ARM ASSEMBLY LAB-6

By

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STATUS UPDATE

The ARM assembly code was written for 32 bit processor and verified using ARMSim simulator successfully.

EXERCISE 1 – SEARCH IN UNSORTED ARRAY

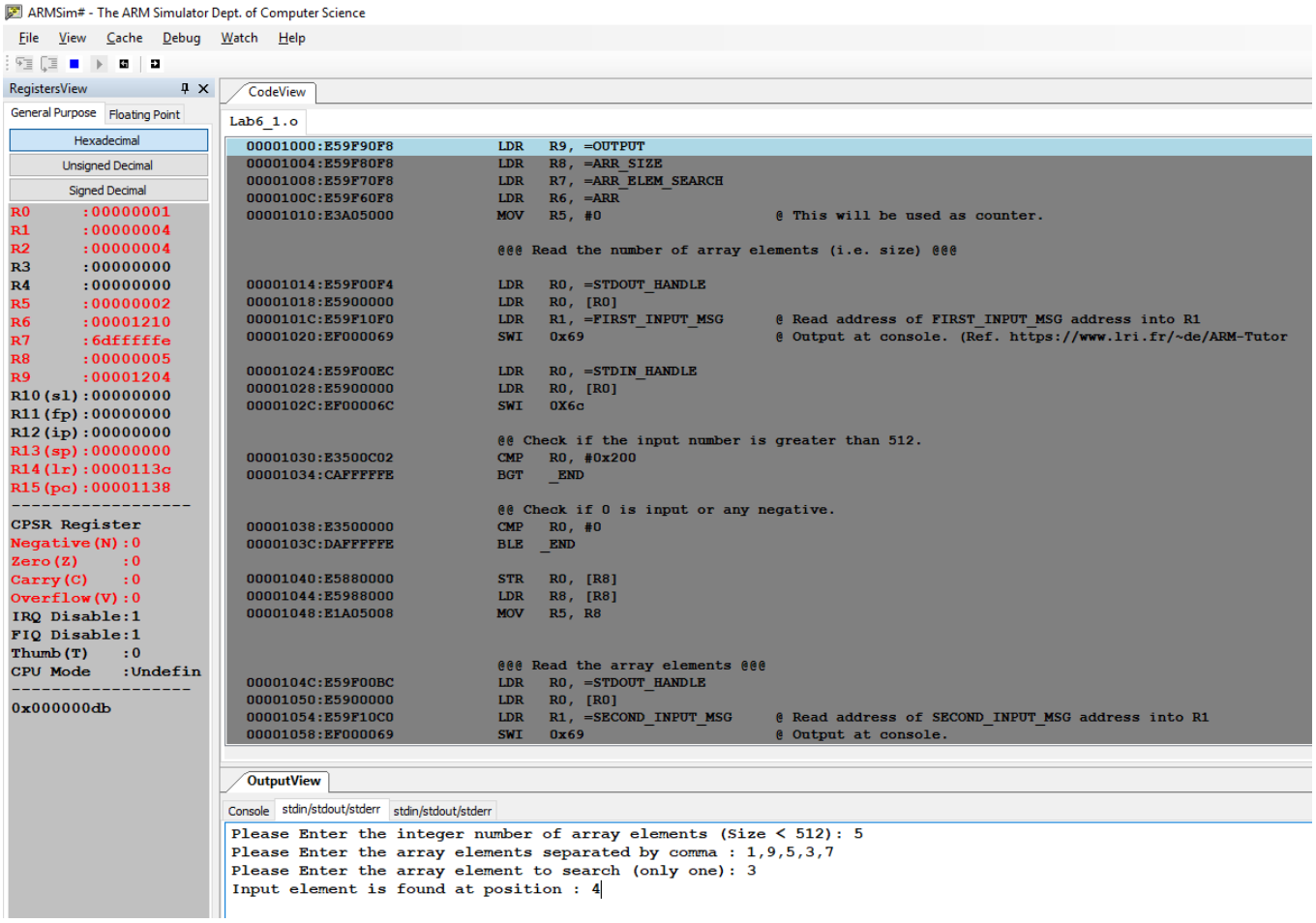
Write an assembly program for searching a given integer number in an array of integer numbers. Assume that the numbers in the array are not in sorted order. The program must ask the user to enter the number of elements of the array and accept each element of the array through keyboard (for this, you need to use software interrupts). Also, the user must enter the element to be searched through keyboard. You must pass the array and the searching element as parameters to a subroutine, SEARCH. The program outputs the position of the given element, if it is present in the array, otherwise, it outputs -1.

The logic to solve this exercise is hand-coded in 32 bit ARM Assembly and verified on ARMSim Simulator.

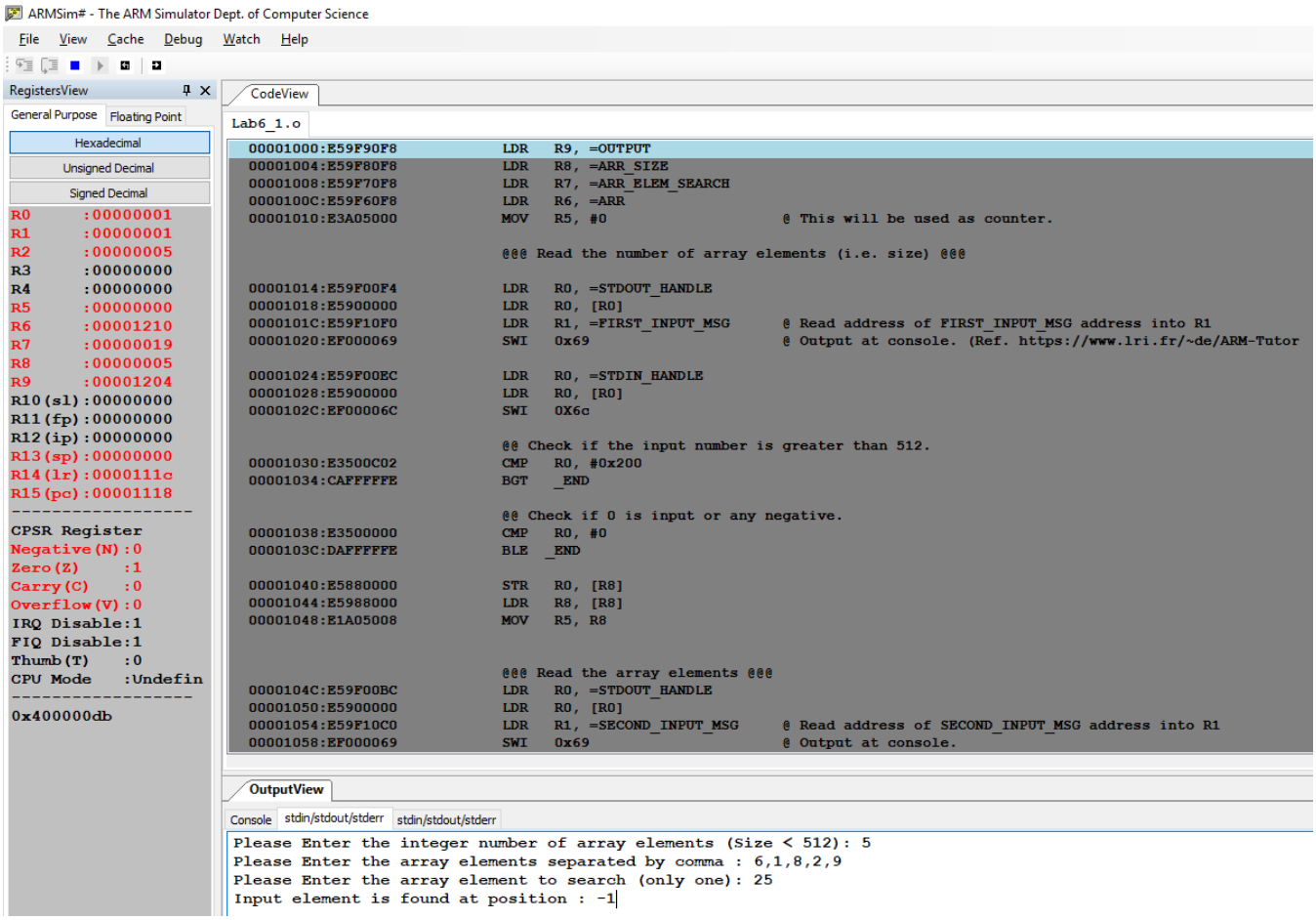
The logic used is mentioned in the code file itself and all the necessary instructions are supplied with comments.

It was run for various inputs and verified.

SCREENSHOT - TEST 1



SCREENSHOT - TEST 2



EXERCISE 2 – SEARCH IN SORTED ARRAY

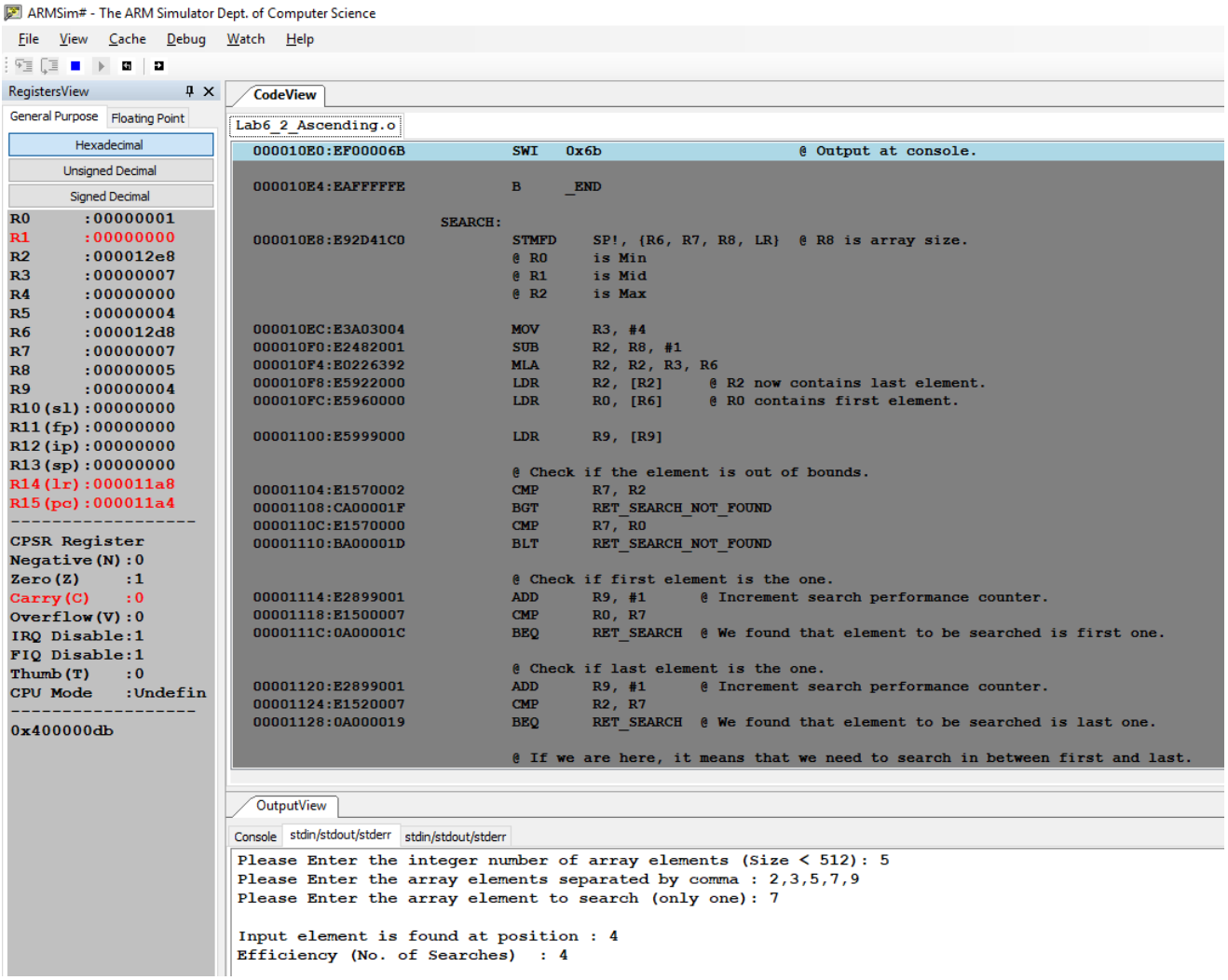
In the above problem, as the elements of the array are not in sorted order, we have to search all the elements to find whether a given element is present or not. Now, assume that the elements of the array are in sorted order. Write an assembly language program that can efficiently search a given element in the sorted array of elements. (Note that here we define the efficiency in terms of the number of searches.)

The logic to solve this exercise is hand-coded in 32 bit ARM Assembly and verified on ARMSim Simulator.

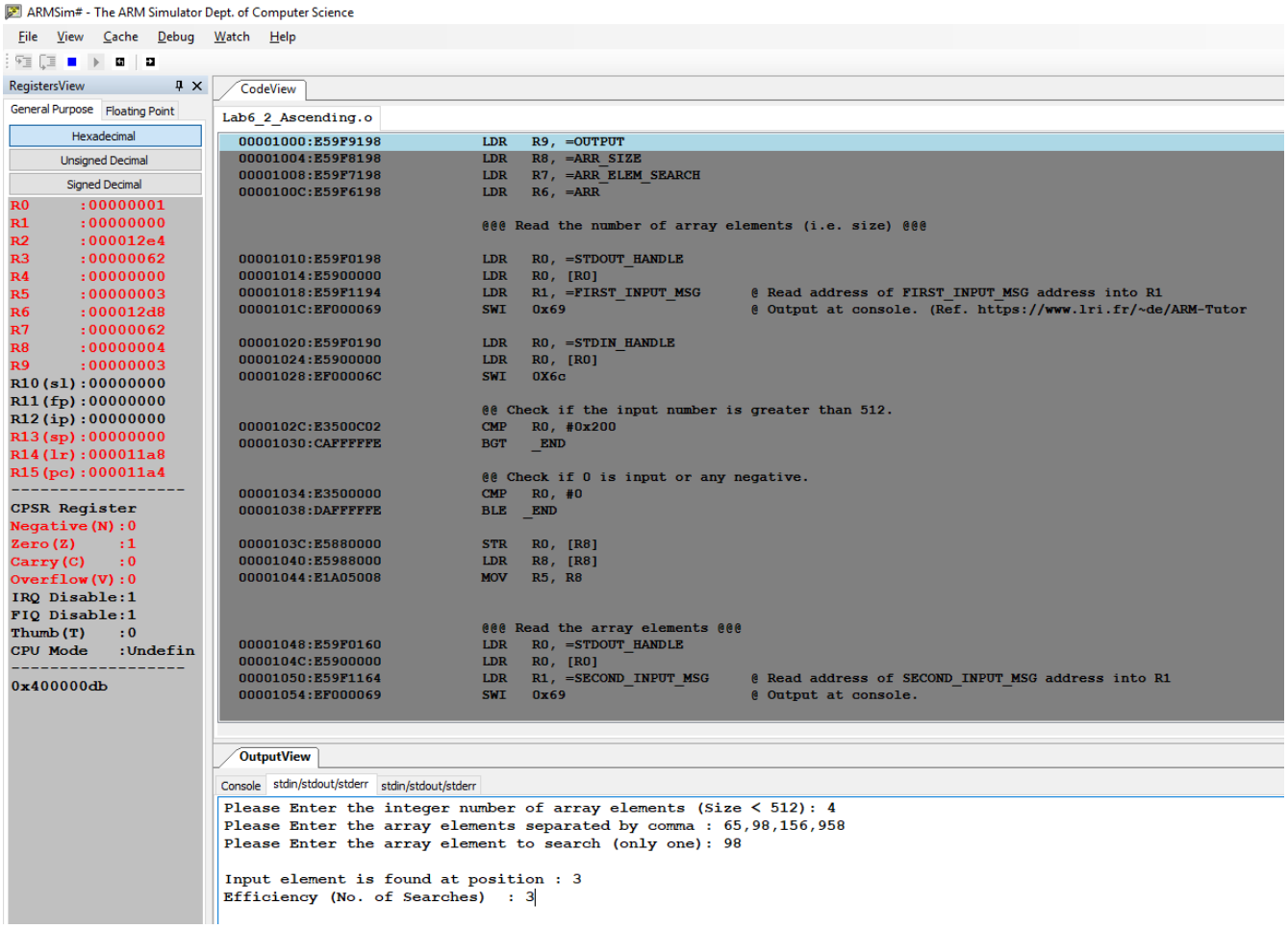
The logic used is mentioned in the code file itself and all the necessary instructions are supplied with comments.

It is separately written in two programs, main for ordering namely, Ascending and Descending Ordering.

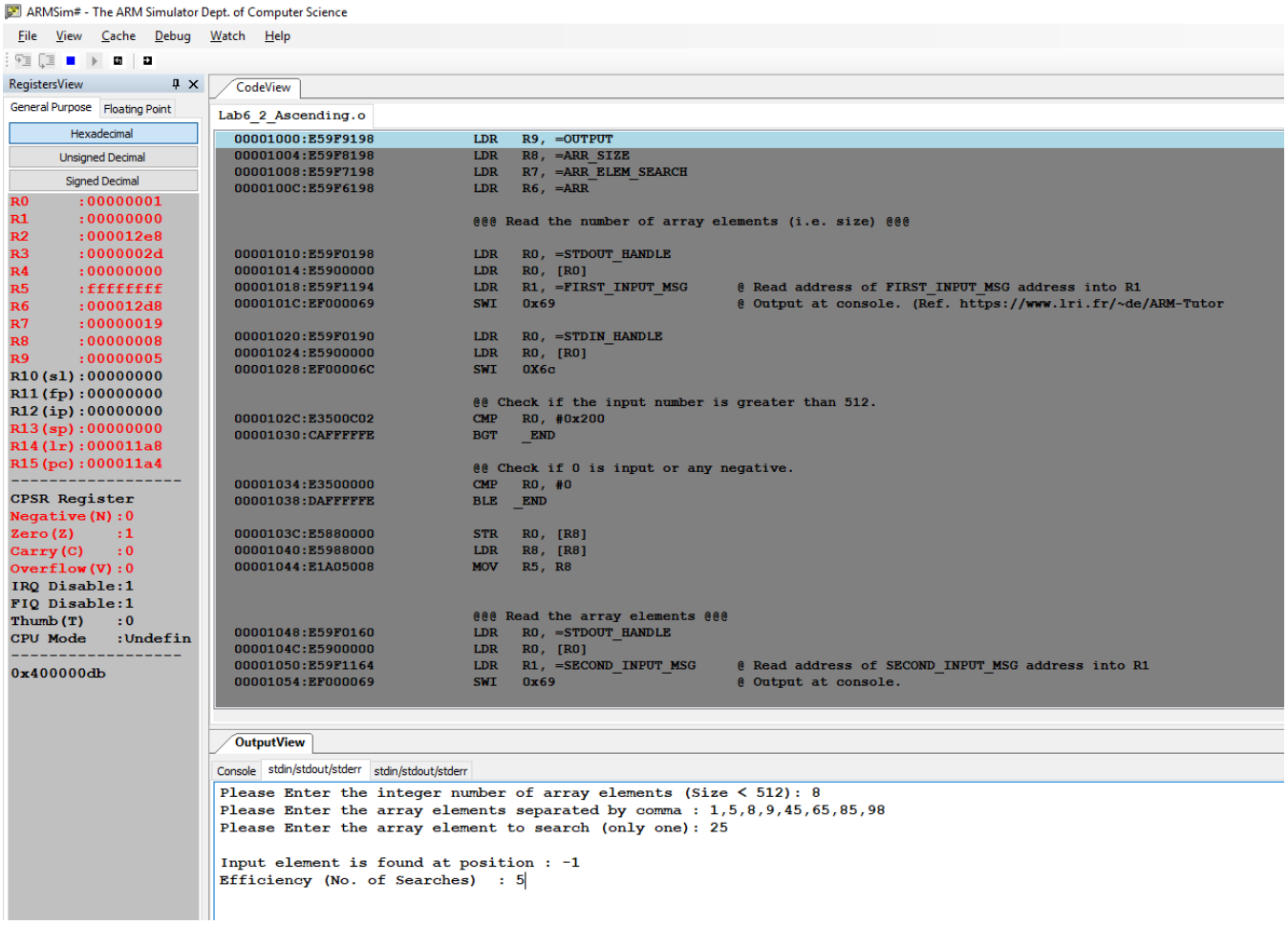
SCREENSHOT – TEST 1: ARRAY IN ASCENDING ORDER



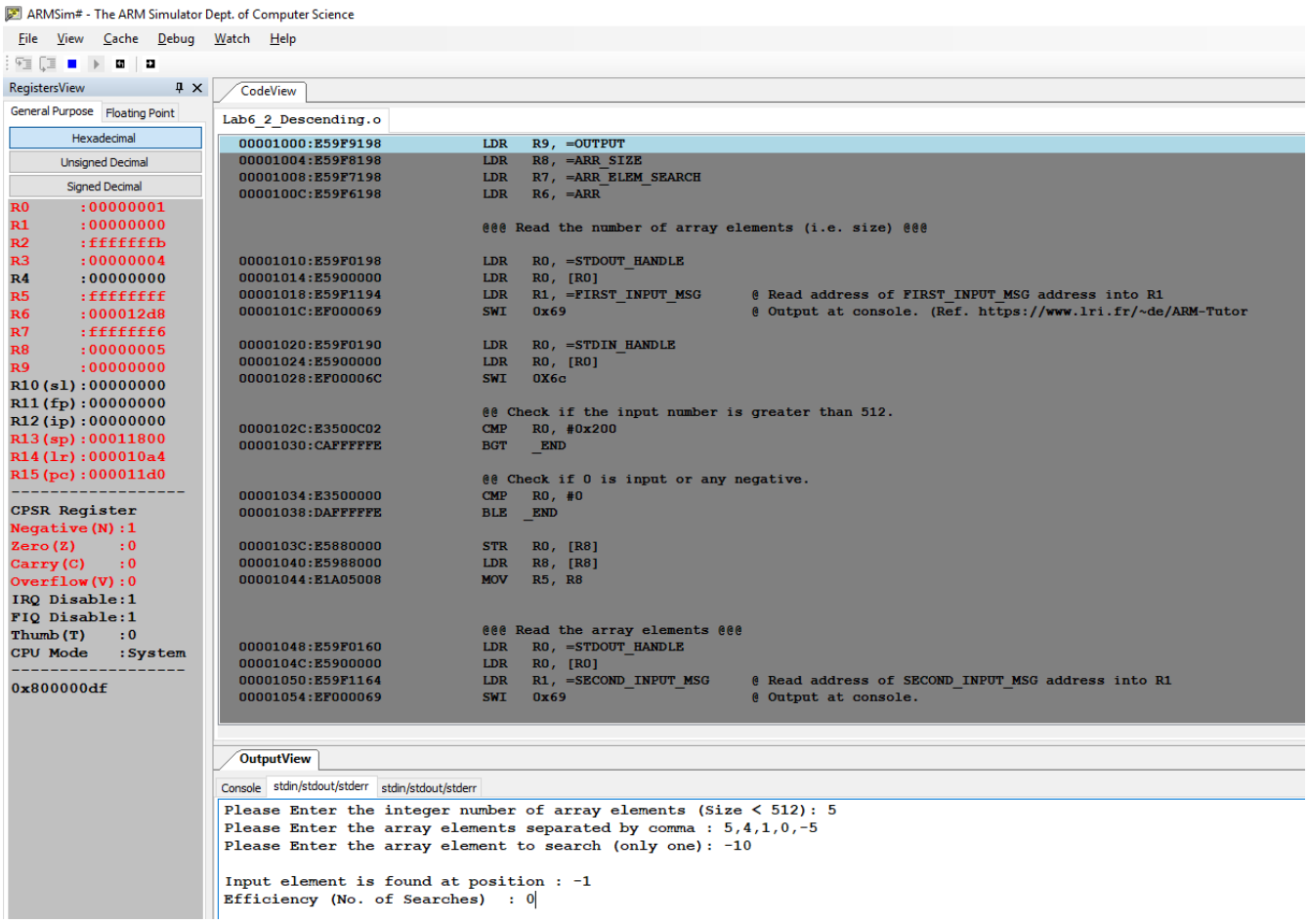
SCREENSHOT – TEST 2: ASCENDING ORDER – EVEN NO. OF ELEMENTS



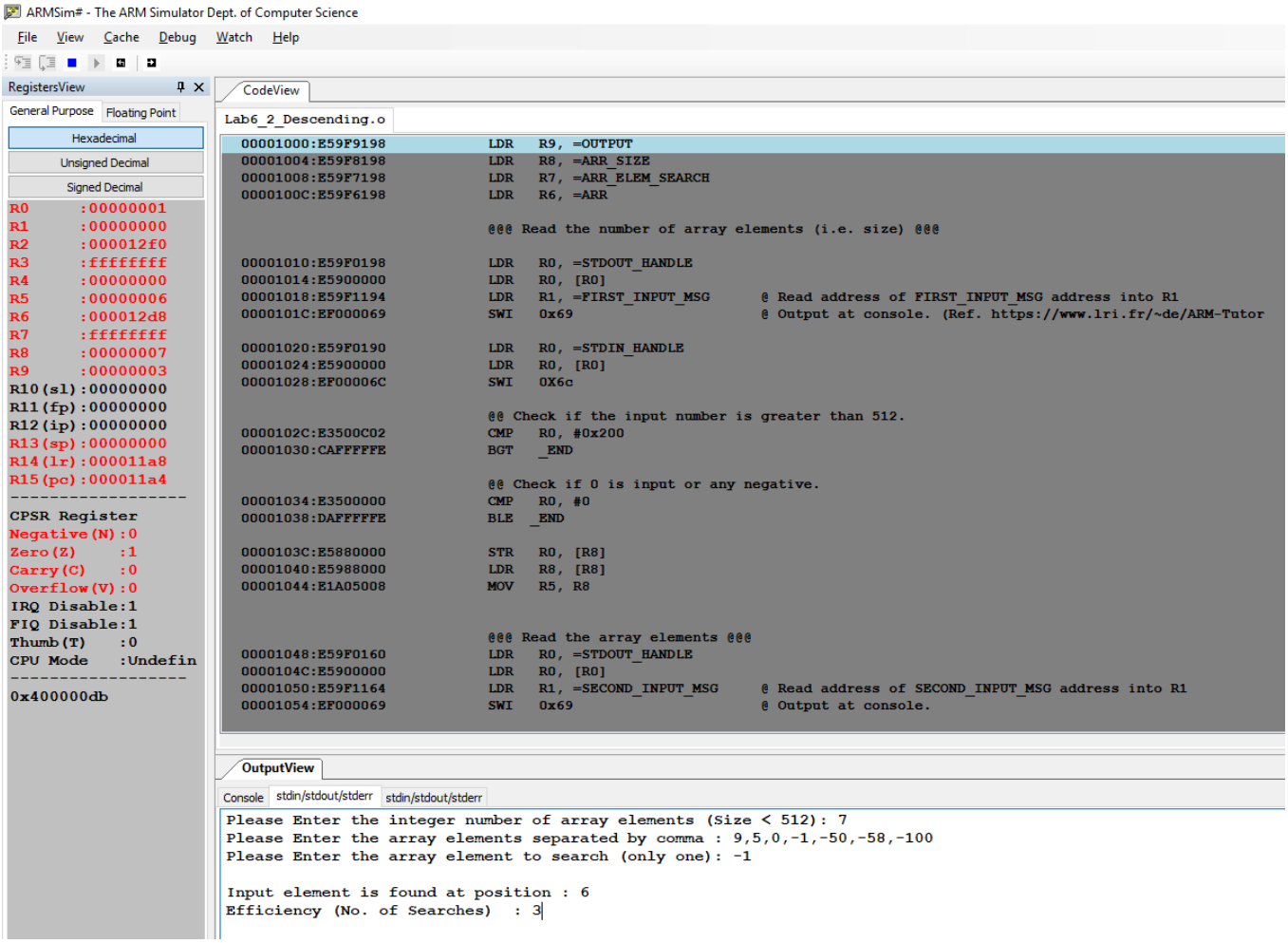
SCREENSHOT – TEST 3: ASCENDING ORDER – BAD SEARCH ELEMENT



SCREENSHOT – TEST 3: DESCENDING ORDER – BAD SEARCH ELEMENT



SCREENSHOT – TEST 3: DESCENDING ORDER – VALID SEARCH ELEMENT



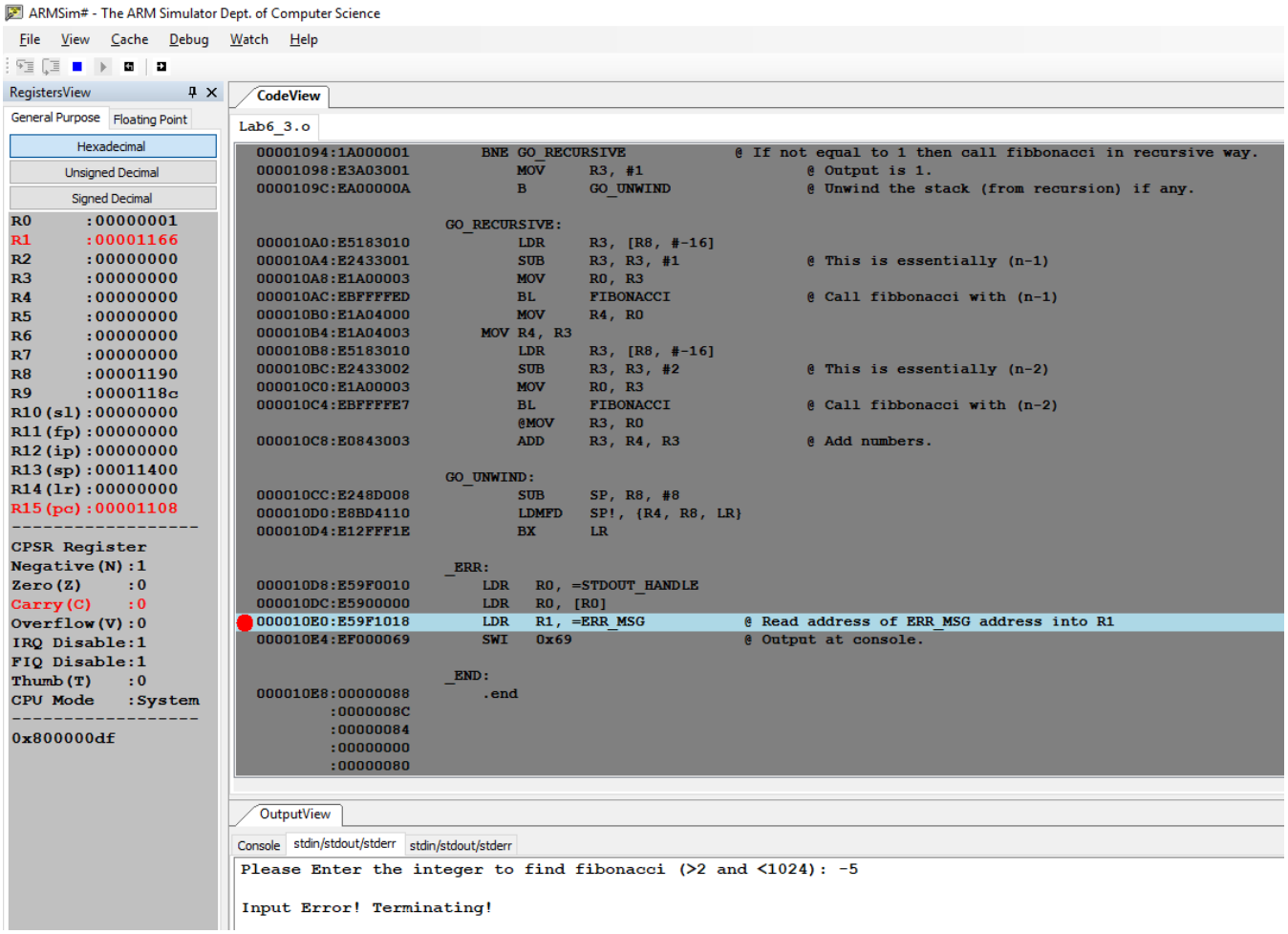
EXERCISE 3 – COMPUTE FIBONACCI NUMBER (RECURSIVELY)

Fibonacci number sequence is defined as 1, 1, 2, 3, 5, 8, 13, 21, … A number in the Fibonacci sequence is the sum of the immediate two previous numbers, i.e. $F_n = F_{n-1}+F_{n-2}$, $n>2$. Note that $F_1 = F_2 = 1$. Write an assembly language program that accepts an integer number, N, through keyboard and computes the N^{th} Fibonacci number in recursive way.

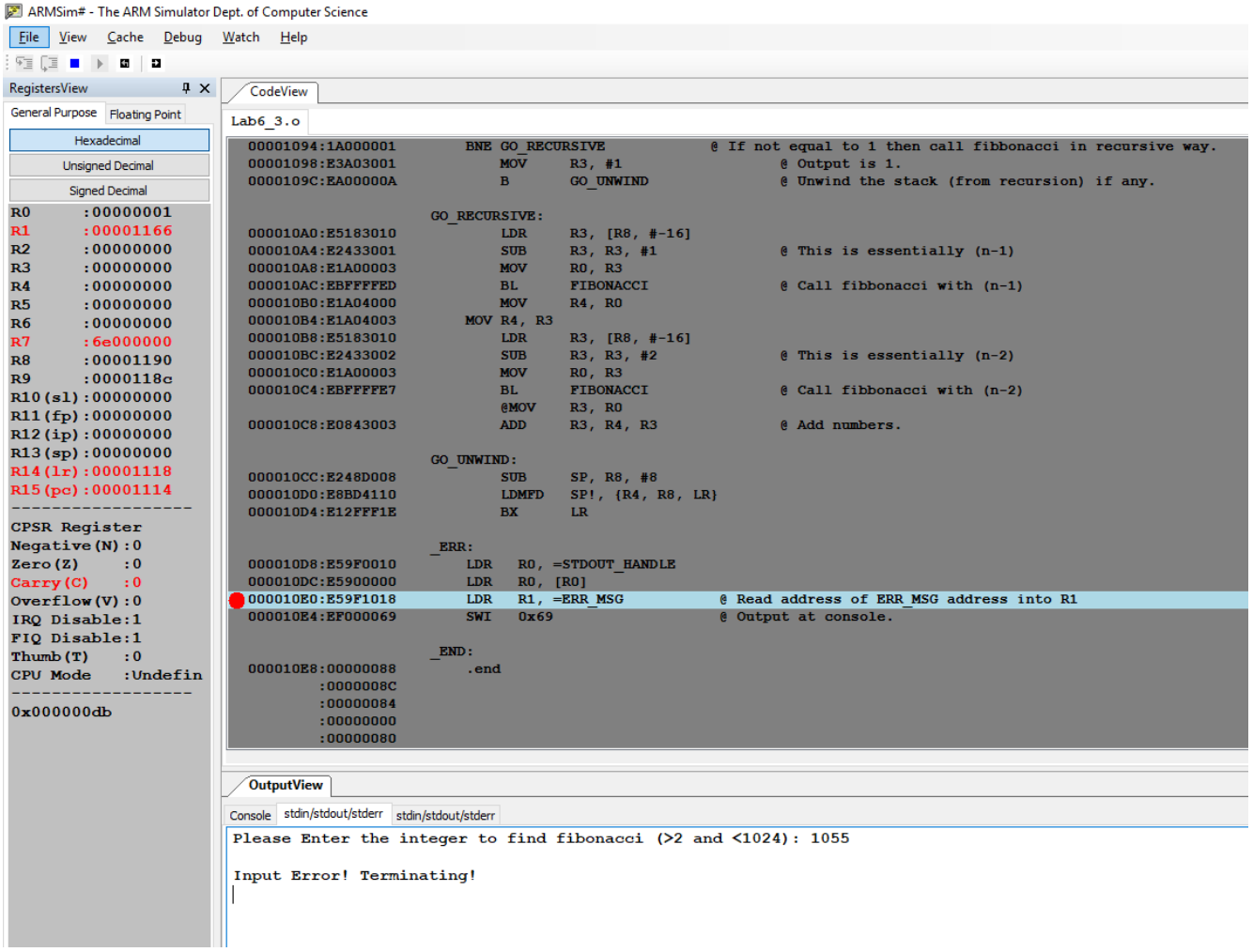
The logic to solve this exercise is hand-coded in 32 bit ARM Assembly and verified on ARMSim Simulator.

The logic used is mentioned in the code file itself and all the necessary instructions are supplied with comments.

SCREENSHOT – TEST 1 – WRONG INPUT



SCREENSHOT – TEST 2: WRONG INPUT



SCREENSHOT – TEST 3: GOOD/VALID INPUT