Control Flow (loops and branches), Inputs & Outputs, and Making Decisions

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Exercise:

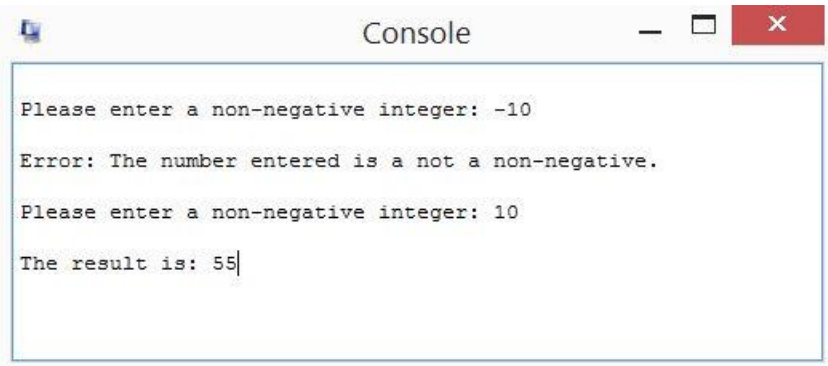
The number of iterations are 6.

Yes, it affects the number of iterations, now the number of iterations are 5, because, by swapping lines 12 and 13 the increment comes before the condition to check, and as it increments first then it checks and the loop ends rather than incrementing then jumping to the loop and then checking.

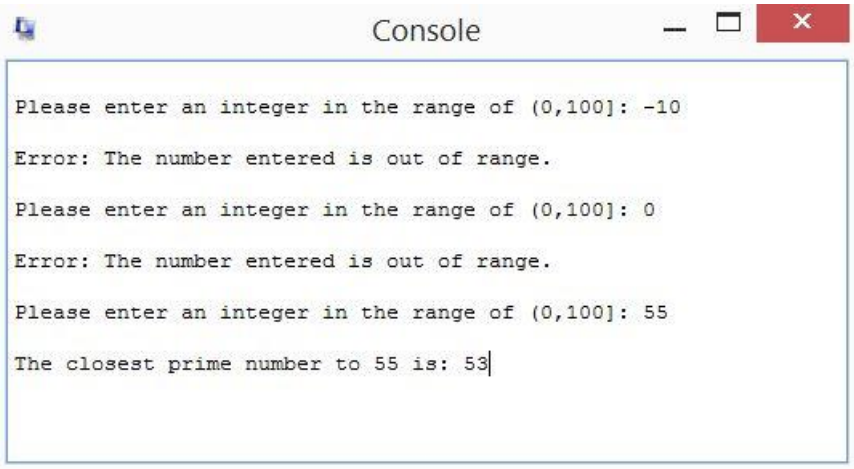
The codes for each Assignment are attached at the end. Output of the codes are below:

Outputs of the codes:

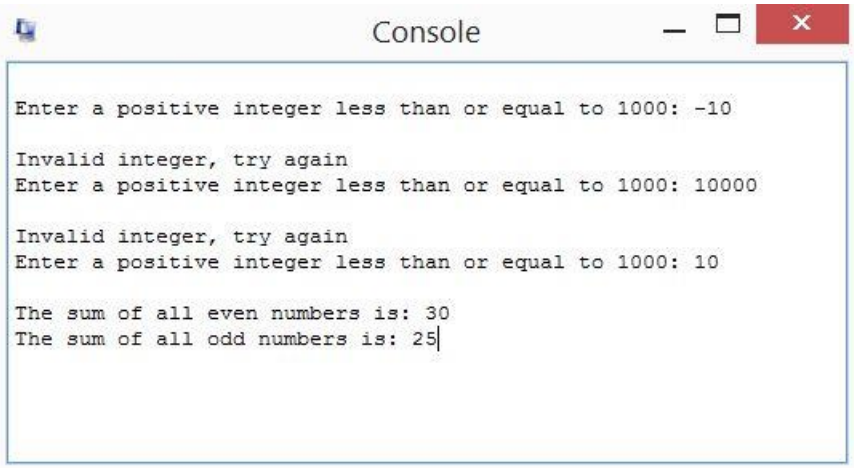
Assignment 1:



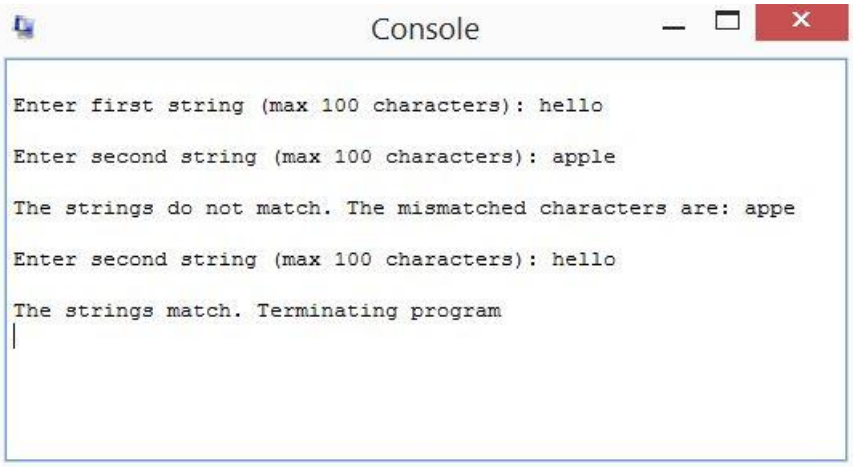
Assignment 2:



Assignment 3:

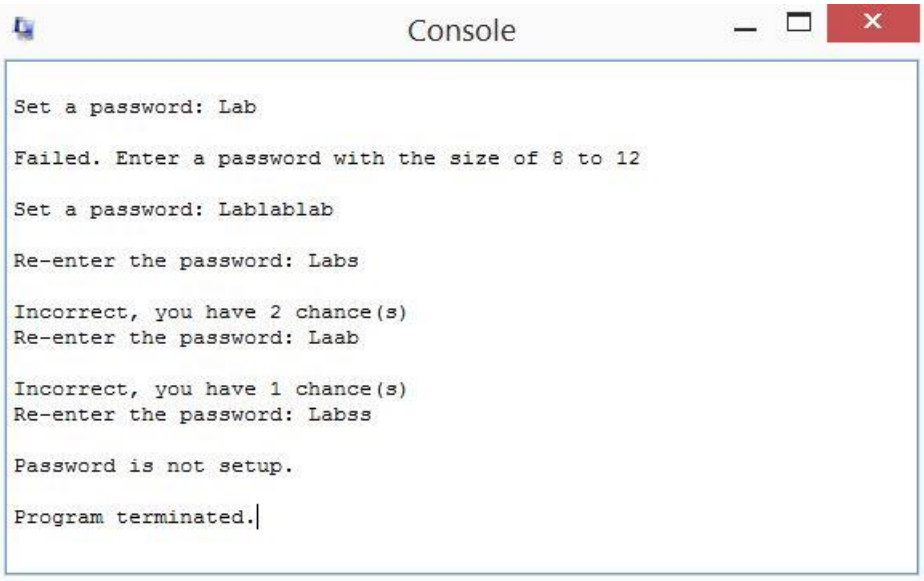


Assignment 4:

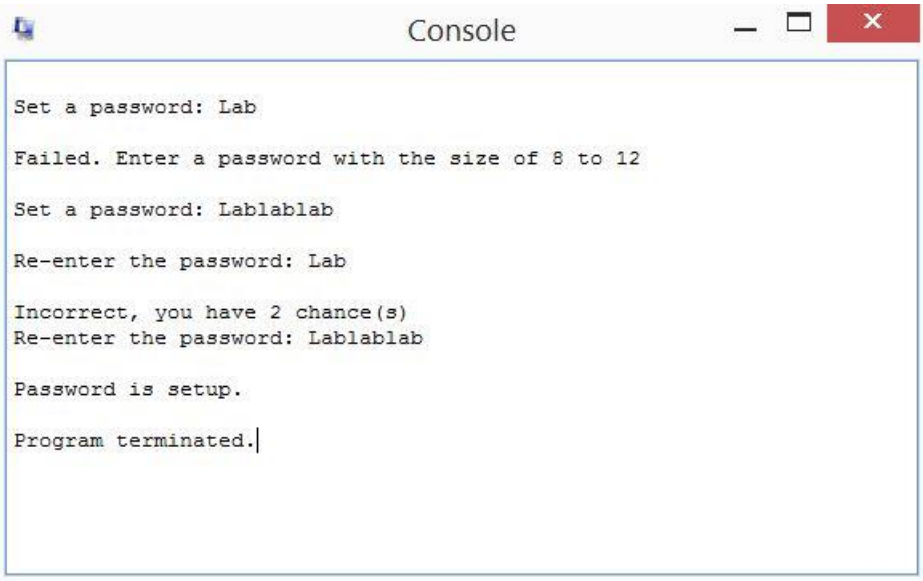


Assignment 5:

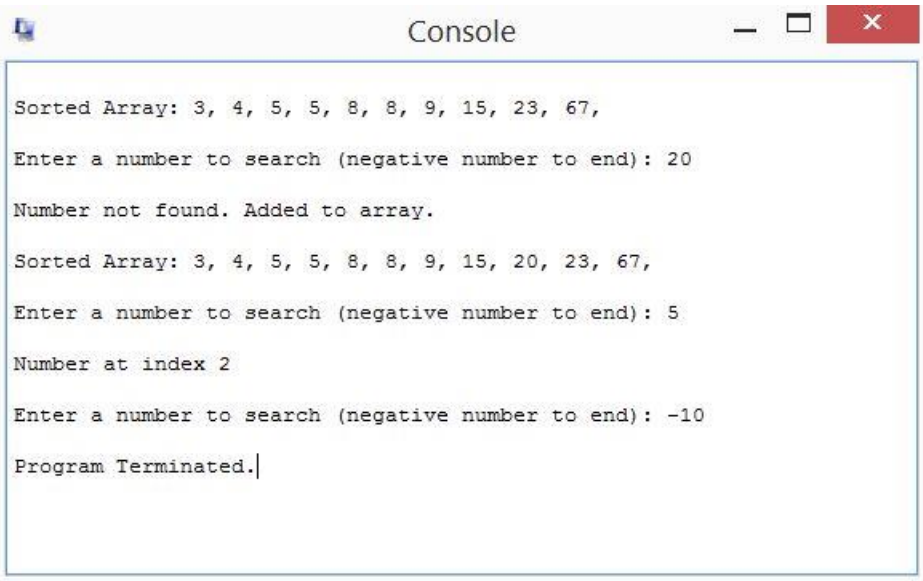
For incorrect password on 3 attempts



For correct password



Assignment 6:



Note: Codes attached after this page of conclusion.

Conclusion:

The assignments of this lab were focused on how to use flow control i.e. loops and branches by combine usage of both the branch instructions and the jump instruction like $slt, beq, bne, j, jr, jal$ to create iterations/loops.

The assignments of the previous lab that were focused on the inputs and outputs e.g. reading and writing integers and strings, so, the knowledge and the implementation of those codes were also involved in the assignments of this lab.

In order to understand the behavior of loops and branches each of the code was run step by step in order to observe the change in register values, which also helped in most of the debugging parts of the assignments.

For the jump instructions particularly jal ($jump\ and\ link$) instruction was used and then the code was run step by step to observe the behavior and change in values of the temporary registers, the $\$ra$, and by using stack pointers to store and retrieve the data on/from the stack.

The use and behavior of memory locations was also observed, especially for the assignments of comparing strings and for storing integers in an integer array.