CSC467: Compilers and Interpreters

Jianwen Zhu

December 3, 2017

Course Info

| Instructor | Jianwen Zhu  
|            | 312 Engineering Annex  
|            | jzhu at eecg.toronto.edu |

| Lecture   | Wed 12-02 WB130  
|           | Thu 05-06 BA 1240 |

| Tutorial  | Fri 02-03 WB130  
|           | Thu 03-04 HA401  
|           | on selected weeks |

| Lab       | Mon 03-06 GB243  
|           | Tue 09-12 GB243  
|           | on selected weeks |

Online Resources

Web Site  
http://www.eecg.toronto.edu/~jzhu/csc467/csc467.html

Important Dates

Oct 08 Midnight  Lab 1 due  
Oct 11  Midterm, in class  
Oct 22 Midnight  Lab 2 due  
Nov 19 Midnight  Lab 3 due  
Dec 03 Midnight  Lab 4 due  

Tutorial Schedules

TUT1  
TUT0101: Sep 29 2-3; TUT0102: Sep 26 3-4  
TUT2  
TUT0101: Oct 06 2-3; TUT0102: Oct 03 3-4  
TUT3  
TUT0101: Oct 13 2-3; TUT0102: Oct 10 3-4  
TUT4  
TUT0101: Nov 17 2-3; TUT0102: Nov 14 3-4  
TUT5  
TUT0101: Nov 24 2-3; TUT0102: Nov 21 3-4  
TUT6  
TUT0101: Dec 01 2-3; TUT0102: Nov 28 3-4
Lab Schedules

Lab1  PRA0101: Oct 02 3-6; PRA0102: Oct 03 9-12
Lab2  PRA0101: Oct 16 3-6; PRA0102: Oct 17 9-12
Lab3.1 PRA0101: Nov 06 3-6; PRA0102: Nov 07 9-12
Lab3.2 PRA0101: Nov 13 3-6; PRA0102: Nov 14 9-12
Lab4.1 PRA0101: Nov 20 3-6; PRA0102: Nov 21 9-12
Lab4.2 PRA0101: Nov 27 3-6; PRA0102: Nov 28 9-12

Office Hour
Please contact by email or during lectures to make appointment.

Course Description
Compiler organization, compiler writing tools, use of regular expressions, finite automata and context-free grammars, scanning and parsing, runtime organization, semantic analysis, implementing the runtime model, storage allocation, code generation.

Prerequisites
You are presumed to have good knowledge of computer architecture and programming languages. Background in operating systems, and experience in programming with C will prove helpful.

Text Book

Machine Project
You are required to complete a machine project, in which you are to construct a mini OpenGL shader compiler for graphics processors.
There will be 4 phases of the machine project, each of major scope. You are required to complete the majority of work of each phase in one of the corresponding labs scheduled, where you will receive helps from TAs. The detailed instructions for each lab will be posted separately. Deadlines for submitting the different phases of the project will be midnight of the following Sunday in the week where the lab is held.
The project will serve as an application of the theory presented in the lectures on a real machine. In particular, you will build a small compiler for a given version of a simple language. It will be implemented using the scanner generator Flex, the parser generator Bison and C language. It will produce assembly code.
You are allowed to work in groups of 2 students. It is your own responsibility to inform the teaching assistant about the list of students in your team at least one week before the handin of the first phase of the project. For the machine project you will need to work on the ecf lab machines. If you are engineering major, your account should have been already established. In any case, it is your own responsibility to meet Cathy Malfara (cathy@ecf.toronto.edu) with your student ID card so that you obtain the proper account.
The teaching assistant will discuss the format of the assignments. For every assignment you should handin: a description of which member of your team was responsible for each part of the work well written documentation for the work you did on the assignment. Documentation will worth at least 15% of the mark for each assignment.
The specification of the language can be found as follows.

MiniGLSL language description
ARB assembly language description
Demo
Screenshots
Some demos of the shader language can be founded here.

Demo1 Without Shader With Shader
Demo2 Without Shader With Shader
Lab 1 Spec Starter 1
Lab 2 Spec
Lab 3 Spec
Lab 4 Spec

Handouts
Tutorial 1 Flex tutorial and Lab 1 review
Tutorial 2 Shader tutorial and project review
Tutorial 3 Bison tutorial

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Tutorial 1 Flex tutorial and Lab 1 review
Tutorial 2 Shader tutorial and project review
Tutorial 3 Bison tutorial

Additional Readings
Past Midterm

Exams
There will be two comprehensive exams for this class: a midterm and a final. The exams will be based on material covered in the lectures (i.e., reading assignment), tutorials and the machine project. You are required to bring some form of valid picture ID. The dates and times of the exams will be announced in the newsgroup.

Grading Policy
The weighting scheme for the class requirements will be as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>40%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

Minor lab downtime will not qualify for project extensions. Nuclear meltdown in the lab might qualify. To protect yourself, keep backups on the lab machines so if your computer crashes, you can recover.

Absence from any exam will result in a zero score unless it is due to an emergency and official documentation is provided.
Cheating Policy

Cheating is against “fair-play” and will not be tolerated under any circumstances. While the pressures of many classes, homeworks, work and/or extracurricular activities can be great, this is never an excuse for copying solutions from others. “Helping” somebody by allowing them to “borrow” your work is not doing them a favor either, but indicates your approval and active participation in such activities. The University holds among its highest principles the notion of academic freedom and integrity. If you are caught cheating it may lower your grade or it can even give you a fail grade for the class. If you think that there is an issue that influences your performance in the class then talk to the instructor.

Other References

The following textbooks are not required but they can serve as good reference material:

