CSE108 – Computer Programming Laboratory
(Spring 2021)
Lab #13

June 4, 2021.

Hand-in Policy: Via Teams. No late submissions will be accepted. File name that you submit should be as following: *StudentNo.c*
Collaboration Policy: No collaboration is permitted.
Grading: This lab will be graded on the scale of 100.

Write a complete program which performs the operations that explatined below. The program should have a menu as following:

```
1: Enter new record
2: Write to the file
3: Read from the file
4: Print the linked list
5: Exit
```

1. **Enter new record:** In this part, user gives several inputs about a country. The program all the data in a *dynamically allocated struct array*. This array should be reallocated everytime user enters a record. The struct should have the following variables:
   - *char *country*
   - *char *capital*
   - *int population*
   - *bool driving_side (True indicates right side and False indicates left side)*

   See the sample input below. (Every element of the array keeps information about a single country.)

```
Your Choice: 1
Country name: Poland
Capital: Warsaw
Population of Poland: 38000000
Do people in Poland drive on the right side? (Yes:1, No:0) : 1
```

2. **Write to the file:** In this part, the program creates a .txt file and saves all elements of the struct array in this file. Every element of the array should be written as a line (use white space to separate the variables of the struct). When all of the entries are written, the file should be closed. The entries of the .txt file should look as below. You can name the .txt file yourself.

```
Poland Warsaw 38000000 Right
Japan Tokyo 126000000 Left
Canada Ottawa 38000000 Right
```

3. **Read from the file:** This part should create a *linked list.* Each list element has the same 4 variables of the struct in Part 2 (as expected, it should also point the next element of the list). Once the list is initialized, the program should reopen the .txt file, then it should read and save the information to the linked list. Every line in the .txt file forms an element of the linked list. The file should be closed at the end of this part.

4. **Print the linked list:** In this part, the program should print the linked list that has been created in part 3. The output should be as following:

```
Your Choice: 4
Country:    Poland    Capital:    Warsaw    Population: 38000000     Driving Side: Right
Country:     Japan    Capital:     Tokyo    Population: 126000000    Driving Side: Left
Country:    Canada    Capital:    Ottawa    Population: 38000000     Driving Side: Right
```

5. **Exit:** Terminates the program.

Notes:

- Allowed libraries: stdio.h, stdlib.h, string.h, stdbool.h
- You can use calloc or realloc to reallocate the struct array.
- The menu should work in an infinite loop.
- You can write your own functions to make things easier.
- There are multiple I/O functions in C like fgets, fputs, fprintf, fscanf etc. You can decide the functions you will use. You can also benefit from the functions like strtok, atoi etc. if you need.
- Assume that all inputs will be valid. You don't have to check; for example, if the input for a country's population is integer or not.
- Assume that all parts will be performed in order (starting from 1st to the 5th). 1st part will work several times, and the others will work only once.
- The strings of the structs don't have to be dynamic, you can declare them statically. You can assume that the strings will be at most 20 characters. Also, if you use a static variable while reading the .txt file you can assume that each line will have at most 100 characters.
- Be careful with the driving_side element of the struct. It should be kept as a boolean variable, but the program should not print *true* or *false* neighter to the screen nor to the .txt file when it is indicating the driving side of the country.