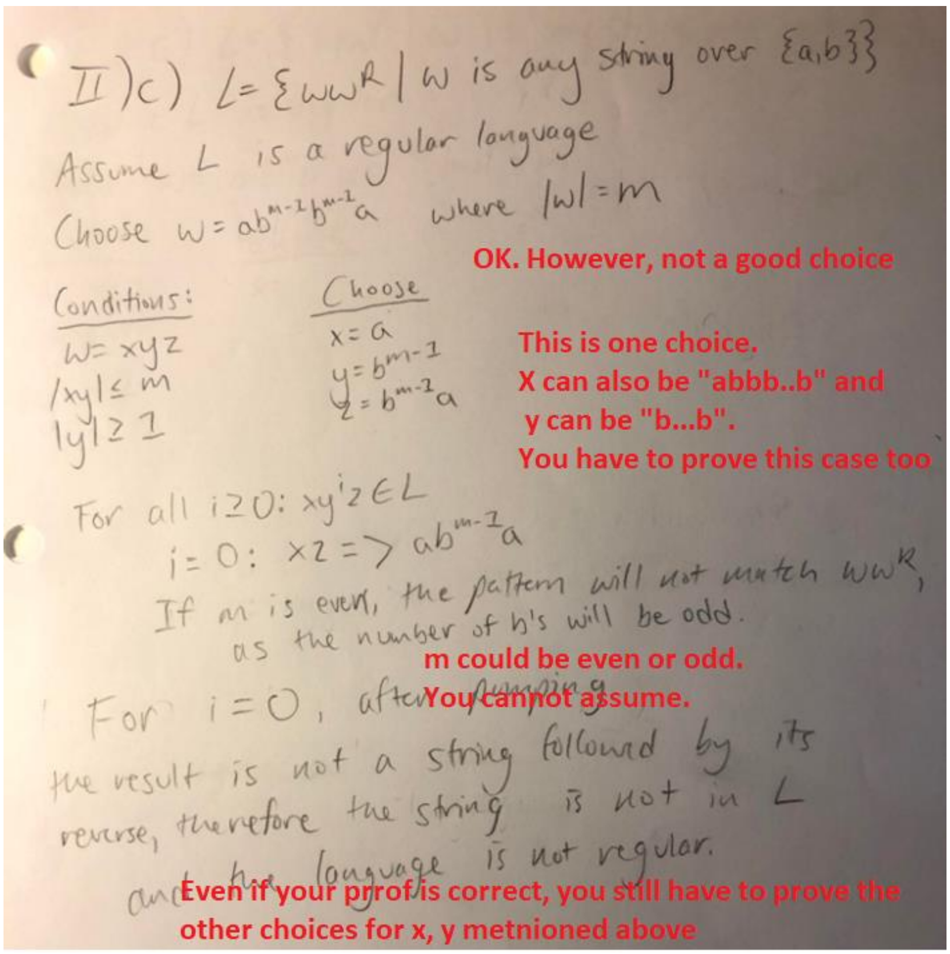
Additional comments on Pumping Lemma:
See the comments on Slide 26.
Step 3 of Pumping Lemma: You can choose any generic string “w”
Step 4: You have to consider all possible choices of x,y and z and then find a contradiction in Step 6. (i.e., for every choice of Step 4, you need to show Step 6 for the proof to be complete.

Consider the solution below, which has many HOLES in the arguments.


II)c) $L = \{ww^R \mid w \text{ is any string over } \{a,b\}\}$
Assume L is a regular language
Choose $w = ab^{m-1}b^{m-1}a$ where $|w| = m$
OK. However, not a good choice
Conditions:
$w = xyz$
$|xy| \le m$
$|y| \ge 1$
Choose
$x = a$
$y = b^{m-1}$
$z = b^{m-1}a$
This is one choice.
X can also be "abbb..b" and
y can be "b...b".
You have to prove this case too
For all $i \ge 0$: $xy^iz \in L$
$i = 0$: $xz \Rightarrow ab^{m-1}a$
If m is even, the pattern will not match ww^R, as the number of b's will be odd.
m could be even or odd.
You cannot assume.
For $i = 0$, after pumping the result is not a string followed by its reverse, therefore the string is not in L and the language is not regular.
Even if your prrof is correct, you still have to prove the other choices for x, y metnioned above

A better choice would have been w = a^mb ba^m
You will then force x and y to be within the first “m” number of a’s.
Step 4, Step 5, Step 6 (consider i=0) should be very similar Example 1.

Another pitfall would be to chose w= a^{200}b ba^{200} .You will then be choosing a fixed length string which in fact is regular.