CS 305 Prelab 7: stacks and queues
Fall 2019

Name: _____(done individually) score: _____ / 30

This prelab is due on Friday, NLT beginning of class.

Readings (do before the lab)

1. Read about stacks and queues in the textbook, chapter 4.
2. Review your lecture notes about stacks and queues.

Exercises (do before the lab)

1. (10 pts) Assume the functions for stacks are defined as shown in the textbook and the data item type is `int`. Examine the following code snippet.

```
Stack s = initStack();
push(s, 8);
push(s, 10);
push(s, 2);
push(s, 4);
int a = pop(s);
int b = pop(s);
```

(2 pts) What value is at the top of the stack s? _____

The code continues:

```
push(s, 7);
push(s, 11);
push(s, 3);
int c = pop(s);
push(s, 1);
```

(2 pts) What value is at the top of the stack s? _____

The code continues:

```
while(!empty(s)) {
       printf("%d ", pop(s));
}
```

(6 pts) What is printed? _____

2. (4 pts) Assume queues are implemented as shown in the textbook and the data type is `int`.

```
Queue q = initQueue();
enqueue(q, 10);
enqueue(q, 5);
enqueue(q, 4);
int a = dequeue(q);
```

(2 pts) What is the value of `a`? _____

The code continues:

```
enqueue(q, 2);
enqueue(q, 11);
enqueue(q, 8);
int b = dequeue(q);
int c = dequeue(q);
```

(2 pts) What is the value of `c`? _____

The code continues:

```
while(!empty(q)) {
        printf("%d ", dequeue(q));
}
```

(6 pts) What is printed? _____

3. (10 pts) Complete the function definition for `isPalindrome`. It takes a string as a parameter and returns 0 if the string is NOT a palindrome and returns 1 if the string is a palindrome. The function **MUST** use a stack to complete this task.

```
int isPalindrome(char * str) {
  if(str == NULL) {
    return 0;
  }
  Stack s = initStack();
  int i = 0;
  // push each character of str to the stack
  while(str[i] != '\0') {
    // complete loop body (4 pts)









  }
  // now pop stack, checking that the value on top of the stack equals the str char
  i = 0;
  while(str[i] != '\0') {
    // complete loop body (6 pts)









  }
  return 1;
}
```

Bring to lab

- Your CS 305 notes.
- Your Data Structures in C textbook.
- A pencil/pen and scratch paper.
- Your completed prelab, done on this sheet.