EN3085 – Computing Lab 1

Preliminary Note: To demonstrate the usage of object-oriented concepts, a simple scenario will be used in the next few weeks. We will produce a simple programme to help manage a list of equipment used in a laboratory, tracking their value and power consumption. In this lab, we will start with procedural programming. Object Oriented concept will be introduced later to gradually improve the programme.

If you need a simple starting point, follow the instructions provided in the sheet "Microsoft Visual Studio 2015 – Getting Started" to create and run the "Hello World" programme provided, then modify it to complete the questions below:

Question 1 – Getting Information from a user: Create a new C++ project with a new **main.cpp** file and use it to create a program that:

- Asks on the screen the name the value (£), wattage (W) and daily usage (h) of a piece of equipment.
- Stores the values provided on the screen in relevant variables (e.g. double, string). You can assume that the values provided by the user will be in the proper format.
- Calculates the daily power consumption of the equipment (KWh) and stores the resulting value in a variable.
- Display in one line on the screen, the resulting specific equipment information: equipment name, equipment value and equipment daily consumption

Optional – move the code into a separate function that is then called in the main file. This will require, in the main file, retrieval of information stored in three variables created in the function (do not use global variables).

Question 2 - Simple loop and storing in an Array: Around the code created in question 1, in the **main.cpp**, create a loop that keeps asking on the screen if the user wants to add an equipment and if so:

- Collect the equipment information as described in question 1
- Store the information in three **Arrays**, using the same array index for each equipment:
    - Store the provided equipment name in an array called *EquipmentNameInfo*
    - Store the provided equipment value in an array called *EquipmentValueInfo*
    - Store the calculated equipment consumption in an array called *EquipmentConsumptionInfo*

Once the user does not want to add anymore equipment:

- Display the number of equipment stored.
- Display line by line the name, value and daily power consumption of each piece of equipment stored.

Optional – Move the code created for question 2 into a separate function that is then called in the main file. This will require, in the main file, retrieval of information stored in three arrays filled in the function (do not use global variables).

Question 3 – Saving in a file: At the end of the program created in question 2, add C++ code that loops through the three arrays created (EquipmentNameInfo, EquipmentValueInfo, EquipmentConsumptionInfo) and:

- Save the recorded information in a text file called "EquipmentInfo.txt". Each line in the file should contain the Name, Value and Consumption of a single piece of equipment, separated by a space.
- Calculate and display the total value and total daily power consumption of the list of equipment.

Question 4 – Reading from a file: At the beginning of the program created in question 3, add C++ code that opens thee file called "EquipmentInfo.txt" for reading and if it exists:

- Store the provided existing equipment information in the three arrays (EquipmentNameInfo, EquipmentValueInfo, EquipmentConsumptionInfo).
- Display the number of equipment stored in the file.
- Display line by line the name, value and daily power consumption of each piece of equipment stored.
- Calculate and display the total value and the total daily power consumption of the list of equipment.

Note: You might need to use the function `stod()` that converts a string into a double (e.g. `string word; double a = stod(word)`) or `stof()` for a float.

Optional – Move the code created for question 3 and 4 into separate functions that are then called in the main file (do not use global variables).

Question 5 – using a vector object: Replace the **Arrays** used in your program with the use of **vector structure** from the vector library.