COMSC 440 Language Translation and Compiler Design

Spring 2020

Project 1: Tiny Compiler

Part A
Due Date: **Wednesday, Feb. 19th** in class

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1. In-Lab exercises

a. Familiar yourself with the Unix/Linux environment and commands (see attached the introduction to Unix/Linux)

b. Download the sample tiny compiler from bridges under resources: louden.zip, or from the textbook author's website:

http://www.cs.sjsu.edu/faculty/louden/cmptext/

and save it in your local folder.

c. Uncompress the file by:

```
gunzip loucomp.tar.Z ( see loucomp.tar)

tar xvf loucomp.tar (see all the .c and .h files)
```

Mac users can use terminal to unzip the file.

d. Understand the structure of the group of files (read p22-26 of the textbook).

e. Understand the *make* command and the *Makefile* file. Check out the following link:

http://mrbook.org/blog/tutorials/make/

f. Compile the group files by:

```
$ make (see tiny.exe)

$ make tm (see tiny.exe and tm.exe)
```

g. Read the sample program *(sample.tny)* written in TINY.

h. Compile the sample.tny with the TINY compiler by:

```
$./tiny sample.tny (see TINY COMPILATION: sample.tny)
```

i. Run the compiled sample program (sample.tm) by:

```
$./tm sample.tm
```

You will see:

```
TM  simulation (enter h for help)...
Enter command: go
Enter value for IN instruction: 7
OUT instruction prints: 5040
HALT: 0,0,0
Halted
Enter command: quit
Simulation done.
```

j. When you are here, you've succeeded in downloading, compiling, and running your TINY compiler.

2. Post-Lab exercises:

a. Write a program called *project1XXX.tny* in TINY language which reads two integer values, calculate their summation, subtraction, multiplication and division, and output the results in the order as listed. XXX are your initials. Check the feasibility of the values for division operation (divided by zero). Output a value of zero if the denominator of the division operation is zero. Calculate the summation and average of all integers between the first and the second integer. Compare those two integers to make sure the range is feasible.

b. Save the file *project1XXX.tny* in a folder with all the necessary TINY compiler files in it.

c. Use the TINY compiler to compile and run *project1XXX.tny* program.

d. Compress your files, which include TINY compiler files and the *project1XXX.tny*, and load them to bridges under folder project1.

Keep reading for Unix/Linux Basic commands.

Introduction to Unix/Linux

1. Linux: Multiprocess, multiuser, interactive computing environment;

2. Logon / logoff:

    - Local Area Network connection: local login (user ID, password)
    - Internet connection: *telnet hostname/IP address* (user ID, password)
    - Logout: <ctrl+D> / exit / (logout)

3. Linux shell

    - What is a Linux shell?
        - A user program
        - An interface between the user and the Linux kernel
        - A command interpreter
    - Different type of shells:
        - bash (Bourne Again shell)
        - csh (C shell):
        - tcsh (TC shell): upgraded csh
    - Determine the name of your login shell: **$** *echo $SHELL*
        - The default shell for MandrakeLinux is bash
    - Reason of using bash: more advanced programming features, most popular; backspace key works

4. Useful general purpose commands

    - *date* – display today's date and current time
    - *cat* – display the whole text file
    - *more* – display a text file one screen at a time
        - *more filename*
        - <Spacebar> - display the next page
        - <B> - display the previous page
        - <Q> - terminate the command
    - *mkdir* – create a directory
    - *rmdir* – remove one or more **empty** directories
    - *ls* – display the contents of a directory
    - *ls –l* – display the details of the content of a directory
    - *file filename* - view the type of data stored in *filename*
    - *mv / cp* – move and copy files or directories
    - *rm* – remove one or more files

- *find* – search for files and commands
- *pwd* – display the location of your current working directory
- *cd* - jump from one directory to another

- *man commandname* – display help info about the *commandname*
- *passwd* – change password
- *history* – list all the commands that you typed at your terminal, maximum number is 500
- *!!* – reinvoke the last command that you executed
- *!n* – reinvoke the command at line *n* in the history list
- */?* – wildcard characters, ? matches any single character; * matches zero or more characters
- *chmod* – change permission of your files
- *&* - ending a command with it will run a command in the background
- *emacs project11.c &* - open a new c program called project11.c from the emacs (editor) and run the emacs from the background;

5. Web resources for Linux

   a. www.linux.org
   b. www.wired.com/wired/archives/5.08/linux.html - Article on Linus Torvalds and Linux
   c. www.freahmeat.net
   d. www.linuxsecurity.com