

Embedded System Design and Modeling

EE382V, Fall 2009

Lab #1

Introduction to Design Example

Due: September 17, 2009 in class (3:30pm)

Instructions:

- Please submit your solutions via Blackboard. Submissions should include a single PDF with the writeup and a single Zip or Tar archive for any supplementary files.
- You are allowed to work in teams of up to three people and you are free to switch partners between labs and the project. Please submit one solution per team.

JPEG Encoder

The purpose of this lab is for you to become familiar with the application source code. A C reference implementation of the core JPEG encoder, which we will use as a starting point for our design, is available at

`/home/projects/courses/fall_09/ee382v-17220/jpegencoder.tar.gz`

Install the JPEG encoder example:

```
mkdir lab1
cd lab
gtar xvzf /home/projects/.../ee382v-17220/jpegencoder.tar.gz
cd jpegencoder
```

Now you can compile and run the example using the provided Makefile:

```
make
make test
```

The latter command runs the example on a “ccd.bmp” sample input and validates the generated “test.jpg” file against an expected “golden.jpg” reference output.

Finally, browse the sources and analyze the source code structure:

- (a) Draw a block diagram of the function hierarchy and their communication dependencies.
- (b) Modify the example for a fixed input image sensor size of 116×96 pixel. Simplify the code as much as possible, remove any unnecessary communication/dependencies, and convert all dynamic memory allocation (via *malloc* calls) into appropriate static data structures.