CSE 331: Automata & Computability Prepared By: KKP Practice Sheet (Regular Expression)

1. Extended definition of Regu	.1 1
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I. LACCINCA ACININGOLO OLINCA	atai Language.

2. Derived the strings from the following expressions:

a) (0+1)*

b) $(00)^*$ **c)** 0^*1^* **d)** $(0^*1^*)^*$ **e)** $0^*1^* + (ab)^*$

f) (0+1)

g) a (0+1) b **h)** a $(0+1)^*$ b **i)** (a $(0+1)^*$ b)* j) $1*01^* + ab$

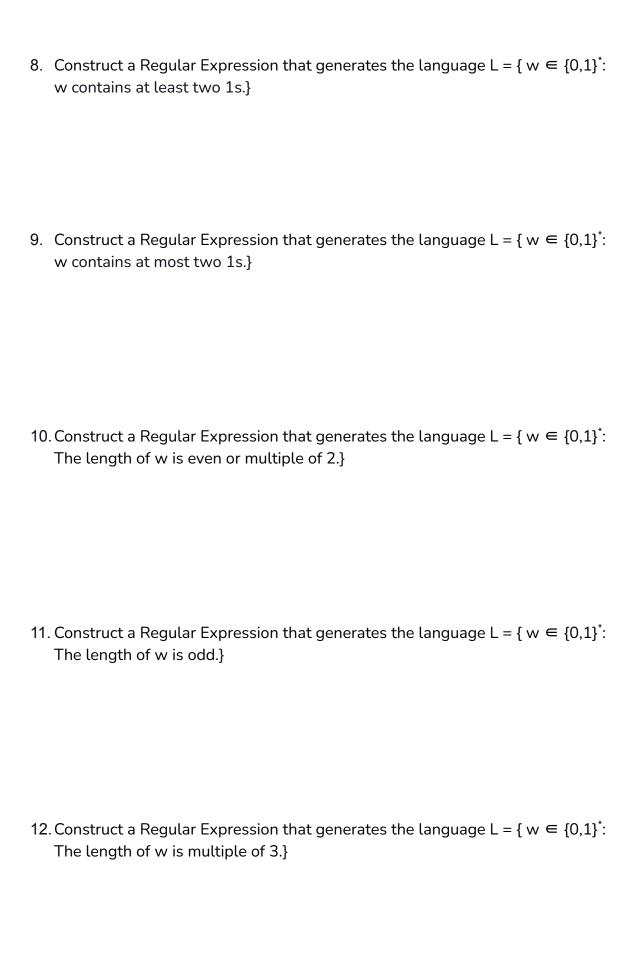
3. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* :$ w contains "101" as a substring.}

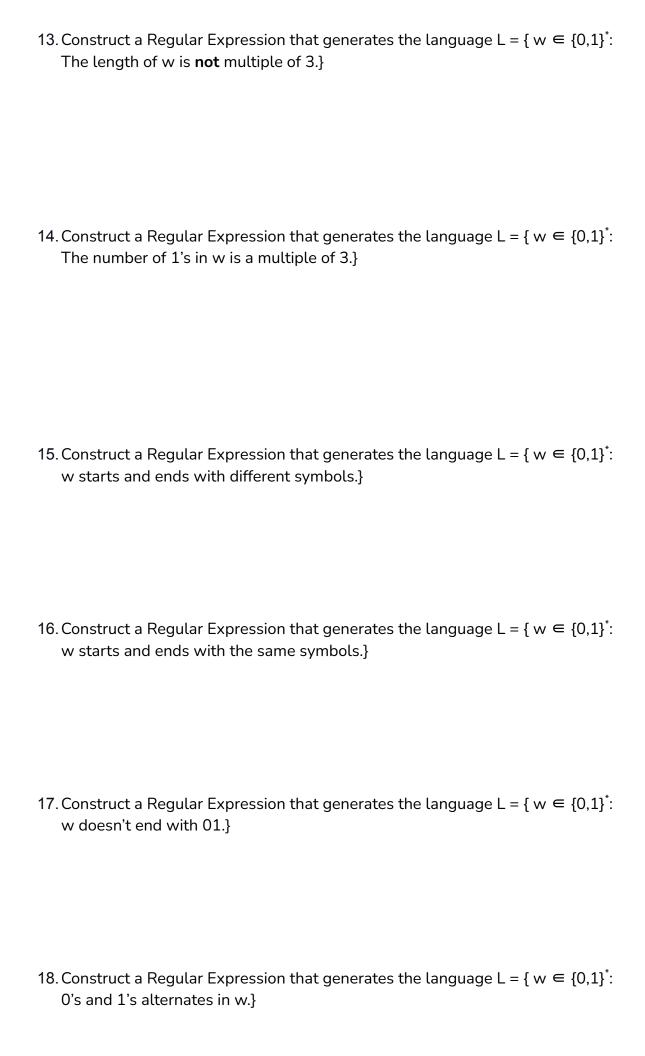
4. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* :$ w starts with "101".}

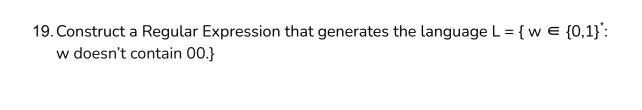
5. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* :$ w ends with "101".}

6. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* :$ w contains "00" or "11".}

7. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* : w \in \{0,1\}^* \}$ contains exactly two 1s.}







20. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^*: w \text{ doesn't contain } 11. \}$

21. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^*: w \text{ doesn't contain 111.} \}$ [Practice]

22. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^*: w \text{ doesn't contain } 10. \}$

23. Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* : w \text{ doesn't contain } 00 \text{ and } 11. \}$ Or, **Similar to Question:**

24. a) Construct a Regular Expression that generates the language $L = \{ w \in \{0,1\}^* : w \text{ contains } 0 \text{ in every third position.} \}$

b) Regular language for \overline{L}

25.

Consider the following languages over $\Sigma = \{0, 1\}$.

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L_1 = \{w: w \text{ does not contain 11}\} L_2 = \{w: \text{every 1 in } w \text{ is followed by at least one 0}\} L_3 = \{w: \text{the number of times 1 appears in } w \text{ is even}\}
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Now solve the following problems.

- (a) **Give** a regular expression for the language L_1 . (2 points)
- (b) Your friend claims that $L_1 = L_2$. **Prove** her wrong by writing down a five-letter string in $L_1 \setminus L_2$. Recall that $L_1 \setminus L_2$ contains all strings that are in L_1 but not in L_2 . (2 points)
- (c) **Give** a regular expression for the language $L_1 \setminus L_2$. (2 points)
- (d) **Give** a regular expression for the language L_3 . (2 points)
- (e) **Give** a regular expression for the language $L_2 \setminus L_3$. (2 points)