CSE331L - Microprocessor Interfacing and Embedded Systems
Sample Practice Problems

1. Write a program which will work for the following equation and store the output in memory.
   $F(x) = 4x^3 + 5x^2 – 2x + 1$; when $x = 2$

2. Write down an ASM program to check whether it's positive or negative. If the number is positive store 1 in r8 register, otherwise store 2 in r8 register.

3. Write a program to find 23rd Fibonacci number. [By implementing Fibonacci formula]. Use loop and procedure.
   OR
   Write a program, in ASM language, that will generate the first 10 Fibonacci Numbers. Assume that the first two numbers are included. Use loop and procedure.

4. Write a program to find the minimum and maximum element in an array. [Create an array of 10 elements].

5. You are given two arrays loaded with random numbers. You must add the content of each array and the sum will be stored in another array. You must print the contents of the sum array. Example:

Array1	1	2	3	4	5
Array2	6	4	5	1	4
SumArray	7	6	8	5	9

   Hints: Create the three arrays. Load values of your wish in the first two. Place the sum of each of the element in the two arrays into the third array.

6. A class teacher has the marks for 20 students. He wants to create a distribution curve based on the frequency of the marks obtained by the students. The exam was out of 10. Write a program that will count the frequency of the marks attained by the students.
   Example:
   Marks:

7	6	5	4	7	6	6	8	3	10

   Frequencies:

0	1	2	3	4	5	6	7	8	9	10
0	0	0	1	1	1	3	2	1	0	1

Instructions: Create an array of size 20. Load the arrays with marks of your choice. Try to add some repetitions so that it simulates a real exam scenario. Create a second array. This array will contain the frequency of the marks. You may use the indices of the array to represent the mark. Study the example.

7. You are given an array of 10 elements. Create two arrays 'even' and 'odd'. Write a code to put the even-indexed values in 'even' array and odd-indexed values in 'odd' array.
   Example:
   Array

Index	0	1	2	3	4	5	6	7	8	9
Value	6	3	1	4	0	8	9	2	7	5

   Even

Index	0	1	2	3	4
Value	6	1	0	9	7

   Odd

Index	0	1	2	3	4
Value	3	4	8	2	5

8. Write a program to count the total number of alphabets and digits in a string. Store the total number of alphabets and digits in the r8 and r9 registers respectively.

9. Write a program that searches for a character inside a string. Once the character is found, your program should store the index of the character in r8 register. If there are multiple instances of the same character, then take only the first one into consideration. For missing character, store 1 in r9 register.

10. Write a program that will put a space in between a letter and a punctuation mark if they do not have any space in between them. For example, if we have a sentence like –

    Input: A computer programmer,sometimes called more recently a coder,is a person who creates computer software.

    Output: A computer programmer, sometimes called more recently a coder, is a person who creates computer software.

11. A palindrome is a word that is same when read from both ends. Example: 'RACECAR'. Write a program that will determine whether the word is a palindrome. The output may be a 'Yes' or a 'No'.
    Example:
    racecar
    yes
    hellyeah
    no

12. Write a program that will concatenate (join) two strings. Make sure the input strings are not destroyed and the final answer must be inside a third array. Input from user not required. Create two strings in your program.
    Example:
    String 1: Hello World,
    String 2: this is Assembly Language Programming
    Output: Hello World, this is Assembly Language Programming

13. Write a program to convert a string to uppercase and lowercase. Use Macro. [Hint: Use ASCII table].
    Input String: Final Assignment
    Upper Case: FINAL ASSIGNMENT
    Lower Case: final assignment

14. Write a program to find the frequency of each vowel in a string.
    Sample String: Final Assignment
    Array

Character	a	e	i	o	u
Frequency	2	1	2	0	0

15. Write a program that will create an 4X4 identity matrix. Use Procedure to create the matrix.
    Output:

    1 0 0 0
    0 1 0 0
    0 0 1 0
    0 0 0 1

16. Write a program to display the transpose of a matrix. Take a 4x3 matrix.