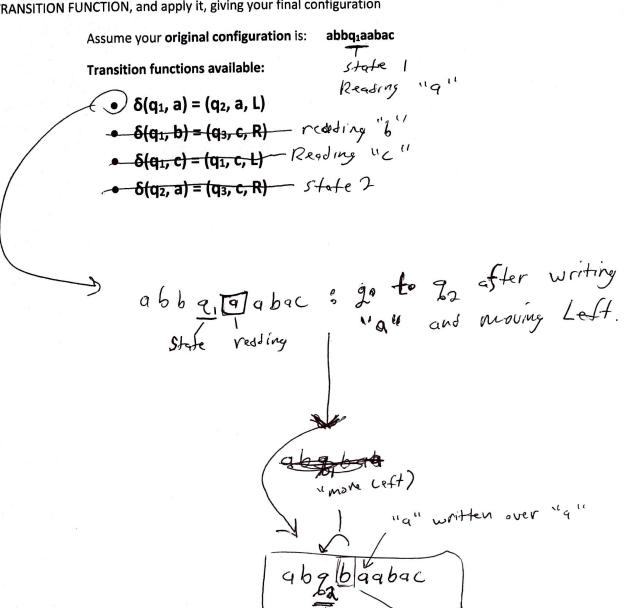
Name:Demetrius Johnson2/23/2021 No calculators are allowed. Show your work. The points for each problem are indicated. Problems with
No calculators are allowed. Show your work. The points for each problem are incomplete work may receive partial, or no credit. COS: [No direct COS] Points: / 20
Points:/20

1. [5 pts] Let the alphabet $\Sigma = \{a, b, c\}$. Given the regular expression r = b(a + c)*b, assume a language L(r) is the language defined by the regular expression r. Explain in English what accepted strings in the language are like.

Accepted strings for the language ((r) is very simple given r, a regular expression, r = b(9+c)*b; the Kleene closure of a+c (a or c) means that there could be any Combinations of a or c to produce a substring including the compty string & 2. Thus, (q+c) * means (2 + q+c)+ (q+c)2+...+(a+c). Having explained the Eleene closure of atc, now we address the "b" that is attached to the start and end of r; this means that all strongs for language L(r) must start and end with L(r) Possible 13 "bb". No other the language with

E= & a, b, c &, where all strings
must start with "b" and end
with "b": Any Robinstion of a or
with "b": Any Robinstion of a or
C, including 2, are allowed between the
start and ending "b". No other "b" allowe

 [10 pts] Give the configuration after applying the appropriate transition function from those listed, using the symbols a, b, c. Only apply the transition function once. PICK THE CORRECT TRANSITION FUNCTION, and apply it, giving your final configuration



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3. [5 pts] One of the biggest open (that is, unsolved) theoretical computer science questions, is "Is P = NP". We do know that $P \subseteq NP$. In your own words, what does that mean?

Using A John P. Baugh's Nideo on Classes P and No as a reference: In computer science, Boolean Algebra - manifested as electrical circuits on with circuit gales, - is why the freld really exists. Boolean Algebra 13 CS's best friend; it's why computers are able to solve complex problems: the problems are broken down into the most simple, smaller problems to which a boolean algorithm can solve it.

The one Caviot to Gorkan is that the more complex a problem becomes, the more it must be broken down, which results in more and more smaller problems to be shed. But because of the speed of electrapy, and using it to calculate billions of simple boolean expressions that as a whole unake up the larger, complex problem, computers are able to run such algorithms; however, problem, computers are able to run such algorithms; however, have in lies the limitation's class p is a group of here in lies the limitation's class p is a group of him in lies the limitation's class p is a group of him in lies the limitation's class p is a group of him in lies that can solve large inputs in a reasonable problems that can solve large inputs in a reasonable which is what polynomial time refers to. Class NP problems are not decreable because there is no way to break always of brokens in a reasonable level to down certain complex problems in a reasonable level to

down certain Complex problems in a reasonal of which a computer can compute. We know if they are subset of NP; PCNP, but we don't know if they are a proper subset: we don't know if all elments of problems a proper subset: we don't know if all elments of problems of type P - which can be solved with boolean books in NP-inputs - are exactly the same as all problem types in NP-

If we socoured it is true that P=NP, that would mean that many Complex problems previously thought that Computers Cannot digest for large inputs would suddenly be able to be solved as long as we find the convect representation of the NP-type problem to unateh a P problem. If we found P=NP, it would electrify the Court Sci. world because many Scientists would then know that for many complex problems, there is a massnable boolean representation that could be developed so that Computers would have more ability in computational power without having to increase processing power. Screatist would have more confidence that there is a solution to many complex problems that Can be solved in order to make tomputers efficient at solving these problems. In fact, in my estimation, they would directly be able to use P=NP to solve numerous mathematical mathematical inquires and to test other theories and unstells. Even if it is specioused that P = NP, it could be used for many of the same purposes at heast in testing other mathematical principles or devoloping current or new theores in mathematics and Computer Schence.