# Introduction to C language (NF05)
# — project 2020-2021 —

*Bashar Chreim (Author of this subject),*
*Taha Arbaoui,*
*Daniel Alshamaa,*
*Amine Athmani.*

*University of Technology of Troyes*

## Smart Parking Reservation System

## Instructions

— Work in monome or in binome.
— Report (PDF format) + code + executable files are to be included in the project file of the TD group in which you will make your presentation. If you are in binomial, think about indicating both names.
— The presentation (power point + execution) will take place during the TD sessions.
— The code will have to be commented in full. To do this, you must use the Doxygen tool [1] to manage the documentation.
— Recommendations : The C language is very informative on the internet, do a search before contacting a friend or professor.
— It is not allowed to take a code from someone otherwise you could be sanctioned.
— It is crucial to cite your references.

1. www.doxygen.org

### Report

The report must include :

1. An introduction that clearly states the topic, as well as the plan of the document.
2. A part that describes the algorithms used (the operation and not the code).
3. The encountered problems and the solutions you have found.
4. An instruction manual for the program
5. A conclusion and perspectives to optimize your program.
6. An appendix that includes the commented code.

**It is also requested to estimate the time required to complete the different parts of the code.**

## Required Work

A smart parking is a place where a person can park his car for a period (In a mall, supermarket, . . . ). Each car slot is equipped by a sensor in order to detect if there is a parked car or not. Let us consider that the parking has the possibility to contain a maximum of 100 cars. Therefore, 100 sensors are deployed in the parking. Each of the latter detect a value in a time interval and store it in a .txt file shared between all sensors. A sensor can return two possible values (1 if there is a parked car in the slot and 0 otherwise). A person who wants to park his car in the parking has to make an online reservation via a mobile application or a website.

Write a C code program that allows a user to make a reservation in the parking. When the user opens the website/mobile application, he has to choose one of the following options :

1. Check the availability of a specific car slot : the user chooses this option by entering "1". The program then asks the user to select the number of the car slot that he wants to check if available (a number between 1 and 100). When the user selects a number, the program prints "Not Available" if there is a car parked in this slot and "Available" otherwise.
2. Display all available car slots : the user chooses this option by entering "2". After that, the program must display the numbers of all available car slots in the parking (each number on a row).
3. Display the number of available car slots : the user chooses this option by entering "3". The program must display the number of available car slots in the parking.

4. Make a reservation : the user chooses this option by entering “4”. The program then asks the user to select the number of the car slot that he wants to reserve. If the user selects a car slot that is not available, the program must print “Sorry, this slot is not available right now”, and asks the user to select another car slot. Otherwise, the program prints, “Your slot is well reserved”, and update the .txt file.

The following Figure shows the initial output of the program :

**Hello and welcome to the smart parking reservation system!**

**Choose one of the following options by entering 1, 2, 3 or 4**

**1-Check the availability of a specific car slot**

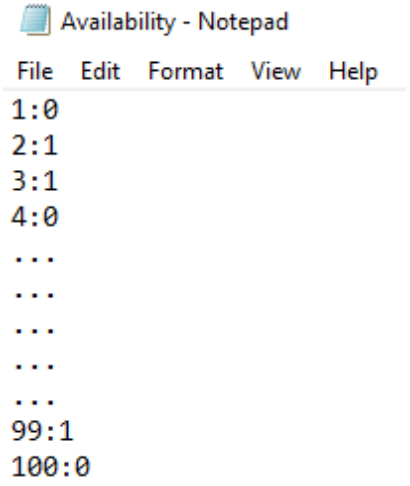
**2-Display all available car slots**

**3-Display the number of available car slots**

**4-Make a reservation**

## Hints

1. Create a txt file that contains 100 rows, each one representing a car slot of the parking and its availability. The following Figure shows how the .txt file must be created : The following Figure shows the initial output of the program :




2. Think about structuring your code by creating functions.