60-266 – Assignment #3

DUE DATE is: *Sunday, November 10, 2019.* To be submitted via Blackboard by 11:59PM.

WARNINGS: You must only use instructions and directives discussed from Lecture 1 to Lecture 8 (ie, Chapt_05-b).

This is a group assignment of **no more than 4 students in a group**. However, submit individually as usual but making sure you include as a comment the last-name, first-name and student-number of each member in the group. What I mean: *all member of the group should submit the work as if it was done individually.* Simply, I do not know how to correctly set the group submission feature on Blackboard.

Programming Exercise (40 points): [call it Ass3.asm]

For this question, you should (1) first separately write the Programs 1, 2, and 3 below, in order to make sure that they execute correctly, and then (2) put them all together appropriately into one single main program [this single main program is Program 4, below, which will be name Ass3.asm and is what you should submit].

Of course, you do not need to do what I wrote above; you can directly start implementing the Program 4 below.

1. (10 points) Write a program `ArrayToStack` which copies (ie, pushes) the *N* elements of an array, `Vector`, onto the runtime stack. `Vector` is an array of unsigned double-word integers.

2. (10 points) Write a program `StackToArray` which copies back to `Vector` the last *N* double-word elements pushed onto the stack (by some piece of code such as `ArrayToStack`). `StackToArray` should not reverse `Vector` (that is, the elements should return to their initial positions as before the execution of `ArrayToStack`).

3. (10 points) Write a program `StackReverse` which uses the runtime stack to reverse an array `Vector` of *N* unsigned double-word integers.

4. (10 points) To test these three programs, your main program should display the following interaction with you (things in reds are your inputs). Fix the maximum size of the array to be *N* = 20; thus, your runtime stack will never overflow ☺.

```
What do you want to do now? > 0

What is the size N of Vector?> 13
What are the 13 values in Vector?> 1 2 3 4 5 6 7 8 9 10 11 12 13

```

```
Size of Vector is N = 13
Vector = 1   2   3   4   5   6   7   8   9   10   11   12   13
Stack is empty

What do you want to do now? > 1

Vector is 1   2   3   4   5   6   7   8   9   10   11   12   13 before ArrayToStack
Stack is 13   12   11   10   9   8   7   6   5   4   3   2   1 after ArrayToStack
Vector is 0   0   0   0   0   0   0   0   0   0   0   0   0 after ArrayToStack
Stack not empty

What do you want to do now? > 2

Stack is 13   12   11   10   9   8   7   6   5   4   3   2   1 before StackToArray
Vector is 1   2   3   4   5   6   7   8   9   10   11   12   13 after StackToArray
Stack is empty

What do you want to do now? > 3

Vector is 1   2   3   4   5   6   7   8   9   10   11   12   13 before StackReverse
Stack not empty
Vector is 13   12   11   10   9   8   7   6   5   4   3   2   1 after StackReverse
Stack is empty

What do you want to do now? > 3

Vector is 13   12   11   10   9   8   7   6   5   4   3   2   1 before StackReverse
Stack not empty
Vector is 1   2   3   4   5   6   7   8   9   10   11   12   13 after StackReverse
Stack is empty

What do you want to do now? > 2
Error - Stack is empty: Cannot perform StackToArray

What do you want to do now? > 0

What is the size N of Vector?> 6
What are the 6 values in Vector?> 8  9  10  11  12  13

Size of Vector is N = 6
Vector = 8   9   10   11   12   13
Stack is empty

What do you want to do now? > 1

Vector is 8   9   10   11   12   13 before ArrayToStack
Stack is 13   12   11   10   9   8  after ArrayToStack
Vector is 0   0   0   0   0   0   after ArrayToStack
Stack not empty

What do you want to do now? > -1
I am exiting… Thank you Honey… and Get lost…
```

As you see: 0 is to create a new Vector, 1 is to fill in a stack from a vector, 2 is to fill in a vector from a stack, 3 is to reverse a vector using the stack stack, and -1 is to exit.