Compiler Construction
CS510

Shahira Azazy

Fall 2020

Administrivia

Welcome to CS510 Compiler Construction

- **Course Information**
- **Grading Policy**
- **Project**

Contact Info. & Office Hours

- **Dr. Shahira Azazy**
  - **4th Floor-Room 519**
  - **Facebook Group**

    https://www.facebook.com/groups/FSSR.CS510.2020/
  - **ISSR-Forum**

  - **E-mail**

    ShahiraAzazy@gmail.com
- **Dr. Zienab Ezz**

References

- A Practical Approach to Compiler Construction, Des Watson, Springer (2017).
- Compiler construction, Kenneth C. Louden, Cengage Learning (1997).
- Compilers—Principles, Techniques and Tools. Aho, Lam, Sethi and Ullman (The Dragon Book)
- Modern Compiler Implementation in Java. Andrew Appel, (2004).
- Engineering A Compiler, Torczon, Linda, and Keith Cooper, Morgan Kaufmann Publishers Inc. (2007).

- Prof. Abdelaziz Khamis Lectures
- Dr. Nermin Hamza Lectures
- Dr. Waleed Arafa Lectures

Recommended Video Lectures

1) Georgia Tech as CS 8803
by Santosh Pande, Catherine Gamboa
https://www.udacity.com/course/compilers-theory-and-practice--ud168

2) Washington University
Compiler Construction
by Perkins
https://www.youtube.com/watch?v=ERTDAMThhwE

3) Stanford university
Compiler
by Alex Aiken
https://online.stanford.edu/course/compilers-0

4) Compiler Design
by Ravindrababu Ravula
https://www.youtube.com/watch?v=Qkwj65l_96I&list=PLEbnTDJUr_IcPtUXFy2b1sGRPsLFMghhS

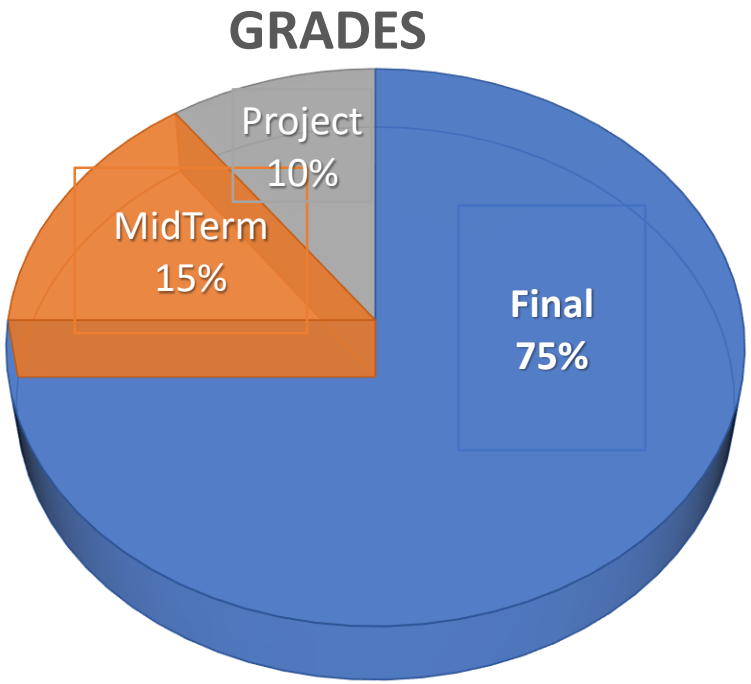
Recommended Video Lectures

- **Ahmed abdelghany**

  https://www.youtube.com/playlist?list=PL2SrwH8nO32EjtyZUl4wXoCYapLNgmTFm

Grading Policy

- 75 Final.
- 15 Mid-term(8 April).
- 10 Projects Exam.



Midterm exam:
April 8,
5:00PM – 6:30PM,
Location TBA

Project(1)

- **No. of Students in each team[3-6]**

  (For Exceptions Contact Me).

- **Language used: Use your favorite programming Language.**
- **Project Deadline :17-04-2020.**
- **Project Exam Start :19-04-2020.**

Project(2)

- **Automatic Generated Scanner Using Lex.**
- **Automatic Generated Scanner Using Yacc.**
- **Code By Hand for the Compiler of "Choose Name" Language.**
  - **The Specification File of TATA Language available at :**

    https://www.facebook.com/groups/FSSR.CS510.2020/

Project(3)

Project Deadline :18-04-2020.

- **Send to my Facebook Account**

1. **WinRAR file**
    1. **Team names(txt file)**
    2. **Lex File**
    3. **Yacc File**
    4. **Code by hand**
    5. **exe or jar files for automatic generated Scanner**
    6. **exe or jar files for automatic generated Parser**
    7. **exe or jar files for code by hand compiler for the ISSR Language**

Project(4)

Project Exam

- Lex & Yacc Practical Exam(2 Marks).
- Code by hand Project Practical Exam(8 Marks).

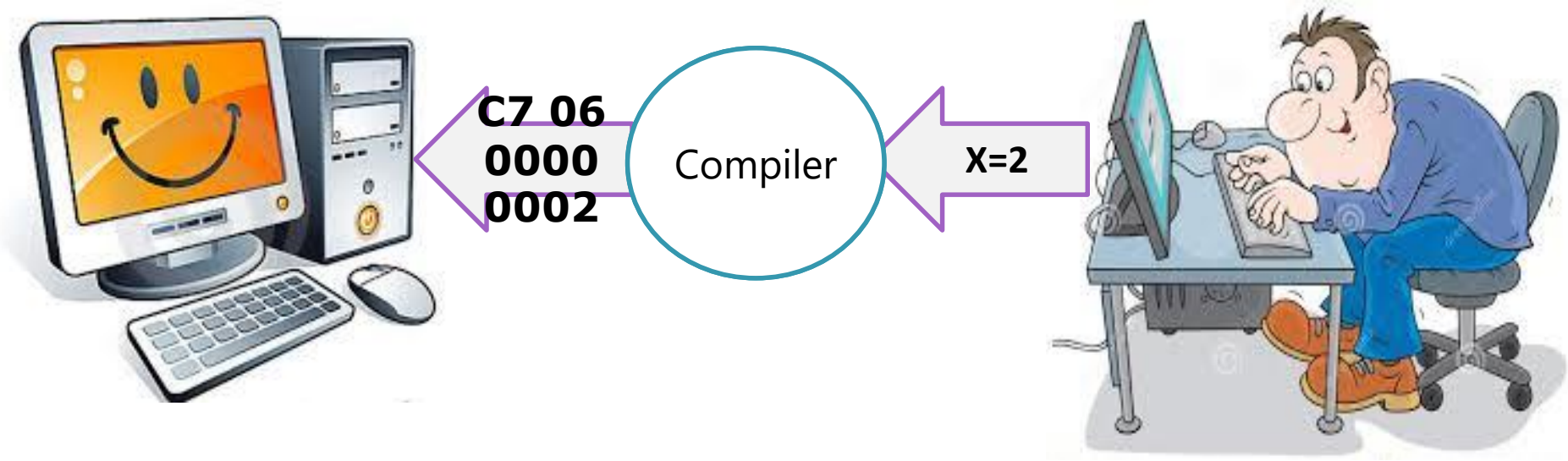
Introduction

Lecture 1

What is a compiler?

- A compiler is a program translating programs written in a high-level language into semantically equivalent programs in another language, typically machine code
- The compiler allows us to program in high-level languages, and it provides a layer of abstraction so that programmers do not have to about the complex details of the underlying hardware.
- The source language may be (C++, Java, or C#), and the target language is usually assembly or machine code.
- A compiler also reports errors and warnings.

What is a compiler?



Why Study Compilers?

- **Build a large, ambitious software system.**
- **See theory come to life.**
- **Learn how to build programming languages.**
- **Learn how programming languages work.**
- **Learn tradeoffs in language design.**

Why Study Compiler Design?

- Why should compiler design be studied?
- Why is this subject considered to be an important component of the education of a computer scientist?
- After all, only a small proportion of software engineers are employed on large-scale, traditional compiler projects.

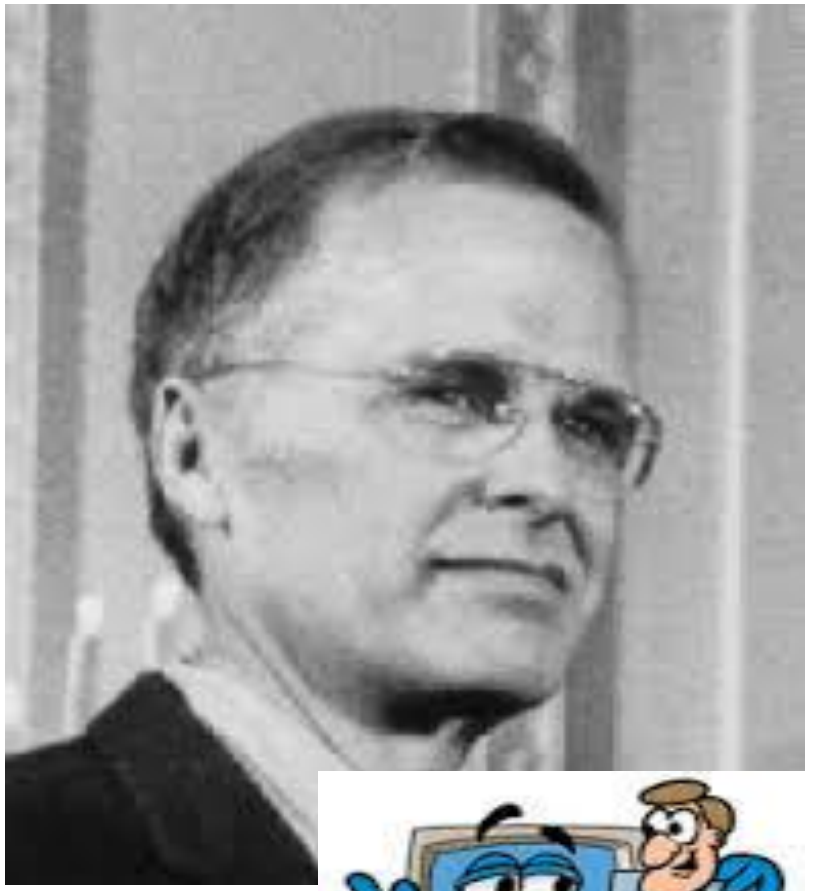
1) **Techniques of the compilers are used in:**
   - Translating javadoc comments to HTML
   - Generating a table from the results of an SQL query
   - Collating responses from email surveys
   - Your printer uses parsing to render PostScript files.
   - Hardware engineers use a compiler to translate from a hardware description language to the schematic of a circuit.
   - Your spam filter most likely scans and parses email content.
2) **Studying compiler design makes you a better programmer**
   - Writing a simple compiler is an excellent educational project and enhances skills in programming language understanding and design, data structure and algorithm design and a wide range of programming techniques.
   - Understanding how a high-level language program is translated into a form that can be executed by the hardware gives a good insight into how a program will behave when it runs, where the performance bottlenecks will be, the costs of executing individual high-level language statements.

A Short History of Compilers

- **Admiral Grace Murray Hopper Inventor of A-0. COBOL**
- **The term “compiler.”**

A Short History of Compilers

- **Speed Coding**
- **Fortran I**



http://www.columbia.edu/cu/computinghistory/backus.html

A Short History of Compilers

- **1954 IBM develops the 704 –Successor to the 701**

* http://www.columbia.edu/cu/computinghistory/704.html