Your name
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Course: CSDS 337 - Compiler Design
Instructor: Dr. Vipin Chaudhary

Project
ID: 123456789
Term: Spring 2021
Due Date: 9th May, 2021

Number of hours delay for this Project: Put hours here
Cumulative number of hours delay so far for each member: Put hours here

Project Team Members: Put names here

Problem 1
Write a C or C++ program to showcase some of the features of Clang and LLVM. You want to write a C program that will best showcase the features of various optimizations. Use time function inside the code to measure program time for performance measurements. This is open ended project but minimum expected effort includes:

1. For a given architecture, compare the time it takes for different types of compiler optimization. Also use compiler option to minimize code size. Compare the codes (target assembly code) for all cases to isolate the types of optimizations implemented.

2. Show at least three different optimizations in your code that are affected by compiler optimizations.

Choice of the C/C++ code will have an impact on the grades. Indicate where such code could be used or use code for known algorithms (sorting, searching, numerical computation, etc.).

1. Bonus (upto 33% based on quality and quantity): Use as many LLVM Analysis, Transform (most important), and Utility Passes (https://llvm.org/docs/Passes.html) that are applicable to your example with complete makefile (or command line script) for the passes and appropriate documentation of results. You may also want to refer to clang.llvm.org

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Deliverables: A zip file containing

- **File with your code**

- **README text file with directions to run the various programs**

- **Report showing original code and optimized code snippets and the particular optimization used; results (table of performance). Similarily for the bonus portion.**

  - **Full names and Case IDs**
  - **(not required) any special notes about your implementation the grader should be aware of**

Tip: An app such as Notepad++ can be used to create .t files which you can use to test your program in the test folder.