

CMSC 216 Quiz 4 Worksheet

The next quiz for the course will be on Wed, Apr 2. The following list provides additional information about the quiz:

- The quiz will be a written quiz (no computer).
- Closed book, closed notes quiz.
- Answers must be neat and legible.
- Quiz instructions can be found at <http://www.cs.umd.edu/~nelson/classes/utilities/examRules.html>
- Make sure you know your section number and your TA's name.

Solutions to the exercises below will not be provided, but you are welcome to discuss your solutions with the TA or instructor during office hours.

Exercises

1. What situation has occurred after the last assignment of the following code?

```
int *p = malloc(sizeof(int));
*p = 400;
p = NULL;
```

2. How are the malloc and calloc functions different?
3. Which of the following are valid or invalid.

- a. free(NULL);
- b. void *a = malloc(0);
- c. free(b); free(b);
- d. free(NULL); free(NULL);
- e. free(0);

4. What is the difference between memcpy and memmove?
5. Are there any problems with the following code fragment?

```
double scores[100];
double *p = scores;
scores[0] = 13.2;
free(p);
```

6. Implement a recursive function that prints the elements of a singly-linked list in reverse order.
7. Implement a function that takes as parameter an array of integers and returns a linked list with those integer values.
8. The **append** function returns a string that represents the concatenation of all the strings present in an array of strings. For this problem, you can assume the end of the parameter array is marked by NULL. You need to allocate memory for the resulting string.

```
char* append(char *data[])
```

9. The following structures will be used for the questions that follow:

```
#define MAX_LEN 80

typedef struct {
    char *title;
    int duration;
} Song;
```

```
typedef struct {  
    Song* all_songs; /* array of songs */  
    int number_of_songs;  
    char album_name[MAX_LEN + 1];  
} Album;
```

- a. Given two Song structures s1 and s2, are there any problems with assigning one structure to another? Is deep copying taking place during the assignment of these two structures?
- b. Define a function that initializes a Song using a duration and a string provided. The function will make a copy of the string parameter.
- c. Define a function that will initialize an Album structure based on an array of Songs provided as parameter. The function will create a dynamically-allocated array of Songs and will initialize each entry with a copy of the corresponding song in the parameter array.
- d. Define a function that will destroy an album. The function will return any dynamically-allocated memory.