a. Construct DFA
 1. $\Sigma = \{0,1\}$ and strings that have an odd number of 1's and any number of 0's.
 2. for $\Sigma = \{a, b, c\}$ that accepts any string with aab as a substring
 3. $\Sigma = \{x, y\}$, where if a substring yy is present, then it has to be followed by an x.
 4. $\{0,1\}$ in which, every substring of 3 symbols has at most two zeros. For example, 001110 and 011001 are in the language, but 100010 is not.
 5. Over $\{a, b\}$, all strings with atleast one a.
 6. Over $\{a, b\}$, strings except those ends with abb
 7. Over $\{a, b\}$, all strings with b as a second letter.
 8. Over $\{0,1\}$ all strings ending with 00
 9. Over $\{0,1\}$ detects even number of 0's
 10. Over $\{a, b\}$, $L = \{w| n_a(w) > 1\}$, where $n_a(w)$ is the number of a's in w
 11. $L = \{w$ denotes an odd binary number$\}$
 12. Over $\{a, b\}$, $L = \{awa\}$
 13. $L = \{w_1 a w_2 | w_1, w_2 \in \{a, b\}*, |w_1| <= 2, |w_2| \geq 2\}$
 14. $L = \{w \in (0, 1)* | w$ contains at least two 0s, or exactly two1s$\}$
 15. $w \in (0, 1)* | w$ contains 101 as a substring
 16. $w \in (0, 1)* | w$ has equal occurrences of 01 and 10 as substrings
 17. $w \in (0, 1)* | $ value of w is a multiple of 4
 18. $w \in (0, 1)* | w$ begins with a 1 and ends with a 0
 19. $w \in (0, 1)* | w$ starts and ends with the same symbol
 20. $w \in (0, 1)* | $ Every odd position of w is a 1
 21. $w \in (0, 1)* | w$ does not contain the substring 110
 22. $w \in (0, 1)* | w$ contains an even number of 0s and contains the pattern 101
 23. $w \in (0, 1)* | $ each 0 is immediately followed by three 1's
 24. $w \in (0, 1)* | w$ has a number of 1's that is multiple of three
 25. $w \in (0, 1)* | $ strings of length 3 at least, where the third symbol from right is an 0
 26. $w \in (0, 1)* | $ strings that have an odd number of 1's and any number of 0's.
 27. $w \in (0, 1)* | w$ contains at least two 0s, or exactly two1s
 28. $w \in (0, 1)* | $ All strings whose number of 0's is divisible by three
 29. $w \in (0, 1)* | $ All strings with no more than three 0's.
 30. Binary strings, which when interpreted as numbers are not divisible by 3.

b. What is the language of below DFA?
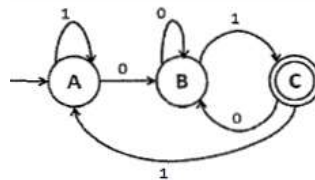


c. Show that the string ababa is accepted for DFA of a.13
d. Check whether the language $L = \{a^{2n}b^{3m}c|n>=1, m>=0\}$ is regular.
e. Define NFA
 1. Over $\{a, b\}$, $L = (a + b)* \, b \, (a + b)$
 2. Over $\{a, b\}$, $L = \{w \mid w$ belongs to abab$^n$ or aba$^n$
 3. Over $\{a, b\}$, all strings ending with aba
 4. Over $\{a, b\}$, all strings ending with ab or ba
 5. recognizes the language where w contains the substring 0101
 6. $L = \{(10)^n 1^m \mid n \geq 1$ is odd and $m \geq 0$ is even$\}$
f. Show that strings abab is accepted for NFA of e.2