CS 2110

Timed Lab 5

Due Date and Time

Day: Monday, November 13th
Time: Before the end of your assigned lab section

Policy

Submission

TURN IN THIS ASSIGNMENT ELECTRONICALLY USING T-SQUARE

SUBMISSIONS WHICH ARE LATE WILL NOT BE ACCEPTED.

EMAIL SUBMISSIONS WILL NOT BE ACCEPTED UNDER ANY CIRCUMSTANCES!

IF YOU FORGET TO HIT THE SUBMIT BUTTON YOU WILL GET A ZERO.

Questions

If you are unsure of what questions mean, the TA's will clarify them to the best of their ability. We will not be able to answer any questions about how to reach a solution to the timed lab questions. You should know how by now!

What's Allowed

- The assignment files
- Your previous homework and lab submissions
- Your mind
- Blank paper for scratch work

What's Not Allowed

- The Internet (except the T-Square Assignment page to submit)
- Any resource on T-Square that is not given in the assignment.
- Textbook or notes on paper or saved on your computer.
- Dropbox (If your hard drive crashes we will let you retake it).
- Email/IM
- Contact in any form with any other person besides TAs
  - **If you have any questions on what you may not use then assume you can't use it and ask a TA.**
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Other Restrictions

1. **You may not leave the classroom until we have verified that you have submitted the lab. If you leave the classroom without submitting you will receive a zero.**

2. **YOU MUST SUBMIT BY THE END OF YOUR LAB PERIOD**. Bear in mind that the clock on your computer may be a few minutes slow. You are supposed to have a full class period to work, and we are letting you use the 10 minutes between classes to make sure you have submitted your work. **WE WILL NOT ACCEPT LATE SUBMISSIONS**, be they 1 second or 1 hour late.

3. The timed lab has been configured to accept one submission. If you accidentally submit or submit the wrong version flag one of the TAs and we will reopen submission for you.

Violations

Failure to follow these rules will be in violation of the Georgia Tech Honor Code **AND YOU WILL RECEIVE A ZERO** and you will be reported to Bill and the Office of Student Integrity.

We take cheating and using of unauthorized resources **VERY SERIOUSLY** and you will be in serious trouble if you are caught.

Remember

1. **There is partial credit given, and some of it is just following the directions.**

2. **We allow you to use your homework assignment.**

3. **Please don't get stressed out during a timed lab. You have plenty of time; however, use your time effectively**

4. **Again, remember: Don't get stressed. Partial credit will be given for things you have done correctly. Do the best you can!**

5. **If you don't know something at least TRY. Do not just walk out of the lab or submit an empty file. Partial credit!**

6. **Remember what you can and can't use. If you don't know, then don't use it and ask a TA if you can use it. If we catch you with unauthorized resources we will give you a zero, so better to be safe than sorry.**

The Assignment

Overview

For this assignment, we will be making a collage of various images. However, we need to manipulate some of these images first, because they are not in the form that we want them to be. In order to do this, you will be writing code for three functions: rotateImageAndDraw, flipVerticallyAndDraw, and drawImage3. You will call these functions in the main. We have given you all the function headers.

Three points of importance regarding these functions:

1. Each function must have **one** for loop.
2. Each function must use **DMA**.
3. Make sure you check for off-by-one errors in each of these functions that you write.

Specifics

There are five things that you need to do, all in the main.c file. They are noted file with 5 marked "TODO"s. Please follow the steps outlined here carefully and you should be fine!

As you may know, this is Bill's last semester here at Georgia Tech. Therefore, we'd like to create a timeline to celebrate Bill's life so far! Unfortunately, some of the older images have become messed up with time, so it's up to you to fix them!

1. We begin our journey through Bill's life with his marriage to his wife! Bill is very excited for his big day and absolutely head over heels for his wife!:

Unfortunately, this image just won't do for our timeline!. So, for your first function, implement code for a function that will **flip any image upside down (meaning that you want to flip the image both horizontally and vertically) and draw it in the far left vertical segment of the Gameboy screen**. The image above should end up looking something like this:

Look how happy he looks now! Before you move on to the next step, make sure that your image prints on the screen in the correct location **and that the text is properly oriented on the bottom of the image**.

2. We're now going to move a little bit further into Bill's life. The Bill of our next image is now a father! While he's happy to have children, they do drive him up the walls sometimes and he ends up looking something like this:

Once again this image just won't do! So, for your second function, implement code for a function that will **flip any image vertically and draw it in the second vertical segment of the GBA screen**. The image above should look like this:

Bill looks all straightened up now and ready for our timeline!

3. We're halfway done with our collage! The next two Bills are much more mature so you won't need to manipulate them in any way. However, we want to draw them on the screen with a drawImage function. You can implement the drawImage3 function in order to draw both of these images. The drawImage3 function is a function that will draw an arbitrary sized image to

the location specified on the screen. Go ahead and implement this function. *(Hint: You already did this in HW09!)*

4. Now we move on to the main function in order to finish this collage. In order to draw anything on the screen, there is one line of code that we need to write. Go ahead and write this at the start of the main function.

5. Finally, it's time to call all those functions you wrote. We want to call the first two functions that already draw to the first two vertical segments and then the drawImage3 function twice for the other two images. However, for the last two images we want to draw to the screen that we will draw using the drawImage3 function, we need to specify where we are going to draw them. The "Bill3" image will be drawn in the **third segment of the GBA screen** and the "Bill4" image will be draw in the **fourth segment of the GBA screen**. Make sure you set these locations properly in your drawImage3 function calls.

The final collage should look like this:

To check, just type the usual "make vba" command in the Terminal in the directory with all the files.

Deliverables

1. tl05.c

Note if your file is not named this you may lose points!

You may submit only the files listed above. We will not accept any internet links we want the files above and only these files!

Check over your submission after you submit it. If you submit the wrong file and leave the lab I will not be happy and we will grade what you submit so please check over what you submitted after you submit it!

Have fun and good luck!