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**presentation**

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**Название:**

John Carmack and his achievements

**Дисциплина:** Английский язык

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**Presentation**

1. Introduction

John Carmack, along with John Romero, became the founders of the FPS game genre. On weak Intel486SX microprocessors, without video cards, they gave out a real 3D shooter without lags with a presence effect, which became a bomb for 1993 - in the era of turn—based strategies and the absence of scrolling.

In the development of the Wolfenstein 3D and Doom video games, John Carmack really used a bunch of non-standard techniques like converting pointers or going beyond the boundaries of objects.

1. Projects

To understand the level of John Carmack's legend, just look at the list of his developments, which includes 41 games published from 1990 to 2012. Some instances:

• Slordax, 1990, the first implementation of side-scrolling in PC games,

• Wolfenstein 3D, 1992, texture mapping,

• Doom, 1993, BSP-trees, abandoning music in favor of ambient noise (Carmack's idea),

• Doom II, 1994,

• Heretic, 1994,

• Hexen: Beyond Heretic, 1995,

• Quake, 1996,

• Quake II, 1997,

• Quake III Arena, 1999,

In subsequent games (after 1999), he no longer acted as a leading programmer, but as a technical director.

He developed game engines almost alone, while other employees concentrated on design, levels and other game mechanics.

1. Childhood at the computer

John Carmack was born on August 20, 1970 and became interested in computer games at a young age. At that time there was no Internet, at first little Jondi (John D. Carmack II) went to the library and looked for some books on programming, studied from them.

In the following years, he actively studied programming, played Ultima, but when at the age of 15 he read Stephen Levy's book "Hackers. Heroes of the computer revolution", the fate of the teenager was decided. The book told about the geeks who changed the world and their culture: experiments with mainframes at MIT, homemade programs, independent game development companies.

1. Running own company

Most of all, he liked to program graphics, including 3D models. The result was immediately visible on the screen. Carmack's first game was called Shadowforge and was very similar to Ultima, although it contained several additional features: for example, the character could attack not in four directions, but in eight. John earned a thousand dollars by selling the game to a private company. Then he continued to work as a freelancer, selling his games to various publishers, and eventually agreed to accept a job offer from Softdisk. Thus began his gaming career as a professional developer.

Working at Softdisk, 19-year-old Carmack came up with a way to implement scrolling on a PC. It was such a breakthrough and impressive idea that a colleague named John Romero persuaded the prodigy to take working computers from the old firm and found his own company, which they called id Software.

1. Professional hacks

One of the hacks is the technique of binary space partitioning (or BSP-tree) — solving the problem of rendering a 3D scene. It is sometimes called visible surface detection (VSD).

For the Doom game, we had to write a fundamentally new object-oriented renderer.

1. Description of BSP-tree

The constructed BSP tree is easy to use to ensure the priority order of objects in the scene. Here is an example diagram of building and traversing a BSP tree representing a simple two-dimensional scene. In a three-dimensional scene, the geometry is more complicated, but the idea is the same:

The first step. The main line along wall D splits the scene into two sets

The second step. The half-spaces on both sides of D are separated again. Wall C is the only one in its half—space, so splitting is not required. Wall B forms a new dividing line in its half-space. Wall A needs to be broken because it crosses the dividing line

The third step. The ordering of the walls relative to the viewing point in the upper right corner, necessary for the pixel coloring algorithm. Here is just a sequential traversal of the tree

A remarkable feature of the BSP tree is that it is enough to build it once, and then the same BSP tree can be used to render the scene regardless of where the camera's point of view is. That's why the BSP tree is so useful for real—time rendering - all the hard work of building a tree is done in advance, not during rendering.

John Carmack not only appreciated the power of the idea, but also found a way to implement BSP trees in real time on processors that could not even perform floating-point operations.

Some experts believe that the episode with the binary partitioning of space is the best visual example of why Carmack became such a legendary figure in programming.

1. Current work

In the 2000s, Carmack became interested in designing rockets (Armadillo Aerospace, pictured at the X-Prize Cup 2005 rocket festival) and virtual reality helmets (Oculus Rift). And now he is using his abilities to solve a more interesting task — creating a strong AI (Keen Technologies). John Carmack considers the emergence of Artificial General Intelligence (AGI, Strong AI) "possible", and he personally has a "non-zero chance to contribute" to this extremely valuable invention.