LAB 3-Extension: Additional Exercises on C Programming

Objective

- To learn more advanced features of C language.

Instructions

1. Please do the following exercises and for each question produce a file for the code and screen shot of the output.
2. Show your work to your TA.
3. Collect the screen shots in a PDF file and upload All code files and the PDF file on TEAMS before the end of the lab to get full marks.
4. Use the following file naming convention for the PDF file:

   LAB3Ext_section_your-first-name_student-id

Note: 1 mark (out of 10) deducted per day late. 3 days late maximum.

Exercises

1. **C programming practice - using if-then-else, function, for loop and array.**
   (i) Write a program which asks a user to enter a number and determine whether the number is odd or even.
   (ii) Create a copy of the program in (i), and create a function `is_even()` that will determine whether a number, which is passed as parameter, is even or odd. The function returns true if the number is even.
   (iii) Create a copy of the the program in (ii) and:
   - Include function `read_num()` that will read a list of numbers from the user and store in array `List[]` of size 5.
   - The program then goes through the numbers and display whether each number is an even or odd using function `display_num()`

2. **C programming practice - using struct, pointers and file**.
   (i) Modify the program in question 1 (iii) to use struct.
   - Create a structure `NumberState` with two variables: `number` and `state`.
   - Use the structure as a type of the elements of the array `List[]`.

- Modify `read_num()` function accordingly. Fill in the state variable for each array element using `is_even()` function.
- Modify `display_num()` function accordingly to use the new type of the array.

(ii) Create a copy of the program in (i) and remove the function `is_even()` and use a new function `set_state()`. This function takes a pointer as an input to an element of the array and updates the state of the number to true or false according to the number (even or odd).

(iii) Create a copy of the program in (ii) and modify `display_num()` function such that it will display the results on the screen and write to a file call `out_file.txt`.