Project Title:

Continuing the project: Optimizing FreeType's Benchmark Integration for Consistent Performance Measures

Size:

350h project

Applicant Name:

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Abstract:

Last year, I took significant steps towards integrating benchmarking capabilities into FreeType's build system, focusing on the ftbench demo program. Although successful, the integration has not yet achieved the desired consistency in performance results. With a deep understanding of FreeType's codebase, makefiles, and project structure, I propose to refine this integration, targeting consistent and reliable benchmark outputs. This project will leverage my familiarity with the system to address existing issues, enhance performance measurement accuracy, and ensure results are beneficial for FreeType's continuous improvement.

Problem Statement:

The integration of the ftbench benchmark into FreeType's build system was a critical step towards measuring the library's performance. However, the challenge of producing consistent results across different builds remains. As performance benchmarking is essential for identifying and addressing inefficiencies, the current variability in results hampers our ability to monitor improvements accurately.

Proposed Solution:

This project aims to optimize the previously integrated benchmarking system within FreeType's build process, focusing on achieving consistent and reliable performance results. I plan to:

- Analyze and identify the causes of inconsistency in the current benchmarking results.

- Implement enhancements to the benchmarking process, ensuring stable and comparable outcomes across versions and configurations.

- Leverage my in-depth knowledge of FreeType's project structure and build mechanisms to make targeted adjustments for improved benchmark performance.

Implementation Plan:

Phase 1: Analysis and Planning (Weeks 1-3)

- Conduct a thorough analysis of the current benchmarking integration, pinpointing sources of inconsistency.

- Plan enhancements to the build and benchmarking process, focusing on stability and reliability.

Phase 2: Development of Optimizations (Weeks 4-7)

- Develop solutions to identified issues, applying my knowledge of the codebase and makefiles for precise modifications.

- Test the enhancements in varied environments to ensure they address the inconsistencies effectively.

Phase 3: Refinement and Testing (Weeks 8-11)

- Further refine the benchmarking process based on test results, aiming for optimal consistency.

- Engage with the FreeType community for feedback on the changes and their impact on benchmarking reliability.

Phase 4: Documentation and Final Adjustments (Weeks 12-14)

- Document the optimization process, detailing the steps taken to achieve consistent benchmarking results.

- Make final adjustments based on community feedback and prepare for integration into the FreeType CI pipeline.

Expected Outcomes:

- A refined benchmarking integration within FreeType's build system that delivers consistent and reliable performance metrics.

- Detailed documentation of the optimization process and setup for future developers.

- Develop Meson and CMake files addition to last years Make.

Experience and Background:

I am a junior Computer Engineering student at Istanbul Sabahattin Zaim University, with a strong background in web development, programming, and open-source contribution. My prior experiences include:

- Contributing significantly to FreeType's benchmarking code integration last year, my extensive familiarity with the project's codebase, makefiles, and structure positions me uniquely to carry this optimization forward. [1]

- Successfully developed a donation automation system for NetBSD (at the same time with FreeType's project) "Continuing the Automation: Automating Donor Acknowledgement and Information Storage & Updating". It wasn't accepted officially as part of GSoC, however NetBSD board recognized my dedication and accepted me for outside support to work on their project. The donation automation

system depend on Python (Flask) and PostgreSQL which successfully streamlined the contribution process. Worked closely with my mentor, Christos Zoulas. [2]

- I am working at BSH (formerly Bosch-Siemens Hausgerate) Solutions Architecture Intern (until June 2024) field which is working in agile/scrum development methodologies. I got experience here to set CI/CD pipelines through GitHub actions, Containerization, Log Management and API Management.

- Developed an emergency services application for Android and web, which earned me 1st place in coding by TÜBİTAK (The Scientific and Technological Research Council of Turkey), the most prestigious award for high school students in Turkey. [3]

- Serving as the president of the Blockchain Club at my university and managing a blockchain payment system project for our campus.

- Huge diversity of interest in CS spanning HAM radio and havin radio amateur licence to cybersecurity and receiving awards from companies for reporting vulnerabilities in their systems.

[1]: https://gitlab.freedesktop.org/freetype/freetype/-/tree/gsoc-2023-ahmet-final

[2]: https://github.com/goeksu/NetBSD-Donation-Automation

[3]: https://github.com/goeksu/Conserva

Why This Project:

Continuing from where I left off last year, I am motivated by the opportunity to solve the remaining challenges and contribute further to FreeType's development. Achieving consistent benchmarking results is crucial for the project's progress, and I am committed to making this a reality.

Availability:

I am fully committed to dedicating my summer to this project, ensuring its completion within the stipulated timeframe. My primary focus will be on delivering a robust solution that meets the project's needs and expectations.

Conclusion:

Building on my contributions from the previous year, this project aims to solidify FreeType's benchmarking framework, ensuring it provides consistent and reliable performance measurements. Through targeted optimizations and leveraging my deep project knowledge, I look forward to contributing to FreeType's ongoing enhancement and reliability.