EECS 222C
System-on-Chip Software Synthesis
Spring 2013

Assignment 1

Posted: April 5, 2013
Due: April 19, 2013 at 12pm (noon)

Topic: Become familiar with the MP3 Audio Decoder application

1. Setup:

A Linux account has been created for you and the login and password information have been sent to your UCI email address. If you have problems with accessing the account, please contact the course instructor by email.

We will use the following Linux hosts for this class:

```
gamma.eecs.uci.edu
omicron.eecs.uci.edu
```

In order to connect to the host remotely, you will need to use the secure shell protocol (SSH) via some client software. Note that in the beginning we will use only the command line interface, so a simple terminal program (e.g. Putty) will be sufficient. For later assignments, we will also use graphical tools for which you need X client software (e.g. Xming).

After logging in, you will need to setup your Linux environment for the assignments in this class. For this assignment, create a separate directory named **hw1** (and later **hw2**, **hw3** and so on) and work inside this directory. Name your directory and all files for submission exactly as shown in the instructions. Otherwise you will not be able to submit them!

2. Task A: MP3 Audio Decoder Application Structure

The first task in this assignment is to install, test, and make yourself familiar with the MP3 Audio Decoder application. You are asked to submit a simple block diagram of the application as your first deliverable.

To install the MP3 Decoder application in your **hw1** directory, do the following:

```
cd ~
mkdir hw1
cd hw1
gtar xvzf /home/eecs222/EECS222C_S13/mad_C.tar.gz
cd mad_C
make clean
make
make test
```

Study the application! Browse and read through the source files and try to understand the structure of the application.

Draw a simple block diagram of the major functions in the source code and indicate the overall functionality of the MP3 audio decoding process.

Convert your block diagram to PDF and name your file **MP3_BlockDiagram.pdf**
Use exactly this filename, otherwise you can't submit it.

3. Task B: MP3 Audio Decoder Study

The second task in this assignment is to answer a set of questions on the MP3 Audio Decoder application. Some questions are simple and have a straightforward answer. Some questions are more open ended.

Be brief in your answers! We will discuss these topics in detail in Lecture 3.

- Example MP3 streams
  - Do they play?
  - Length in seconds?
  - Number of samples?
- Application source code
  - How many source files?
  - How many lines of code?
  - How many functions?

- What are the major functions?
  - How do they relate?
  - Function call graph?
- What are the most critical functions?
  - Where is the most time spent?
- What type of operations are performed?
  - Floating point?
  - Others?
- Where is any potential for parallel execution?

Create a PDF document with your answers and name your file
`MP3_Study.pdf`
Again, use exactly this filename, otherwise you can't submit it.

4. Submission:

For this assignment, submit the following deliverables:

`MP3_BlockDiagram.pdf`
`MP3_Study.pdf`

Place both files into your directory named **`hw1`**. To submit these files, change into the parent directory of the **`hw1`** directory and enter **`turnin`**.

The **`turnin`** command will locate the deliverables the current assignment asks for and allow you to submit them *before the deadline*, as follows:

```
doemer@mu.eecs.uci.edu# ls
MP3_BlockDiagram.pdf  MP3_Study.pdf  mad_C/
doemer@mu.eecs.uci.edu# cd ..
doemer@mu.eecs.uci.edu# turnin
============================================================
EECS 222C Spring 2013:
Assignment "hw1" submission for doemer
Due date: Fri Apr 19 12:00:00 2013
** Looking for files:
**   MP3_BlockDiagram.pdf
**   MP3_Study.pdf
============================================================
* Please confirm the following:                             *
* "I have read the Section on Academic Honesty in the       *
* UCI Catalogue of Classes (available online at             *
* http://www.editor.uci.edu/catalogue/appx/appx.2.htm#academic) *
* and submit my own original work accordingly."             *
Please type YES to confirm. YES
```

```
============================================================
Submit MP3_BlockDiagram.pdf [yes, no]? y
  File MP3_BlockDiagram.pdf has been submitted
Submit MP3_Study.pdf [yes, no]? y
  File MP3_Study.pdf has been submitted
============================================================
  Summary:
============================================================
Submitted on Fri Apr  5 11:10:02 2013
You just submitted file(s):
  MP3_BlockDiagram.pdf
  MP3_Study.pdf
```

Note that you can use the **`turnin`** tool to submit at any time before the deadline, *but not after!* Since you can submit as many times as you want (newer submissions will overwrite older ones), it is highly recommended to submit early and even incomplete work, in order to avoid missing the deadline.

Late submissions will not be accepted!

--
Rainer Doemer (EH3217, x4-9007, doemer@uci.edu)