Study Questions (Chapter 03 – Part E)

1. Question 3.15 on page 224: Write an ARM assembly language routine to count the number of 1s in a 32-bit word in r0 and return the result in r1.

2. Question 3.16 on page 224: A word consists of the bytes b4, b3, b2, b1. Write an ARM assembly language function to re-order (transpose) these bytes in the order b1, b3, b2, b4.

3. Question 3.22 on page 224: Write ARM code to implement the following C operation.
    ```
    int s = 0;
    for ( i = 0; i < 10; i++) {
    s = s + i*i;)
    ```

4. Question 3.39 on page 225: Write an ARM assembly language program that scans a string terminated by the null byte 0x00 and copies the string from a source location pointed at by r0 to a destination pointed at by r1.

5. Write an ARM assembly language *program* to count the number of characters in a *null*-terminated string (STRING1) and store the result in memory at the location identified by label "length".
    You may want to define the data of the program as follow:

    ```
    STRING1 DCB "This is a test string1"   ;String1
    EoS1    DCB 0x00                        ;end of string1
    length  DCD 0x00                        ;to store the calculated string length
    ```

6. Write an ARM assembly language *program* to concatenate two *null*-terminated strings (STRING1 and STRING2) and store the result in another *null*-terminated STRING3. Assume that the length of STRING1 + the length of STRING2 ≤ 255.
    You may want to define the strings as follow:
    ```
    STRING1 DCB "This is a test string1"   ;String1
    EoS1    DCB 0x00                        ;end of string1
    STRING2 DCB "This is a test string2"   ;String
    EoS2    DCB 0x00                        ;end of string2
    STRING3 space 0xFF
    ```