Assignment 5

Due: Sunday, 10 June 2018, 11:59 PM on TEACH as list.c

Linked Lists

To begin getting ready for CS 261, you will write a **C program** that fills and sorts a singly linked list of integers. Make sure your program compiles using **gcc and the following list.h and test_list.c files on the ENGR server**. **When sorting nodes, you may not swap the values between the nodes, you must change the pointers on the nodes to swap them.**

list.h

```
struct node {
	int val;
	struct node *next;
};

int length(struct node *); //get the length of the list
void print(struct node *, int); //print a certain number of elements from the list starting with the first node
struct node * push(struct node *, int); //put at front
struct node * append(struct node *, int); //put at back
struct node * clear(struct node *); //delete entire list
struct node * remove_node(struct node *, int); //delete a particular node
struct node * sort_ascending(struct node *); //sort the nodes in ascending order
struct node * sort_descending(struct node *); //sort the nodes in descending order
//insert into a specific location in the list
struct node * insert_middle(struct node *, int val, int idx);
```

test_list.c

```
#include "list.h"
#include <stdio.h>
#include <stdlib.h>
int main (){
	char ans[2];
	int num;
	struct node *head = NULL;
	do {
		do {
			printf("Enter a number: ");
			scanf("%d", &num);
			head = push(head, num);//Can change to append
			printf("Do you want another num (y or n): ");
			scanf("%1s",ans);
		} while(ans[0] == 'y');
		printf("Sort ascending or descending (a or d)? ");
		scanf("%1s",ans);
```

```
        if(ans[0] == 'a')
            head=sort_ascending(head);
        else if(ans[0] == 'd')
            head=sort_descending(head);
        print(head, length(head));
        printf("Do you want to do this again (y or n)? ");
        scanf("%1s",ans);
        head = clear(head);
    } while(ans[0] == 'y');
    return 0;
}
```

For example:

```
Enter a number: 100
Do you want another num (y or n): y
Enter a number: 30
Do you want another num (y or n): y
Enter a number: 50
Do you want another num (y or n): y
Enter a number: 10
Do you want another num (y or n): n
Sort ascending or descending (a or d)? a
Your linked list is:
10 30 50 100
Do you want to do this again (y or n)? n
```

Requirements and Reminders

- No late assignments will be accepted on Assignment 5. Extensions will not be granted unless a traumatic event has occurred. The TAs grade the last assignment on their own, there will not be demos.
- Only submit the list.c which contains the function definitions for the linked list
- list.h should not be altered. Altering the prototypes may result in your program failing to compile resulting in a zero.
- The TAs will provide the main and list.h to test your program.
- Swapping values between nodes is not a valid way to sort. The nodes themselves must be swapped.
- The assignment must be written in C and compiled with gcc on the ENGR server.
- Failure to compile will result in a zero. No exceptions.
- No memory leaks.
- No segmentation faults.
- Lack of correct coding style will incur an automatic 10 point deduction.