

Are IEEE 754 32-bit and 64-bit binary floating -point accurate enough?

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Abstrak

This paper describes a research toward the accuracy of floating-point values, and effort to reveal the real accuracy. The methods used in this research paper are assignment of values, assignment of value of arithmetic expressions, and output the values using floating-point value format that helps reveal the accuracy. The programming-tool used are Visual C# 9, Visual C++ 9, Java 5, and Visual BASIC 9. These tools run on top of Intel 80 x 86 hardware. The results show that $1 \cdot 10^{-x}$ cannot be accurately represented, and the approximate accuracy ranges only from 7 to 16 decimal digits.