John Carmack

John Carmack has been a hugely influential software engineer in the gaming industry. he pioneered using conceptual solutions to 3d and rendering problems that were developed in research institutes and then translating them to the video game environment. This provided solutions to rendering and running time problems in video games. He is also a major advocate for open-source software development and has been a key member in hugely influential projects that have influenced game design.

John Carmack was born Shawnee Mission, Kansas in nineteen seventy. As a kid he was interested in video games from a young age. This interest included games like Pac-Man and Space Invaders. When he was fourteen, he helped a group of other children break into a school to steal Apple II computers. Carmack helped by making a mixture of thermite and Vaseline to burn a hole into the windows so they could sneak in without tripping the alarm. The solution worked and the alarms were not tripped once a hole had been burned out of the glass window. The resulting hole was not big enough for everyone in the group though and one of the kids ended smashing the glass as he was entering resulting in an alarm getting set off and the police arresting the gang. This event speaks to the more irrational and atypical behaviour associated with Carmack when he is searching for innovative solutions to problems. After High school he attended the University of Missouri–Kansas City (UMKC) until he dropped out to pursue a career as a freelance programmer.

Soon after withdrawing from university, he was hired by a computer company called Softdisk in Louisiana to work on a series of disk magazine publications. From here john Carmack was introduced to John Romero and other future members of id software and together they would form their own video game company called “id software” and released their first video game together called “Commander Keen”

The first of his technological contributions would be made in Commander Keen. This was Adaptive tile refresh. This technique is described by David Kushner in his book “masters of doom”

to compensate for the poor graphics performance of PCs in the early 1990s. Its principal innovation is a novel use of several EGA hardware features to perform the scrolling in hardware. The technique is named for its other aspect, the tracking of moved graphical elements to minimize the amount of redrawing required in every frame. Together, the combination saves the processing time that would be otherwise required for redrawing the entire screen

this allowed the computers of the time to be able to better handle common side scrolling style games of which Commander Keen was one. This led to a wider market of computers that could play the games that were being developed by Carmack. It also allowed for more complex and diverse levels as more of the world could be played without the drawback of having to redraw the entire screen.

the second big technological contribution made by Carmack includes the use of ray casting in “Hover tank 3D”, “Catacomb 3-D” and famously in “Wolfenstein 3D”. ray casting is a technique that is used to render 3d objects (hence the common use of the phrase “3d” in the named games). Ray casting was developed in nineteen seventy-eight by a man called Scott Roth whilst working at General Motors Research Labs. Ray casting renders 3d objects by using primitive solid types like cubes and cylinders then combining them into more complex solids by using set operators like union and intersection. This technique of rendering 3d objects had not been utilised in video games until Wolfenstein 3d was released. Due to john Carmack willing to adopt new and cutting-edge solutions to the development of better video game graphics it allowed for higher graphical ceiling for videos games on computers of the time. The use of ray casting in this case meant that a game centred in a 3d environment could be explored. Due to very few games of the time offering a true 3d experience it meant that in nineteen ninety-two when Wolfenstein 3d was released it would become a smash hit and inadvertently lead to id software being propelled from a small-time video game development company to becoming an industry leader.

the most famous game id software ever released, “Doom” was also the first game to use another technique introduced by john Carmack. This is the use of binary space partitioning. This technique was developed in nineteen sixty-nine for use in rendering scenes in large high powered flight simulators developed for the United States air force by the company General Electric. After this BSP was discussed heavily in the research community and appeared on several papers regarding 3d object rendering throughout the nineteen eighties. The technique involves recursively dividing a scene into two until the partitioning satisfies one or more requirements. It can be viewed as like a KD tree. In computer graphics this involves dividing the scene until each node of the binary spatial partition tree consists of only polygons that can render in arbitrary order. In the context of doom this was to draw scenes correctly by knowing what to draw to the screen based on where the player was. This is so that the player was never able to see behind any walls or look past certain areas due to incorrect rendering of a scene.

This problem had been solved in for video game development, but the running time was quite inefficient and due to Carmack’s introduction of a complex research technique it allowed for doom to run very well for a 3d game that was released in nineteen ninety-three. It was due to the development of techniques like this that lead to doom being ported to nearly every platform available at the time. It also was ported to handheld video games like the Gameboy. In two thousand and one, nearly eight years after its initial release. After this Carmack would go on to develop an engine for quake. During this time, he invented a technique know as surface caching. When working on doom3 and mega Texture technology he would develop the use of a fast inverse square root algorithm. Showing that throughout his career as a video game developer he persisted in searching for new and innovative solutions to problems instead of relying on old techniques.

Outside of Carmack’s contribution to software development in the video game industry he is a huge advocate for open-source software. He has led strong and long-standing opposition to software patents calling them “robbery”. He himself has worked on open-source projects like porting the X window System to Mac OS X Server. And improving OpenGL drivers for Linux.

His biggest contribution to the spirit of open-source software has been his constant insistence on releasing the source code of his old games despite the lucrative opportunity of holding on to them. He first released the source code to Wolfenstein 3d in nineteen ninety-five (only 3 years after initial release) the second big game he released the source code for was Doom (only 4 years after initial release). Due to this doom and Wolfenstein had a thriving “modding” community that lead to the game having a strong impact on the gaming community at the time giving them a platform to develop mods for a 3d environment. The ease of which mods could be added also helped to give the game a sense of bootleg style that made it leave an impression on those that got to experience it that way. this directed trends in video games over the next twenty years. An example of john Carmack’s endorsement of open-source development was when a fan developed a patch for quake (another popular id software game) so that it could run on Linux machines. The fan sent the patches to john Carmack and instead of Carmack taking legal action against the fan he instead decided to use the patches to develop a Linux version of the game. This shows that Carmack was not afraid of outside development on his own projects especially when it directly helped him refine his work.

To conclude john Carmack was a highly influential figure in the advancement of video game potential and performance on machines of the time. His approach to video game development allowed for more complex development and depth in video games. Secondly his stance on open-source software has allowed for a more widespread adoption of the concept due to him being a highly influential figure in video game development.

Bibliography

John Carmack early life:

<https://www.pouet.net/prod.php?which=61298>

<https://web.archive.org/web/20180304184833/http://www.bethblog.com/gate.php?referer=%2Fweb%2F20170320052321%2Fhttp%3A%2F%2Fwww.bethblog.com%2F2011%2F01%2F26%2Fall-the-rage-john-carmack%2F>

ray tracing:

<https://www.pouet.net/prod.php?which=61298>

Bsp :

<https://www.pouet.net/prod.php?which=61298>

open source:

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