

# James Gosling

Creator and Father of Java



## Background and Education

James Gosling is a Canadian computer scientist and software engineer commonly and affectionately known as the “Father of Java”.

Gosling was born in Alberta, Canada on the 19<sup>th</sup> May 1955. His father’s side of the family worked in farming while his mother worked in tourism. Gosling’s love for computers that would go on to inspire his transformation of the world of computing began at about 13 years old when he received a tour of the computer department of the University of Calgary. He describes this as “pretty much love at first sight” and this was the experience that led to him teaching himself programming by sneaking into the university and using the facilities there. His ability at an early age was so impressive that he landed a job as a software engineer in the physics department of the university while still in school.

Gosling went on to complete a BSc in Computer Science at the University of Calgary in 1977, before obtaining his M.A and subsequently Ph.D in Computer Science in 1983 from Carnegie Mellon University in Pennsylvania.

Gosling has a love of proving “the unknown” and famously has a framed picture on the wall of his office of his favourite irrational number,  $\sqrt{2}$  to 1,000 digits.

## Work

In 1981, while working on his postdoctoral thesis on Algebraic Constraints, Gosling wrote a version of Emacs known as Gosling Emacs, sometimes shortened to gosmacs or gmacs. He initially allowed it to be distributed without restriction but later sold it to UniPress. While at Carnegie Mellon he also developed a multi-processor version of Unix as well as a number of other compilers and mail systems.

Following his Ph.D, Gosling joined Sun Microsystems in 1984, a company whose expertise spanned computers, computer components, software, and information technology services. Initially he worked on network extensible windows systems, before he began implementing a compiler for a safe multi-threaded distributed object-oriented programming language named Oak in 1991.

Oak was created when Gosling led a team to develop software for next generation smart appliances. He explained that C or C++ had issues such as unchecked array bounds, pointers and the fact that anything could be cast to anything without any checks, all of which could cause reliability issues for consumer electronics, an area where safety and reliability were a key concern of manufacturers. He decided to create a new programming language instead to use for developing this software in a more reliable fashion. The language Gosling and his team, known as 'The Green Team' created was called 'Oak', named after the tree that stood outside Gosling's office. While initially, Oak was developed with the intention of being used for appliances such as digital cable television, it was too advanced for this purpose and the focus switched towards the web. In 1994 following trademark issues, the name was changed to Java and in 1996, history was made when Java 1.0 was shipped.

Java transformed the internet. The Java compiler turns code into Bytecode which is analysed by the JRE (Java Runtime Environment) or Java Virtual Machine and translated for interpretation by the users' computers. As a result, various types of computers are able to retrieve the same webpage, meaning that web browsers could be interactive rather than having only static pages.

Numerous versions of Java have been released since, and it is one of the most popular languages used worldwide, and can be deployed across multiple platforms. Gosling continued to work for Sun Microsystems with titles of CTO, VP & Fellow until April 2, 2010 shortly after it was acquired by Oracle. Gosling cited pay reductions, status, decision-making ability, change of role and ethical challenges as reasons for leaving.

Since leaving Sun Microsystems, Gosling worked for Google, a startup called Liquid Robotics and in May 2017 he joined Amazon Web Services as a Distinguished Engineer. As well as his work with Amazon Web Services, Gosling is an Independent Director at Jelastic, an adviser at Lightbend, Strategic Advisor for Eucalyptus, and board member of DIRT Environmental Solutions.

For his work and contribution to computer science and software engineering, James Gosling received numerous awards and commendations. Most notably:

- Awarded *The Economist* Innovation Award in 2002.
- Awarded *The Flame Award* USENIX Lifetime Achievement Award in 2002.
- Made an Officer of the Order of Canada in 2007. This Order is Canada's second highest civilian honour with officers being the second highest grade within it.
- Became a fellow of the Association for Computing Machinery in 2013.
- Awarded IEEE John von Neumann Medal in 2015.
- Elected as a Foreign Associate member of the National Academy of Engineering in the United States.

## Impact & Conclusion

It's no overstatement to say that Gosling revolutionised the world of computing when he created Java. This was the first programming language widely available that enabled users to transmit code over the internet between computers to be executed while still meeting security requirements. The ability to "write once, run anywhere" provided a new degree of portability, and features such as automatic storage management; just-in-time compilation and standard libraries executable by any Java virtual machine are just some factors contributing to Java becoming one of the most broadly used programming languages in the world. Java can be found in consumer technology, handheld devices, computers, servers and electronic chips in bank and identity cards among other places.

Gosling was the developer behind the first Unix windows manager and one of the first multi-format text editors that allowed the use of tables, pictures, and other graphics in a single document. Gosling has also worked on embedded systems for the ISIS II satellite, a real-time specification for Java, and while employed by Liquid Robotics he worked on autonomous ocean-going robots.

It's clear that Gosling's work has had a profound influence on the world of computing, and has turned him into one of the most celebrated and respected software engineers of our time. A measure of the success of his work and the impact it has on the day to day lives of ordinary people is an incredible figure. The number of devices running Java today is 15 billion, roughly double Earth's population.

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