

**MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF COMPUTER ENGINEERING**

**CENG 491
SENIOR DESIGN PROJECT
PROPOSAL REPORT
FALL 2007**

Group Name: Hellim

Group Members:

Kutay YILDIRICI	e143393@metu.edu.tr
Tayfun ÇAKICIER	e154349@metu.edu.tr
Halit Emre SAYILIR	e143385@metu.edu.tr
Anıl KOYUNCU	e143380@metu.edu.tr

Group Mail: hellim-ltd@googlegroups.com

Project Title: CStar - Optimizing C Compiler

Roles and Responsibilities

	Tayfun	Halit	Anil	Kutay
Leader			√	
Recorder	√	√		
Devil's Advocate		√		
Initiator				√
Time Keeper	√			
Gate Keeper				√
Optimist	√			
Summarizer			√	

Since there are many optimizations in the project, we decided to share the optimizations according to their difficulties. For example one member of the project will not do the easiest part and the other members will not try to solve the hardest part of optimizations. All the workload will be examined clearly and will be shared fairly.

We decided to do our weekly meetings twice a week on Mondays and Fridays after our common courses. Since we are all fourth year students, we know each other very well. Every team member has to share his comments and opinions about the project regularly. So every member of the team will have enough knowledge about the project.

Overview

Compilers' importances are increasing nowadays. Every new architecture depends on the compiler technology. For example Intel's compilers do not work with %100 efficiency with AMD's compilers.

In this project Halit, Anil and Tayfun will develop the optimizations on Linux native platform and Kutay will work under VMWare. Host machine would be X86 and GCC version 4 will be used in order to prevent complications due to framework. The optimizations will be tested on two benchmarks: Dhrystone and Whetstone.

The following will be implemented in the project:

1) Optimizations

At the beginning we will start with minimum requirements. First we will try to finish constant folding, basic block ordering, dead code elimination, local/global forward substitution, strength reduction, unreachable code elimination, dead object elimination, local/global copy propagation, local/global common subexpression elimination, jump optimizations.

2) Test Case Generator

We will develop a test case generator that will generate random C codes(around 1000-2000 lines).

3) Optimization Manager

We will also develop a manager for optimization. It will be able to read an external file during compilation. External file will support "if" and "simple loop" statements

Little Estimation with Cocomo

With Cocomo 81:

Submitted the pairs:

* size = 8000
 * mode = 1.12
 * rely = 1.40
 * data = 0.94
 * cplx = 1.30
 * time = 1.00
 * stor = 1.00
 * virt = 1.00
 * turn = 1.07
 * acap = 0.86
 * aexp = 0.82
 * pcap = 0.70
 * vexp = 1.10
 * lexp = 0.95
 * modp = 1.00
 * tool = 1.10
 * sced = 1.04

Results:
 Effort = 33.27 Person Months
 Schedule = 8.52 Months

With Cocomo 2:

COCOMO II		Source Lines Of Code		8,000		GO!		0		Pricing Per Hour			
		Project Complexity											
Team Skills		-8	-6	-4	-2	0	2	4	6	8	10	12	
4		12.8 6.6	13.3 6.7	13.9 6.8	14.5 6.9	15.1 7.0	15.7 7.1	16.4 7.2	17.1 7.4	17.8 7.5	18.6 7.6	19.4 7.7	8,000 Source Lines Of Code 0.8 Team Skills 1.20 Project Complexity 23.8 Person-Months 475 Person-Days 3,803 Person-Hours 0.7 Duration Years 8.3 Duration Months 167 Duration Days 1,333 Duration Hours 2.9 Average Staffing
3		14.9 7.0	15.5 7.1	16.2 7.2	16.9 7.3	17.6 7.4	18.4 7.6	19.1 7.7	19.9 7.8	20.8 7.9	21.7 8.0	22.6 8.2	
2		17.0 7.3	17.8 7.5	18.5 7.6	19.3 7.7	20.1 7.8	21.0 7.9	21.9 8.1	22.8 8.2	23.8 8.3	24.8 8.5	25.8 8.6	
1		19.2 7.7	20.0 7.8	20.8 7.9	21.7 8.1	22.6 8.2	23.6 8.3	24.6 8.4	25.6 8.6	26.7 8.7	27.9 8.9	29.1 9.0	
0		21.3 8.0	22.2 8.1	23.1 8.2	24.1 8.4	25.2 8.5	26.2 8.7	27.3 8.8	28.5 8.9	29.7 9.1	31.0 9.2	32.3 9.4	
-1		23.4 8.3	24.4 8.4	25.5 8.6	26.5 8.7	27.7 8.8	28.8 9.0	30.1 9.1	31.3 9.3	32.7 9.4	34.1 9.6	35.5 9.7	
-2		25.6 8.6	26.6 8.7	27.8 8.8	29.0 9.0	30.2 9.1	31.5 9.3	32.8 9.4	34.2 9.6	35.6 9.7	37.2 9.9	38.7 10.0	
-3		27.7 8.8	28.9 9.0	30.1 9.1	31.4 9.3	32.7 9.4	34.1 9.6	35.5 9.7	37.0 9.9	38.6 10.0	40.3 10.2	42.0 10.3	
-4		29.8 9.1	31.1 9.2	32.4 9.4	33.8 9.5	35.2 9.7	36.7 9.8	38.3 10.0	39.9 10.1	41.6 10.3	43.4 10.5	45.2 10.6	

Contact

Project Manager

Anil KOYUNCU

Telephone

(+90) 0505 7047389

Email

e143380@metu.edu.tr