## ENSF 337 Tutorial 6 – Oct 24, 2018

### Problem one:

Write a C program that makes a copy of a text file, replacing each upper case character letter with the corresponding lowercase letter, and leaving all other characters unchanged.

## Solution:

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


int main(void) {
    const char* input_filename = "input.txt";
    const char* output_filename = "output.txt";
    FILE *fpin, *fpout;

    fpin = fopen(input_filename, "rt");
    if(fpin == NULL) {
        fprintf(stderr, "input file cannot be openee");
        exit(1);
    }

    fpout = fopen(output_filename, "wt");
    if(fpout == NULL) {
        fprintf(stderr, "output file cannot be openee");
        exit(1);
    }
    int c;
    c = fgetc(fpin);

    if(ferror(fpin)){
           fprintf(stderr, "read failed ....");
           exit(1);
    }

    while(c != EOF) {
        if(c >= 'A' && c <= 'Z' )
            c = c + ('a' - 'A');

        fputc(c, fpout);
        if(ferror(fpout)){
            fprintf(stderr, "write failed ....");
            exit(1);
        }

        c = fgetc(fpin);

        if(ferror(fpin)){
            fprintf(stderr, "read failed ....");
            exit(1);
        }
    }
    return 0;
}
```

**Problem Two:**

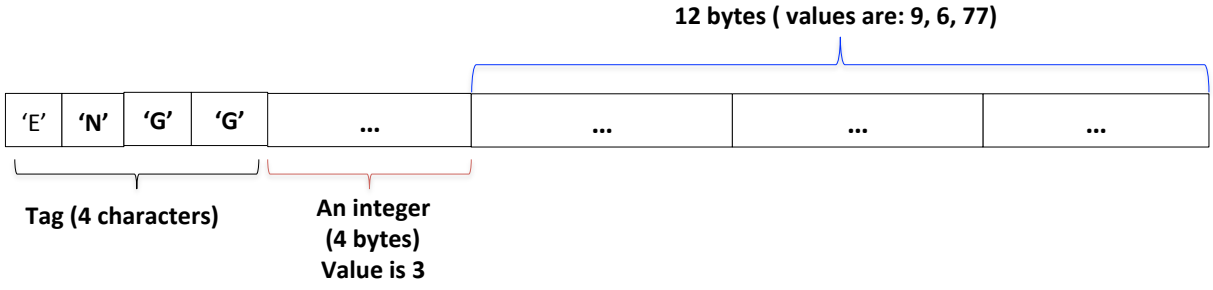
Assuming size of `int` is 4 bytes, what is content of file `out.bin`.

```
#include <stdio.h>
void write_binary (const char *filename, const int *a, int n);

int main(){
    const char* filename = "out.bin";
    int a[10] = {9, 6, 77, 55, 4};
    write_binary(filename, a, 3);
}

void write_binary (const char *filename, const int *a, int n){
    FILE *fp = fopen(filename, "wb");
    fwrite((void *) "ENGG", 1, 4, fp);
    fwrite((void *) &n, sizeof(int), 1, fp);
    fwrite((void *) a, sizeof(int), n, fp);
    fclose(fp);
}
```

## Solution:



**Problem Three:**

Write a function called read_binary that reads and displays the data in the file created in problem two.

**Solutions:**

```
void read_binary (const char *filename)
{
    char tag[5];
    int n;
    int number;

    FILE *fp = fopen(filename, "rb");
    size_t n_read = fread(tag, 1, 4, fp);

    if(n_read == 0) {
        fprintf(stderr, "failed to read ....");
        exit(1);
    }

    tag[4] = '\0';
    if(strcmp(tag, "ENGG") !=0) {
        fprintf(stderr, "invalid tag ....");
        exit(1);
    }

    fprintf(stdout,"%s\n", tag);

    n_read = fread(&n, 4, 1, fp);

    if(n_read == 0) {
        fprintf(stderr, "failed to read number of data");
        exit(1);
    }

    fprintf(stdout,"%d\n", n);

    int i = 0;
    while(i < n && i < 10) {
        n_read = fread(&number, 4 , 1, fp);

        if(feof(fp)) {
            fprintf(stdout, "End of file reached");
            exit(1);

        }

        if(ferror(fp)) {
            fprintf(stderr, "failed to read data...");
            exit(1);
        }

        fprintf(stdout, "%d\n", number);
    }

    fclose(fp);
}
```