operator to save computing time (shift right by 3 to multiply, shift left to divide).




For example, suppose the ray at column 200 hits a wall slice at distance of 330 units. The projection of the slice will be $64 / 330 * 277 = 54$ (rounded up). Since the center of the projection plane is defined to be at 100. The middle of the wall slice should appear at this point. Hence, the top position where the wall slice should be drawn is $100 - 27 = 73$. (where 27 is one half of 54). Finally, the projection of the slice will look something like the next figure (<http://permadi.com/tutorial/raycast/rayc9.html#FIGURE21>).

Figure 21: A partly rendered view.



<<PREVIOUS (/1996/05/ray-casting-tutorial-8/) | TABLE OF CONTENTS (/1996/05/ray-casting-

tutorial-table-of-contents) | CONTINUE >> (/1996/05/ray-casting-tutorial-10/)

Share this:  (<http://www.facebook.com/sharer.php?u=http://permadi.com/1996/05/ray-casting-tutorial-9/>)  (<http://twitter.com/share?url=http://permadi.com/1996/05/ray-casting-tutorial-9/&text=Ray+Casting+Tutorial+%E2%80%93+Part+9+>)  ([http://www.tumblr.com/share/link?url=permadi.com/1996/05/ray-casting-tutorial-9/&name=Ray Casting Tutorial - Part 9](http://www.tumblr.com/share/link?url=permadi.com/1996/05/ray-casting-tutorial-9/&name=Ray+Casting+Tutorial+-+Part+9))   (<https://plus.google.com/share?url=http://permadi.com/1996/05/ray-casting-tutorial-9/>)

< PREVIOUS POST ([HTTP://PERMADI.COM/1996/05/](http://permadi.com/1996/05/ray-casting-tutorial-8/) RAY-CASTING-TUTORIAL-8/) NEXT POST > ([HTTP://PERMADI.COM/1996/05/](http://permadi.com/1996/05/ray-casting-tutorial-10/) RAY-CASTING-TUTORIAL-10/)

Write your comment here ...

LEAVE A REPLY

You must be logged in (http://permadi.com/wp-login.php?redirect_to=http%3A%2F%2Fpermadi.com%2F1996%2F05%2Fray-casting-tutorial-9%2F) to post a comment.

Advertisement

Like Us on Facebook (<https://www.facebook.com/pages/Permadi.com/102374649838897>) | Follow Us on Twitter (<https://twitter.com/PermadiWebsite>) | About (/about-me/) | Privacy Policy (/privacy-policy/) | Contact (/contact/) | Site Terms of Use (/terms-of-use/)
(C) 2017 F. Permadi