**CS 2050 Lab Assignment 8 – Fall 2014**

**\*\*\* FAILURE TO RETURN THIS DOCUMENT TO THE TA WILL RESULT IN A ZERO GRADE FOR THE LAB \*\*\***

**Directions:**

Complete the following lab assignment using the description given in each section. Be sure to comment your program; otherwise you may lose up to 5 points. You must use proper indent styles; otherwise you may lose up to 5 points.

**Submission information:**

Submit this assignment by following the instructions given by your lab assistant. It must be submitted before the end of the lab USING THE CODE THE TA GIVES YOU. Not doing so WILL result in a zero, no exceptions.

**Description:**

In this lab you will be implementing a queue.

Add the following to the top of your queue.h file:

typedef struct node\_ {

char\* data;

struct node\_\* next;

}Queue;

**Any global variables will result in a loss of 15 points.**

**The prototypes should be in queue.h and their implementations in queue.c**

**Queue\* enqueue(Queue\* queue, char\* data);**

Parameters:

* queue: A pointer to a queue
* data: A string to be enqueued

Return: The possibly new head of the queue

**char\* dequeue(Queue\*\* queue);**

Parameters:

* queue: A double pointer to the head of a queue

Return: The string dequeued from the queue

**int size(Queue\* queue);**

Parameters:

* queue: A pointer to a queue

Return: The length of the queue

**The following functions and their prototypes should be in a file called printer.c**

A common use of a queue is as a buffer, a place to store information for future use. This file will use your queue as a “buffer” for its printer.

**Queue\* print(Queue\* queue);**

**Parameters:**

* queue: A pointer to a queue

Return: A pointer to the updated queue

A common use of a queue is as a buffer, a place to store information for future use. Print should dequeue every item in the queue and print out its string.

Print should begin by calling sleep for 1 second, example:

Queue\* print(Queue\* queue) {  
 sleep(1);

. . .

}

Sleep is a function is unistd.h and pauses your programs execution for the specified number of seconds. We are using it here to make print appear to be a costly function.

**int main(int argc, char\* argv[]);**

Main will read in one input file and read in each line as a single string to be enqueued. After each line is read it will check to see if the queue length is greater than or equal to three and if it is it will call print.

**Bonus**

Currently either only either enqueue or dequeue can run in O(1) time while the other must run in O(n). Modify the struct **BUT NOT THE FUNCTION PROTOTYPES** so that both may run in O(1) time.

**Guidelines for Grading Lab 8**

**30 Points Possible**

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**General**

***If your program does not compile, results in a segmentation fault, gets stuck in an infinite loop, or does not produce any input/output (I/O) because most of the source code is commented out then your lab will receive a grade of zero.*** You may receive partial credit if your C program compiles and produces some valid I/O that meets the lab specifications.

Submission Guidelines:

tar –czvf lab7.tar.gz runner.c set.c set.h Makefile

cs\_submit CS2050\_LAB-X LAB7 lab7.tar.gz

Remember to have a header at the top with your name, id, pawprint, date, etc.

All functions are 5 points

Use of global variables: -15 points

Bonus: +5

input.txt

Do you like green eggs and ham?

I do not like them, Sam-I-am.

I do not like green eggs and ham!

Would you like them here or there?

I would not like them here or there.

I would not like them anywhere.

I do so like green eggs and ham!

Thank you!

Thank you,

Sam-I-am!

***Example output***

$ make

gcc queue.c -c

gcc printer.c queue.o -o printer

$ ./printer input.txt

*<no output here, 1 second pause>*

Do you like green eggs and ham?

I do not like them, Sam-I-am.

I do not like green eggs and ham!

*<no output here, 1 second pause>*

Would you like them here or there?

I would not like them here or there.

I would not like them anywhere.

*<no output here, 1 second pause>*

I do so like green eggs and ham!

Thank you!

Thank you,

*<no output here, 1 second pause>*

Sam-I-am!

$ make clean

rm \*.o printer