COSC 519 – Fall 2015 – Homework #3 – Mary Snyder

1. *Using Fork() and Exec() or Clone(), create four child processes. Load the Hello" program in each process after creation (same program). Each child program should print its own PID or some other parameters distinguishing its execution.*
2. *Each process should run and return to the parent process where the parent is waiting to terminate. The parent should only terminate after all children returned from execution.*

a. **child_create.c**

```
#include <sys/types.h>
#include <stdio.h>
#include <unistd.h>

int main()
{
	printf("Parent PID: %d\n", getpid());
	pid_t pid;
	int childNum;

	for(childNum = 1; childNum < 5; ++childNum)
	{
		pid = fork();

		if (pid < 0) {
			fprintf(stderr, "Fork Failed");
			return 1;
		}
		else if (pid == 0) {
			printf("Child %d PID: %d\n", childNum, getpid());
			execlp("/home/mjs/Homework3/hello", "hello", NULL);
		}
		else {
			wait(NULL);
			printf("Child %d Complete\n", childNum);
		}
	}

	printf("All children complete\n");
	return 0;
}
```

b. output

```
Parent PID: 1356
Child 1 PID: 1357
File file.txt opened and reads as follows:
Hello World!
Writing to file: Hello to you too!
Child 1 Complete
Child 2 PID: 1358
File file.txt opened and reads as follows:
Hello World!
Hello to you too!
Writing to file: Hello to you too!
Child 2 Complete
Child 3 PID: 1359
File file.txt opened and reads as follows:
Hello World!
Hello to you too!
Hello to you too!
Writing to file: Hello to you too!
Child 3 Complete
Child 4 PID: 1360
File file.txt opened and reads as follows:
Hello World!
Hello to you too!
Hello to you too!
Hello to you too!
Writing to file: Hello to you too!
Child 4 Complete
All children complete
```

c. hello.c

```c
#include <stdio.h>
#include <stdlib.h>

int main ()
{
    // Open file "file.txt"
    char file_name[] = "file.txt";
    FILE *fp = fopen(file_name, "r+a");

    // Check for error opening file
    if(fp == NULL)
    {
           perror("Error opening file.\n");
           exit(EXIT_FAILURE);
    }

    // Print file contents
    printf("File %s opened and reads as follows: \n", file_name);
    char *line = NULL;
    size_t length = 0;
    ssize_t read;
    while((read = getline(&line, &length,  fp)) != -1)
    {
           printf("%s", line);
    }

    // Write to file
    char message[] = "Hello to you too!\n";
    printf("Writing to file: %s", message);
    fprintf(fp, message);

    // Close file
    fclose(fp);

    // Cleanup
    if(line != NULL)
           free(line);

    // Return
    return 0;
}
```

d. file.txt before run

```
Hello World!
```

e. file.txt after run

```
Hello World!
Hello to you too!
Hello to you too!
Hello to you too!
Hello to you too!
```