

# Introduction to Systems Programming

## 234124

### HW1 - Dry

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makefile

makefile with  
\$(COMP\_FLAG)

## 2.1

```
#include "stdlib.h" // Error 1
#include "string.h"
#include "assert.h"

char* stringDuplicator(char* s, int times){

    assert(!s); // Error 5
    assert(times > 0);
    int LEN = strlen(s); // Error A
    char* out = malloc(LEN*times); // Error 2,6
    assert(out);
    for (int i=0; i<=times; i++){ // Error 4 & B
        out = out + LEN; // Error 3
        strcpy(out,s);
    }
    return out;

}
```

Errors:

### Program Code Errors

1. **#include errors** – should be <stdlib.h>, < string.h>, < assert.h> and not “”.
2. **Buffer OverFlow**-No sizeof in the malloc size, the memory allocated isn't in the right size.
3. **Out of bounds write 1**: Moved out pointer before strcpy put the string.
4. **Out of bounds write 2**: because of “i<=times” the loop repeated times+1.
5. **assert(!s) – logic error**: should fail if the input string pointer is NULL not the other way around.
6. **Missing string ending** – need to add ‘\0’ at the end

### Code Convention Errors

- A. **Name convention**: LEN should be in lowercase letters (not a constant)
- B. **Indentation**: Failed to use proper indentation for the “for” code block

## 2.2

```
#include <stdlib.h>
#include <string.h>
#include <assert.h>

char* stringDuplicator(char* s, int times){
    assert(s);
    assert(times > 0);
    int len = strlen(s);
    char* out = malloc((len*times+1)*sizeof(char));
    assert(out);
    out[len*times]='\0';

    for (int i=0; i<times; i++){
        strcpy(out,s);
        out = out + len;
    }

    out=out-len*times;
    return out;
}
```