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
   ```