

# Comparing Performance Differences Between RUST and C++

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**Abstract**—The following research paper attempts to compare between two of the most popular low-level systems programming languages: RUST, and C++. We aim to find performance differences between the two by taking the x86 CPU Platform as a baseline, compiling to the Assembly, using a proprietary Assembly Tracer and Analyzer Program (tra86) built to trace execution, and analyzing the output trace files. The findings lean towards favoring RUST, which on top of the security, inheritance, and debugging benefits, also provides a huge gain in performance on the systems level.

**Index Terms**—compilers, programming languages, assembly, systems, performance

## I. INTRODUCTION

Computers are an intricate piece of machinery, wherein decades of development and contributions have shaped the field to what it is today. What started as an electronic method of crunching numbers in its infancy has evolved to the primary method of data exchange and communications today. These developments have taken place at various stages of computation: from low-level systems that communicate directly with the hardware, to high-level code such as Artificial Intelligence or Internet Webpages. Decades of contributions to all these different levels of computation have rendered the systems that we use daily.

The building block of any computer program are the set of commands that a programmer passes to the computer, namely via a programming language. In a compiled-language, the user-written source code is translated to Assembly, Assembled into an Object File with external files linked, and then compiled into an executable file. Thus, in modern-day programming, the programming language at use is the most crucial element at

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Table Head	Table Column Head		
	Table column subhead	Subhead	Subhead
copy	More table copy <sup>a</sup>		

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ACKNOWLEDGMENT

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