

**Project Title:**

Integrate ftbench into FreeType's build structure

**Applicant Name:**

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**Abstract:**

The project aims to integrate the ftbench demo program into FreeType's build system, allowing for easy performance comparison between baseline and current git versions. Furthermore, the project will integrate the results into FreeType's CI as provided by GitLab.

**Problem Statement:**

Currently, the ftbench demo program operates independently from FreeType's build system, making it difficult to evaluate performance improvements and regressions between releases.

**Proposed Solution:**

Develop an automated system to integrate ftbench into FreeType's build structure, enabling easy comparison of performance metrics, and incorporate the results into FreeType's CI.

**Implementation Plan:**

1. Analyze and understand the ftbench source code and FreeType's build system
  - *Review the ftbench source code, focusing on its functionality and interaction with FreeType library functions*
  - *Study FreeType's build system, including its Makefile, CMake, and Meson configurations*
  - *Understand how FreeType's CI is set up on GitLab using GitLab CI/CD*
2. Integrate ftbench into FreeType's build system
  - *Add ftbench to the Makefile, CMake, and Meson configurations*
  - *Ensure ftbench is built alongside the FreeType library and other demo programs*

3. Design a method to compare baseline and current git version performance metrics
  - *Establish a method for running ftbench on both the baseline version (e.g., a stable release) and the current git version*
  - *Implement a mechanism for calculating performance differences between the two versions using Python or a shell script*
4. Choose between modifying ftbench to emit HTML code or post-process raw results with a script to produce an HTML page
  - *Evaluate the pros and cons of each approach in the context of the project requirements*
  - *Select the most suitable approach based on the evaluation*
5. Implement the chosen method for generating an HTML report
  - *If modifying ftbench, implement necessary changes to emit HTML code by leveraging FreeType's FT\_Outline\_Decompose function and SVG output capabilities*
  - *If post-processing raw results, develop a script (e.g., in Python or JavaScript with Node.js) that processes ftbench output and generates an HTML report using an open-source template engine like Jinja2 (Python) or EJS (JavaScript)*
  - *Ensure the report is easy to read and highlights performance differences*
6. Integrate the results into FreeType's CI on GitLab
  - *Develop a GitLab CI configuration that runs ftbench and generates the HTML report using GitLab CI/CD YAML syntax*
  - *Integrate the configuration into FreeType's existing GitLab CI setup*
  - *Ensure the CI pipeline runs smoothly and generates the HTML report upon successful builds*
7. Document the integration process, user guide, and any changes made to ftbench or FreeType's build system
  - *Write comprehensive documentation on integrating ftbench into FreeType's build structure*
  - *Provide a user guide on how to use the new ftbench integration and interpret the HTML report*
  - *Document any changes made to ftbench or the build system, ensuring future maintainability*
8. Perform thorough testing and address any bugs or issues that arise during the implementation
  - *Test the ftbench integration with various FreeType versions and configurations*
  - *Fix any bugs or issues discovered during testing to ensure a robust and reliable solution*
9. Finalize the implementation, addressing any feedback from mentors and the FreeType community

- *Revise and polish the implementation based on feedback received*
- *Ensure the final solution is well-documented and easy for the FreeType community to use and maintain*

### **Timeline:**

Week 1: Discuss project details with mentors and set up development environment

Week 2-3: Integrate ftbench into FreeType's build system(s) and test for functionality

Week 4-5: Post-process ftbench's raw results to produce a nice-looking HTML page

Week 6-7: Modify ftbench to emit HTML code directly

Week 8-9: Integrate results into FreeType's CI as provided by GitLab

Week 10-11: Testing, bug fixing, and documentation

Week 12: Final documentation and project report

### **Deliverables:**

1. ftbench integration into FreeType's build structure
2. Performance comparison method for baseline and current git versions
3. HTML report generation from ftbench results
4. Integration of results into FreeType's CI on GitLab
5. Comprehensive documentation and user guide

### **Experience and Background:**

I am a sophomore Computer Engineering student at Istanbul Sabahattin Zaim University, with a strong background in web development, programming, and computer sciences. My prior experiences include:

- As a student at the 42 School, I have developed a strong foundation in C programming, algorithms, and Unix build tools. This educational background, along with my experience in creating a libc library, demonstrates my expertise in C and understanding of library structures.
- Developing 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. The project is available on my GitHub profile.
- Serving as the vice-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.

**Why FreeType and this Project:**

FreeType is an important open-source project with a significant impact on the rendering of fonts and text across various platforms. My expertise in C programming and experience with libc creation make me well-suited for this project, allowing me to contribute to the FreeType community effectively.

**Availability:**

I am available to dedicate my time to the Google Summer of Code project for the entire summer, making it my top priority. If not selected, I plan to pursue other internship opportunities in Turkey, but my primary goal is to participate in GSoC.

**Conclusion:**

I am eager to contribute to the FreeType project and the open-source community through this Google Summer of Code project. I am confident that my background in C programming, 42 School education, and experience with libc creation will enable me to successfully integrate ftbench into FreeType's build structure and enhance performance evaluation. Thank you for considering my proposal, and I am looking forward to working with the FreeType team.