

## CSC 3210 – Assignment #3

### Spring 2022

**Objective:** Learn memory organization/layout, data transfer concepts and instructions, direct memory access, memory allocation.

#### Requirements:

**1. (5 points) Use a loop instruction with indirect addressing to solve the problem.**

- Do not copy the elements to any other array.
- **Use the LOOP and XCHG instruction.**
- The input array, *inputStr* contains elements: “A”, “B”, “C”, “D”, “E”, “F”, “G”, “H”.
- The array’s elements after running the program should look like: “G”, “H”, “E”, “F”, “C”, “D”, “A”, “B”.
  - o **Submit the following:**
    - Rename the asm file using your last name as Lastname1.asm
    - Screenshot of the code and memory window showing the content of the variable *inputStr*.

**2. (5 points) Write an assembly program that does the following:**

- Define the following value **0506-0307-0408-0102h** in the .data segment using the 64-bit unsigned identifier named *qVal*.
- **You can subdivide the qVal value into 4 words – 0506, 0307, 0408, 0102**
- **Extract these words from qVal using PTR operator.**
- Find the sum of the words. The sum should be D17h.
- Store the result in any 16-bit register.
- The direction of adding two words goes from left to right.
  - o **Submit the following:**
    - Rename the asm file using your last name as Lastname2.asm
    - Screenshot of the code and memory window showing the result in a 16-bit register.

**3. (5 points) Consider the following code:**

```
if (var1 > var2) OR (var3 < var2) {
    var1 = var2 + var3;
    var2++;
    var3++;
}
else{
    var1--;
    var2--;
    var3--;
}
```

Here *var1*, *var2* and *var3* are DWORD variables.

*var1* is initialized with 10 (decimal), *var2* is initialized with 11(decimal) and *var3* is initialized with 12 (decimal).

Translate the following code in assembly code (MASM).

You need to implement the logic of the **if-else statement** with compound condition.

#### Note:

- **Comment header** for .ASM files:
  - Student: Full name
  - Class: CSC3210
  - Assignment#: 3
  - Description: This program .....
- Follow the program standards as presented in your book. Pay more attention to code comments and

consistent indentation.

- Create a new project for every question. Do not use one project with multiple .asm files.