

John Carmack

BIOGRAPHY

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Early Life and Start

Growing up in Kansas City Missouri, John Carmack knew from an early age he wanted to work with computers. In an interview for Slashdot in 1999, he described himself of being an “amoral little jerk” when he was young. In fact, he spent a year in a juvenile home after being caught attempting to steal Apple II computers from a local school and showing little remorse in a subsequent psychiatric evaluation.

He studied computer science at the University of Missouri but dropped out to start taking programming contracts for the Apple IIGS. He has stated in hindsight he wasted some of his time in university due to a superiority complex as he states his views at the time were: “I am smarter than all these people around me, and therefore I will completely ignore anything that anyone has to say!”.

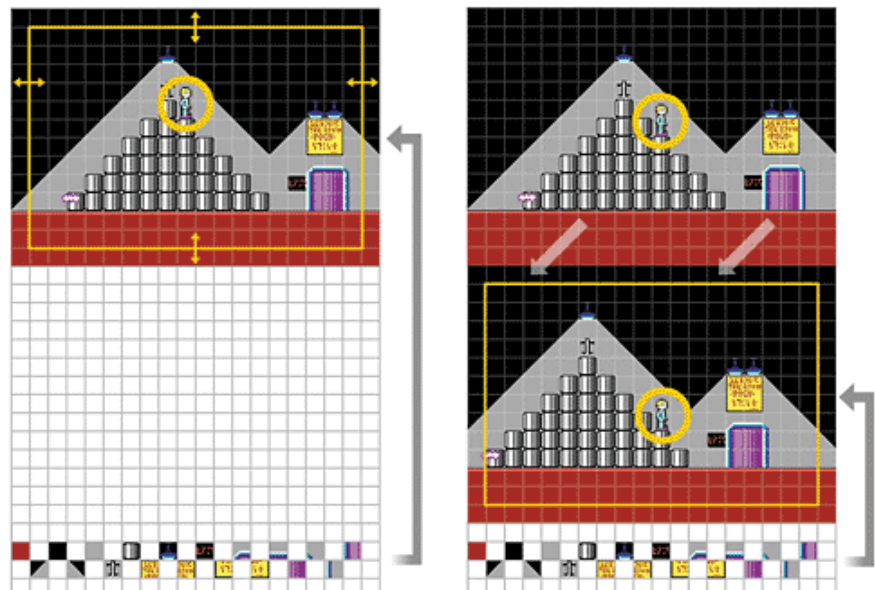
After completing several freelance contracts for Softdisk he was employed full time to work on their Gamer’s Edge subscription service. It was here he would meet programmer John Romero, artist Adrian Carmack and designer Tom Hall. These 3 individuals would go on to co-found id Software in 1991 with Carmack. The team would go on to make several key innovations in the PC game development over the 90’s.

Innovation

At the beginning of 90’s most PC’s had relatively poor graphical performance compared to the dedicated gaming consoles at the time. While side scrolling platformers like Super Mario Bros ruled the console space, they were difficult to replicate on PC’s due to processing power required to redraw the entire background every frame as there were no dedicated hardware features to support scrolling graphics like the consoles of the time. To work around this

limitation, Carmack with help from Tom Hall designed an algorithm to only redraw elements that needed to be updated when the player moved.

Carmack achieved this by having the background of tiles stored in memory, but the outside border of tiles would not be sent to the screen. This

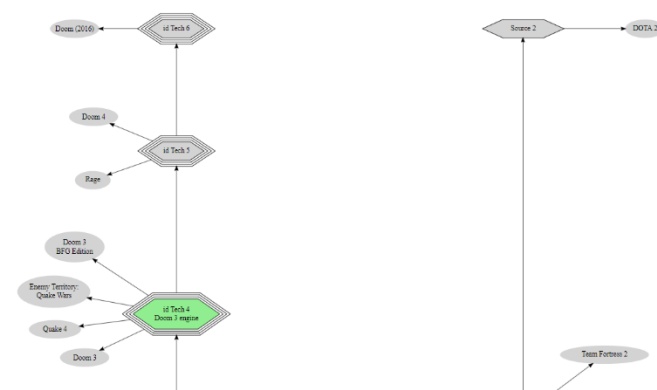


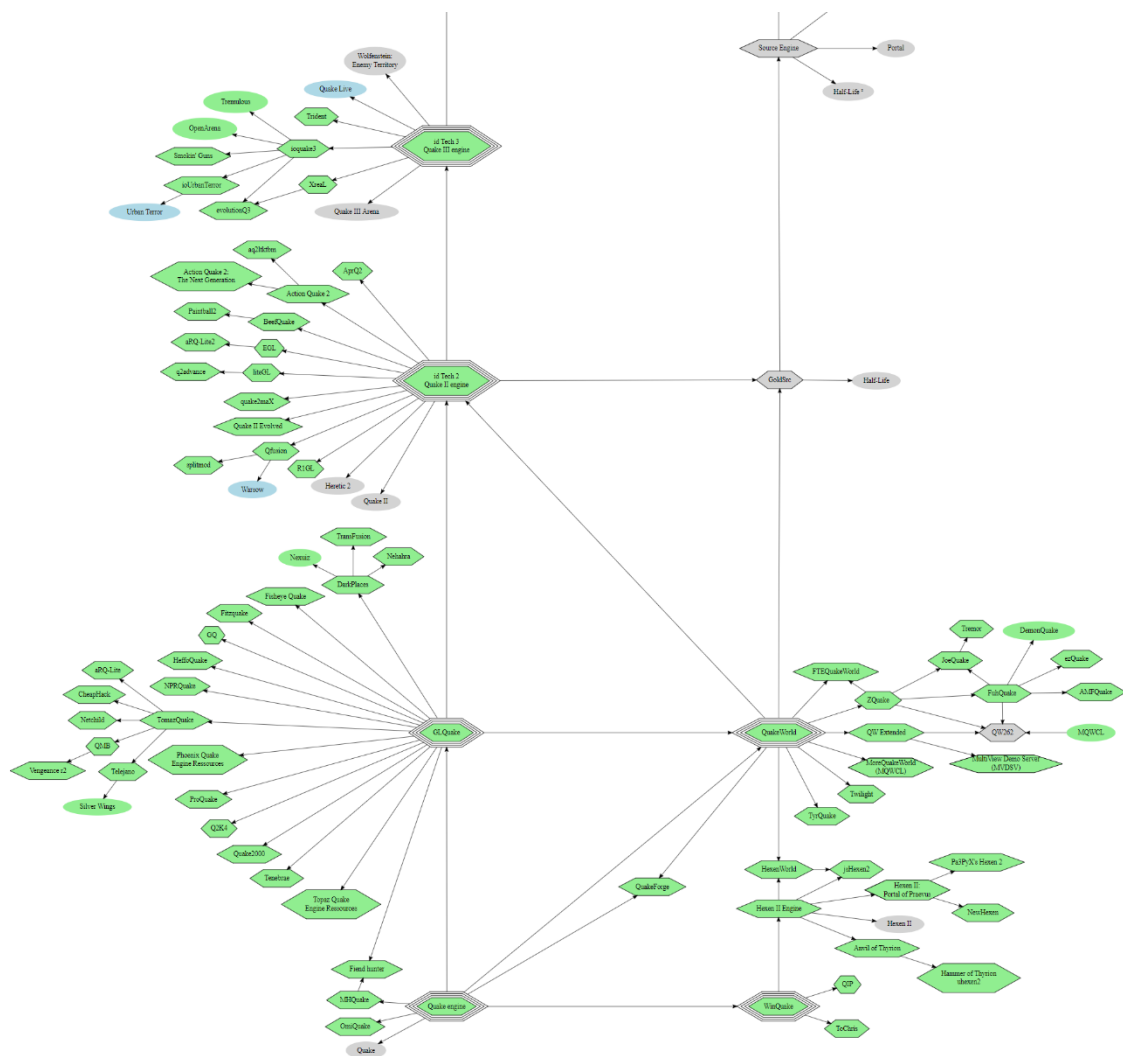
meant instead of drawing the screen every time the player moved, the origin of the image would be shifted in the direction of the movement. When the edge of the image was reached the last column of tiles on either side, most of the existing image would be reused with new tiles being drawn onto the edge. The origin would then be moved to center on this new image. This adaptive tile refresh method was considerably more efficient than redrawing the entire background and allowed the CPU to focus on drawing player and enemy animations. This led to id software pitching a Super Mario Bros. 3 PC port to Nintendo. While impressed by their demo Nintendo refused their offer as they didn't want their intellectual property on anything but their own hardware.

Carmack's next big contribution was his pioneering efforts on 3d graphics used in Wolfenstein 3D and Doom. Again, due to PC limitations at the time, 3d graphics that change dynamically based on the player's location could be incredibly taxing for the CPU's of the time. Thus, an efficient algorithm was needed to render only what was necessary (e.g. the player's field of view). This was achieved by Carmack using binary space partitioning. This allowed 3d walls to be rendered front to back avoiding unnecessary rendering of objects not in view using recursive binary tree traversal. From this the program was able to gauge distance by drawing lines based on the viewer's location. In an interview Carmack stated that "Doom treated [the surfaces of the 3-D world] all as lines, cutting lines and sorting lines is so much easier than sorting polygons.... The whole point was taking BSP [trees] and applying them to...a plane, instead of to polygons in a 3-D world, which let it be drastically simpler." The process would end when all the x-axis values of the player's vision were accounted for. This divide and conquer approach to rendering allowed these games to run so smoothly in time where nothing could come close to its pioneering 3d graphical quality.

Engine Legacies

Probably Carmack's most far-reaching work in the game development world was his work on the Id Tech series of engines starting with the Quake Engine. The engine was able to achieve full 3d rendering with lighting and shadows using more efficient utilizations of some of the methods mentioned before and 3D hardware acceleration support used by the latest graphics cards. In 1997, Carmack released the entire engine's source code online for free under public license. This allowed many developers to modify and add to the engine, a notable example being GoldSrc. This was Valve Corporation's first game engine that ran Half Life based on the framework of Quake's engine, albeit heavily modified.





This series of engines that Carmack developed had a far-reaching effect in industry. Id tech 3 was licensed to Infinity Ward to create the original Call of Duty creating a 15-billion-dollar franchise. Tim Sweeney the founder of Epic Games has been on record to say that he was heavily inspired by "John Carmack's pioneering programming work on Doom and Quake" when developing the original Unreal Engine which is the currently the industry leading 3d engine.

Carmack has released the source code of every project released during his time at Id and has been on record to detest the practice of software patents: "Why should society reward that? What benefit does it bring? It doesn't help bring more, better, or cheaper products to market. Those all come from competition, not arbitrary monopolies."

In August 2013 Carmack became the CTO for Oculus VR and left Id shortly afterwards. Unfortunately, his recent career at Oculus has been marred by messy lawsuits regarding the sale of Id software to ZeniMax Media and the ongoing accusations that Carmack violated his non-disclosure agreement with ZeniMax when working at Oculus.

In summery there is no denying the impact Carmack has had on the gaming industry. Considering inflation, the video game industry has almost tripled in terms of revenue since the early 90's to 108.9 billion dollars. While obviously not the only contributor Carmack influence in growing the PC gaming market despite the limitations at the time and creating ground breaking game engines have left a lasting mark on the industry today.

Bibliography:

<https://www.britannica.com/biography/John-Carmack>

https://en.wikipedia.org/wiki/John_Carmack

http://fabiensanglard.net/fd_proxy/doom3/pdfs/johnc-interviews.pdf

<https://vimeo.com/148909578>

<https://spectrum.ieee.org/consumer-electronics/gaming/the-video-game-software-wizardry-of-id>

<https://www.youtube.com/watch?v=yTRzfKh4Tgo>

<https://web.archive.org/web/20080719150755/http://developer.nvidia.com/attach/6832>

<https://slashdot.org/comments.pl?sid=151312&cid=12701745>

http://vgsales.wikia.com/wiki/Video_game_industry