

STA2005S - Experimental Design Assignment

Jing Yeh

yhxjin001@myuct.ac.za

Saurav Sathnarayan

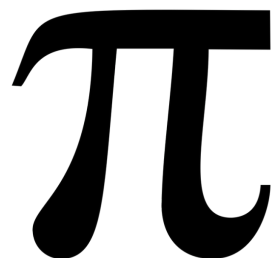
sthsau001@myuct.ac.za

2024-09-16

Abstract

In this report, we explored the efficiency of 6 programming languages through the approximation of π . We found that efficiency of various programming languages can vary widely, with C and C++ being the most efficient programming languages. We also presented evidence for compiled languages having better performance than interpreted languages. Our results suggest that programmers can benefit from taking the efficiency of various programming languages into account, rather than simply opting for simplicity in the syntax of these languages .

Keywords: Programming Languages, Efficiency, Large-Scaled Iterative Computations

A large, bold, black Greek letter pi (π) is centered on the page. The symbol is rendered in a classic serif font, with a thick horizontal bar at the top and a curved tail that loops back to the right.

Contents

1	Introduction	1
1.1	Compiled vs Interpreted Languages	1
1.2	Distribution of Execution Times (Pilot Experiment Part 1):	2
2	Methods	3
2.1	Setting	3
2.2	Approximation of π	3
2.3	Sampling Procedure	3
2.4	Sources of Variation	4
2.5	Experimental Units:	4
2.6	Randomisation Procedure	4
2.7	Planned Comparisons	4
2.8	Pilot Experiment Part II	5
2.9	Design	5
3	Results	7
3.1	Verifying Model	7
3.2	Pairwise Comparisons	8
3.3	Compiled vs Interpreted	8
4	Discussion	10
5	Conclusion:	10
6	Appendix	11
7	Reference	12