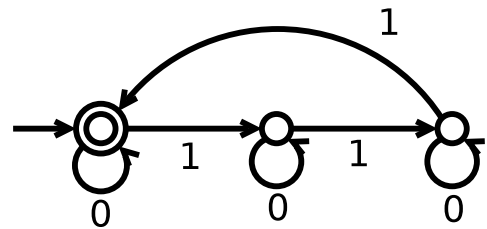


Some questions to consider. Numbers 2–6 are taken from (or suggested by) the textbook *Discrete Mathematics* by Stephen Barnett. Addison Wesley, 1998.

1. Consider the FSA at the right. Which of these strings does it accept? 0 1111 10101 110110101? Characterize the strings it accepts.

How would you change it to eliminate such strings having no ones?



2. Prove that $\sqrt{2}$ is irrational.
3. You have five dimes, three quarters, two silver dollars and a two-dollar bill. How many ways are there to distribute these among your three neices, Sally, Alice and Karen. Some might get nothing. one thing. (Coins of the same type are same; if it's three dimes, it doesn't matter which three.)

How many of these make sure each niece gets at least one coin (or the bill)? (I don't know).
4. A standard pack of 52 playing cards has four suits with 13 cards each. If one card is selected from each suit, how many 4-card hands can be created? How many of those have two aces?
5. In a group of 13 or more people, there will always be (at least) two who have the same birth month. Why?
6. Suppose there is a group of 12 people. Some are friends with each other. Show that there will be two with the same number of friends.
7. Use Boolean Algebra to simplify $C + D(E + \overline{D}) + D\overline{E}$.