CS/ECE 374 P04

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TOTAL POINTS

100 / 100

QUESTION 1

1 Problem 4.A. **20 / 20**

✓ **- 0 pts** Correct

QUESTION 2

2 Problem 4.B. **20 / 20**

✓ **- 0 pts** Correct

QUESTION 3

3 Problem 4.C. **20 / 20**

✓ **- 0 pts** Correct

QUESTION 4

4 Problem 4.D. **20 / 20**

✓ **- 0 pts** Correct

QUESTION 5

5 Problem 4.E. **20 / 20**

✓ **- 0 pts** Correct

HW Solution

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Solution:

(A) All strings that contain the subsequence 101.

Solution: $(0+1)^*1(0+1)^*0(0+1)^*1(0+1)^*$
1, 0, 1 could be placed between arbitrary senquence of characters and have to be in such order

(B) All strings that do not contain the subsequence 111.

Solution: $0^*10^*10^* + 0^*10^* + 0^*$
"Do not contain subsequence 111" means we could only have less than three occurrences of 1 that surrounded by arbitrary number of 0s. Therefore there only three cases: two 1s and each surrounded by arbitrary number of 0s, one 1s which is surrounded by arbitrary number of 0s or only arbitrary number of 0s

(C) All strings that start in 11 and contain 110 as a substring.

Solution: $111^*0(0+1)^*$
Such a string could start with 11 and followed by a run of 1s. we should have at least two 1s which overlap with 110 for two characters, and then followed by a single 0, followed by arbitrary sequence of characters.

(D) All strings that do not contain the substring 100.

Solution: $0^*(1+10)^*$
Divide such string into blocks. The initial block may consist of any number of 0s. The other block should consist of a 1 or a run of 10. When we've seen 10, it can only followed by either a 1 or another 10.

(E) All strings in which every nonempty maximal substring of consecutive 0s is of length 1. For instance 1001 is not in the language while 10111 is.

Solution: $(1+01)^*(\varepsilon+0)$
The length of every occurrence of 0 should only be 1. We could either have a run of 1s or a run of 01. Since we could have a 0 after both of the above cases, $(0+\varepsilon)$ is followed

1 Problem 4.A. **20 / 20**

✓ **- 0 pts** **Correct**

2 Problem 4.B. 20 / 20

✓ - 0 pts Correct

3 Problem 4.C. 20 / 20

✓ - 0 pts Correct

4 Problem 4.D. 20 / 20

✓ - 0 pts Correct

5 Problem 4.E. **20 / 20**

✓ **- 0 pts** **Correct**