

30 pts

Name: _____

Class Day / Time: _____

Due Date: _____

Lab #15 – Structures and Macros

1) Create a structure named **MyStruct** containing two fields:

- field1, a single word, and
- field2, an array of 20 doublewords.

The initial values of the fields may be left undefined.

The structure created in question # 1 (**MyStruct**) will be used in questions #2 through #10:

2) Declare a **MyStruct** variable with default values.

3) Declare a **MyStruct** variable that initializes the first field to zero.

4) Declare a **MyStruct** variable and initialize the second field to an array containing all zeros.

5) Declare a variable as an array of 20 **MyStruct** objects.

6) Using the **MyStruct** array from question #5, move **field1** of the first array element to AX.

7) Using the **MyStruct** array from question #6, use ESI to index to the third array element and move AX to **field1**. Hint: Use the PTR operator.

8) What value does the expression **TYPE MyStruct** return?

9) What value does the expression **sizeof MyStruct** return?

10) Write an expression that returns the number of bytes in **field2** of **MyStruct**.

11) Assume that the following structure has been defined:

```
RentalInvoice STRUCT
    invoiceNum BYTE 5 DUP(' ')
    dailyPrice WORD ?
    daysRented WORD ?
RentalInvoice ENDS
```

State whether or not each of the following declarations is valid:

a. rentals RentalInvoice <>	Valid? _____
b. RentalInvoice rentals <>	Valid? _____
c. march RentalInvoice <'12345',10,0>	Valid? _____
d. RentalInvoice <,10,0>	Valid? _____
e. current RentalInvoice <,15,0,0>	Valid? _____

12) Using the following Triangle structure, declare a structure variable and initialize its vertices to (0,0), (5, 0), and (7,6): (Use the COORD struct defined in class)

```
Triangle STRUCT
    Vertex1 COORD <>
    Vertex2 COORD <>
    Vertex3 COORD <>
Triangle ENDS
```

13) Declare an array of Triangle structures. Write a loop that initializes Vertex1 of each triangle to random coordinates in the range (0..10, 0..10).

For the following two questions use the macros and procedures discussed in class.

14) Write a macro named **mPrintChar** that displays a single character on the screen. It should have two parameters: this first specifies the character to be displayed; the second specifies how many times the character should be repeated.

Sample call: mPrintChar 'X',20

15) Write a macro named **mPromptInteger** that displays a prompt and inputs an integer from the user. Pass it a string literal and the name of a doubleword variable. Sample call:

```
.data
    minVal DWORD ?
.code
    mPromptInteger "Enter the minimum value", minVal
```