Theory of Computing Assignment 2

a) $L_{20} = \{ |w|_1 \mid w = 010 \vee w = 01010 \vee w = 010x010, x \in \{0,1,2\}^* \}$

$R = 1(010 + 01010 + 010(0+1+2)^*010)1$

b) $L_{21} = \{ w \mid w = 01011010 \vee w = 01011x1010, x \in \{0,1,2\}^* \}$

$R = 01011010 + 01011(0+1+2)^*1010$

c) $L_{22} = \{ w \mid w = (0212)^n \vee w = (1202)^n \vee w = (1202)^n 12 \vee w = (0212)^n 02, n \}$

$R = (0212)^+ + (1202)^+ + (1202)^+12 + (0212)^+02$

d) $L_{23} = \{ x1y \mid |y| = 4, x, y \in \{0,1,2\}^* \}$

$R = (0+1+2)^* 1 (0+1+2)^4$

e) $L_{24} = \{ w \mid w = 22021 \vee w = 22021x22021, x \in \{0,1,2\}^* \}$

$R = 22021 + 22021(0+1+2)^*22021$

f) $L_{25} = \{ w \mid |w|_a = 0 \pmod 7 \wedge |w|_b \neq 0 \pmod 5, w \in \{a,b,c\}^* \}$

$R =$

g) $L_{26} = \{ w \mid |w|_a \equiv 1 \pmod 2, w \in \{a,b,c\}^* \}$

$R = ((b+c)^* + a(b+c)^*a)^* a(b+c)^*$

h) $L_{27} = \{ w\,aa \mid |w|_a + |w|_b \equiv 0 \pmod 2,\ w \in \{a,b,c\}^* \}$

$R = ((a+b)(a+b) + c)^* aa$

i) $L_{28} = \{ w\,abaaaba \mid w = \varepsilon \vee w = aw \vee w = baw \}$

$R = (a + ba + c)^* abaaaba$

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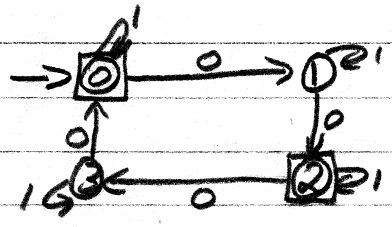
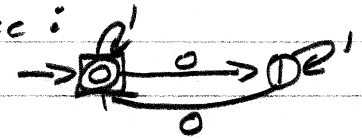
Question 2 regex can be found in grail Files Question 2/Part A and Question 2/Part A

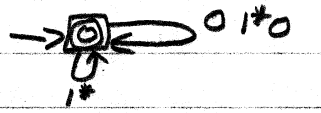
3 a)



Minimize:

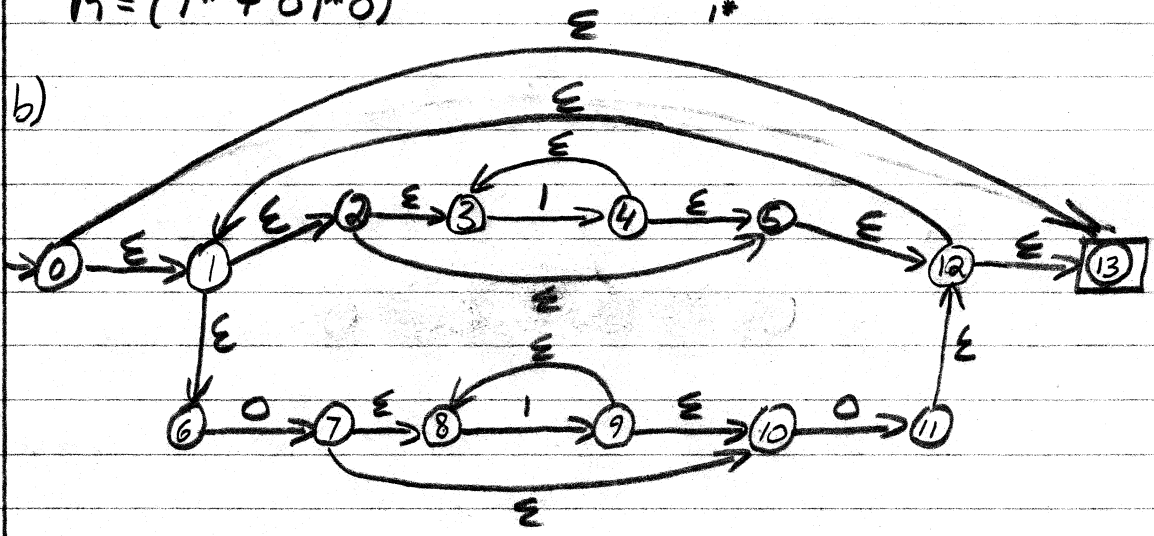


Eliminate State



$R = (1^* + 01^*0)^*$

b)



c) $\overline{0} = \{0, 1, 2, 3, 5, 12, 13, 6\}$

$\overline{1} = \{1, 2, 3, 5, 12, 13, 6\}$

$\overline{2} = \{2, 3, 5, 12, 13, 1, 6\}$

$\overline{3} = \{3\}$

$\overline{4} = \{4, 3, 5, 12, 13, 1, 2, 6\}$

$\overline{5} = \{5, 12, 13, 1, 2, 3, 6\}$

$\overline{6} = \{6\}$

$\overline{7} = \{7, 8, 10\}$

$\overline{8} = \{8\}$

$\overline{9} = \{9, 8, 10\}$

$\overline{10} = \{10\}$

$\overline{11} = \{11, 12, 13, 1, 2, 3, 5, 6\}$

$\overline{12} = \{12, 13, 1, 2, 3, 5, 6\}$

$\overline{13} = \{13\}$