**CSCE 5400 Formal Languages, Automata, and Computability** - **Fall 2024**

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1. If doable, find a regular expression for the following languages over alphabet {a, b}.
2. Strings with an odd number of **a**

**Ans**: b\*a(b\*ab\*a)\*b\*

Or

b\*ab\*(b\*ab\*ab\*)\*

1. Both the number of a's and the number of b's are even

**Ans**: (aa + bb + (ab+ba)(aa+bb)\*(ab+ba))\*

1. No string contains the substring **aa**

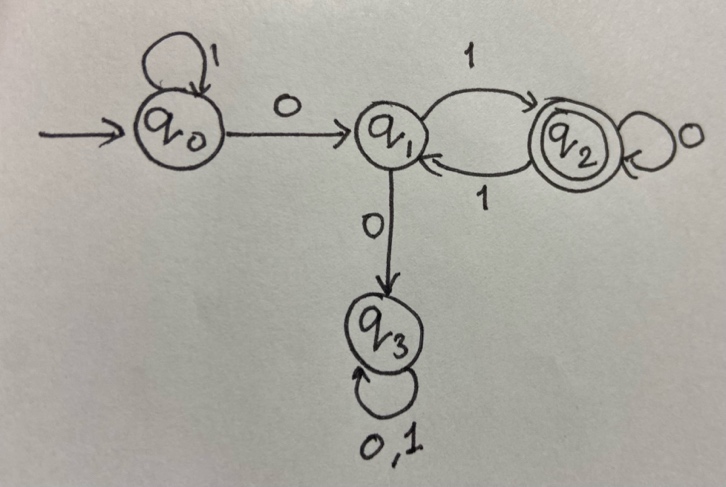
**Ans**: (b+ab)\*(a+ є)

1. {a**2n** | n є N} U {b**2n+1** | n є N} while N= {0,1,2, 3,...}

**Ans**: (aa)\* + b(bb)\*

1. Construct a DFA for the following regular expressions :
2. 1\*01(0+11)\*

**Ans:**



1. ab\* + c

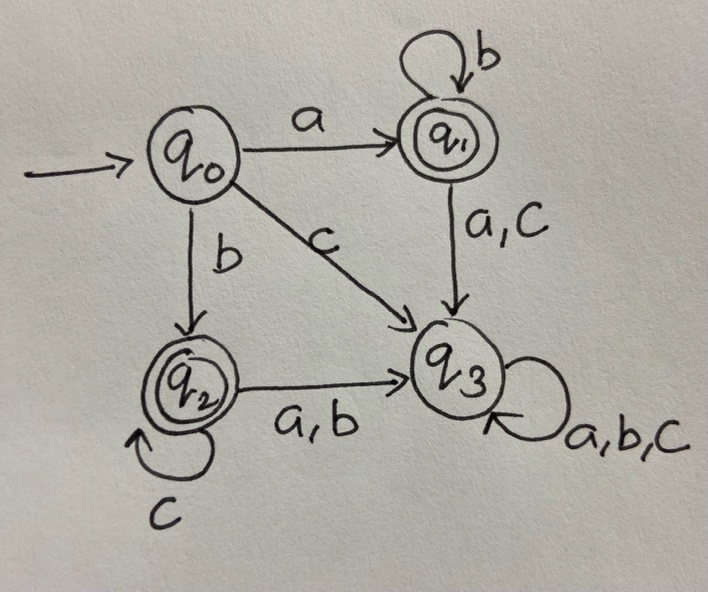
**Ans**:

A diagram of a diagram

Description automatically generated with medium confidence

1. ab\*+bc\*

**Ans**:



1. b\* + b\*a(ba)\*

**Ans**:

A diagram of a flowchart

Description automatically generated

1. Consider the following Finite State Machine,A diagram of a diagram

   Description automatically generated
2. Give an equivalent Regular Expression for the above FSM.

**Ans**: b\*a(a+b)\*

1. Design an equivalent automaton (DFA) to the above FSM with minimum number of states.

**Ans**:

