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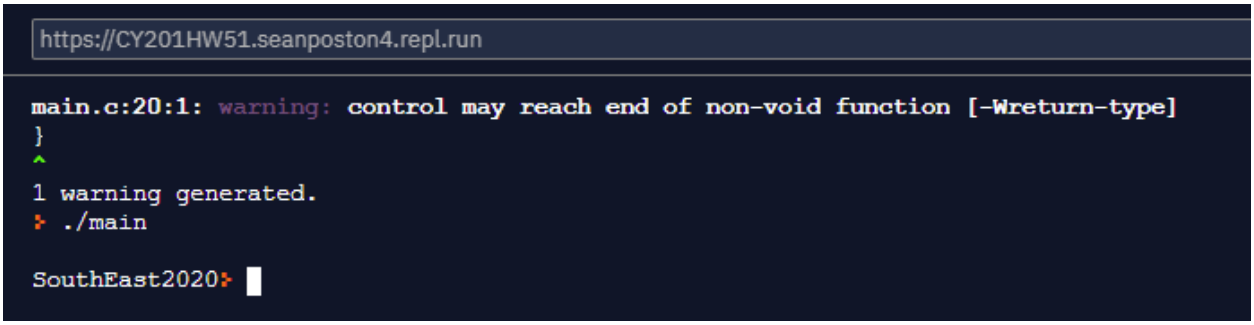
CS351

PI DAY

Question 1: https://repl.it/@seanposton4/CY201HW51

Output:



The code is written in a very iterative fashion. The program goes down the line, copies the proper amount of characters to a temp string, then does what is needed (flips the case of the character or returns a number based on the string).

Improvement:

I could have maybe made one function with nested if statements. Instead of this:

```
4   void caseFlip(char* data) {
5       for (int i = 0; i < sizeof(data) / sizeof(data[0]); i++) {
6           if(i == 0) {
7               data[i] = toupper(data[i]);
8           }
9           else {
10              data[i] = tolower(data[i]);
11          }
12      }
13  }
14
15  char* numFlip(char* data) {
16      if (strcmp(data, " ZERO") == 0)
17          return "0";
18      else if (strcmp(data, " TWO") == 0)
19          return "2";
20  }
```

I could have made one function using nested if statements just to save code.

I could have also written a function to do the main part of the code:

```
27      strncpy(temp, originalString, 5); //copy "sOUTH" to temp
28      caseFlip(temp); //convert "sOUTH" to "South"
29      strcpy(newString, temp); //add "South" to newString
30      for (int i = 5; i < sizeof(originalString) / sizeof(originalString[0]); i++)
31          originalString[i - 5] = originalString[i]; //remove "sOUTH" from originalString
32      memset(temp, 0, sizeof(temp)); //reset temp to nothing
```

I end up writing this part about 5 times, and I could probably have easily moved it to a function with a few pointers. I did try to, but it didn't immediately work so I returned to this version.

Question 2: https://repl.it/@seanposton4/CY201HW52

To figure this out, I tested this to make sure that the addresses of a multidimensional array were still all in a row:

```
8       for (int i = 0; i < 2; i++) {
9           for (int j = 0; j < 3; j++) {
10              printf("%p\n", a[i][j]);
11          }
12      }
```

```
https://CY201HW52.seanposton4.repl.run

                                        %d
2 warnings generated.
> ./main
0x1
0x2
0x3
0x4
0x5
0x6
0
>
```

This was the output, which led me to believe that they were all in a row in the memory. So, it means that all that needs to be done is increment the pointer n times, where n is the number of elements in the array.

Output:

```
https://CY201HW52.seanposton4.repl.run

clang version 7.0.0-3~ubuntu0.18.04.1 (tags/RELEASE_700/final)
> clang-7 -pthread -lm -o main main.c
> ./main
21
>
```

New sum_dimensional_array function:

```c
int sum_dimensional_array(const int a[][LEN], int n) {
    int sum = 0;
    const int *p = &a[0][0]; //set p to the starting address of a;

    for (int i = 0; i < 6; i++) {
        sum += *p;
        p++;
    }

    return sum;
}
```

Source Codes:

Question 1:

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>
void caseFlip(char* data) {
    for (int i = 0; i < sizeof(data) / sizeof(data[0]); i++) {
        if(i == 0) {
            data[i] = toupper(data[i]);
        }
        else {
            data[i] = tolower(data[i]);
        }
    }
}

char* numFlip(char* data) {
    if (strcmp(data, " ZERO") == 0)
        return "0";
    else if (strcmp(data, " TWO") == 0)
        return "2";
}

int main(void) {
    char originalString[] = "sOUTHeAST TWO ZERO TWO ZERO";
    char newString[14];
    char temp[10];

    strncpy(temp, originalString, 5); //copy "sOUTH" to temp
    caseFlip(temp); //convert "sOUTH" to "South"
    strcpy(newString, temp); //add "South" to newString
    for (int i = 5; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 5] = originalString[i]; //remove "sOUTH" from
originalString
    memset(temp, 0, sizeof(temp)); //reset temp to nothing

    strncpy(temp, originalString, 4); //copy "eAST" to temp
    caseFlip(temp);
    strcat(newString, temp);
    for (int i = 4; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 4] = originalString[i];
    memset(temp, 0, sizeof(temp));

    strncpy(temp, originalString, 4); //copy " TWO" to temp
```

```
    strcat(newString, numFlip(temp));
    for (int i = 4; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 4] = originalString[i];
    memset(temp, 0, sizeof(temp));

    strncpy(temp, originalString, 5); //copy " ZERO" to temp
    strcat(newString, numFlip(temp));
    for (int i = 5; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 5] = originalString[i];
    memset(temp, 0, sizeof(temp));

    strncpy(temp, originalString, 4); //copy " TWO" to temp
    strcat(newString, numFlip(temp));
    for (int i = 4; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 4] = originalString[i];
    memset(temp, 0, sizeof(temp));

    strncpy(temp, originalString, 5); //copy " ZERO" to temp
    strcat(newString, numFlip(temp));
    for (int i = 5; i < sizeof(originalString) / sizeof(originalString[0]); i++)
        originalString[i - 5] = originalString[i];
    memset(temp, 0, sizeof(temp));

    printf("\n%s", newString);
      return 0;
}
```

Question 2:

```c
#include <stdio.h>
#define LEN 3

int sum_dimensional_array(const int a[][LEN], int n) {
    int sum = 0;
    const int *p = &a[0][0]; //set p to the starting address of a;

    for (int i = 0; i < 6; i++) {
        sum += *p;
        p++;
    }

    return sum;
}

int main(int argc, char *argv[]) {

    int arry[2][3]={
        {1,2,3},
        {4,5,6}
    };

    printf("%d \n",sum_dimensional_array(arry, 6));

    return 0;
}
```