# Lab1 Report

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This lab is not a difficult one , the only thing we need is just memorize the Instruction Set and know how to use it . Let me introduce how I solve it .( Because TA only ask me the questions about the algorithnm , I will omit the questions and introduce the algorithnm and my code in detail .)

**ALGORITHNM**

If the value contains three consecutive 1’s , we could use \*111\* (the position of 111 corresponds to the position of three consecutive 1’s , the other bits are all 0)to perform a bit-wise AND . Then the result minus \*111\* ,it must be 0 . If it is not 0 , it doesn’t contains three consecutive 1’s in these bits . There are 14 possibilities of three consecutive bits in a 16-bits value . So we could do the thing I said for 14 times, and if the results are all not 0, we could say that this value doesn’t contain three consecutive 1’s.

**CODE**

1. 0010 001 0 1111 1111; store the data in R1
2. 0101 011 011 1 00000; R3<-0 ; R3 store the (111)
3. 0001 011 011 1 00111; R3<-R3+(111)
4. 0001 000 011 000 011; R0=14

First we need to initialize some registers. We use R1 to store the value we input . R3 stores \*111\* and R4 controls the number of loops.

1. 0101 100 001 000 011;AND R4,R1,R3  ;R4 stores the AND result
2. 1001 100 100 111111;NOT R4,R4
3. 0001 100 100 1 00001;R4<-R4+1
4. 0001 100 100 000 011;R4<-R4+R3
5. 0000 010 0 0000 0101;if=0 yes
6. 0001 011 011 000 011;R3<-R3+R3
7. 0001 000 000 1 11111;R0--
8. 0000 001 1 1111 1000;loop start

The most important thing is we should judge how to loop .There are three cases . The first one is that we have found three consecutive 1’s , the second one is that the three bits being examined don’t have 111 which means we’re going to skip to the next loop, the last one is that we have searched through all bits but don’t find three consecutive 1’s which means we should break out of the loop.

1. 0101 010 010 1 00000; R2<-0
2. 0000 111 0 0000 0010; end
3. 0101 010 010 1 00000; R2<-0
4. 0001 010 010 1 00001; R2<-R2+1

After break out of the loop, we could set R2 to 0 or 1 depending on the cases.Then the program ends.