Compiler Construction HW 2

21 CST H3Art

2024 Fall Semester

Write regular expressions for the following languages over the alphabet $\sum = \{0, 1\}$.

Hint: some of these languages may include ε.

(a) The set of all strings that do not contain the substring 00.

(b) The set of all strings that contain at least three 1s.

(c) The set of strings where all characters must appear in consecutive pairs (i.e. 00 or 11)

Examples of strings in the language: ε, 000011. and 11. Examples of strings not in the language: $11\underline{1}00$, $00\underline{1}00$, and $1100\underline{0}$)

Solution:

(a)

```
0?(1+0?)*
```

(b)

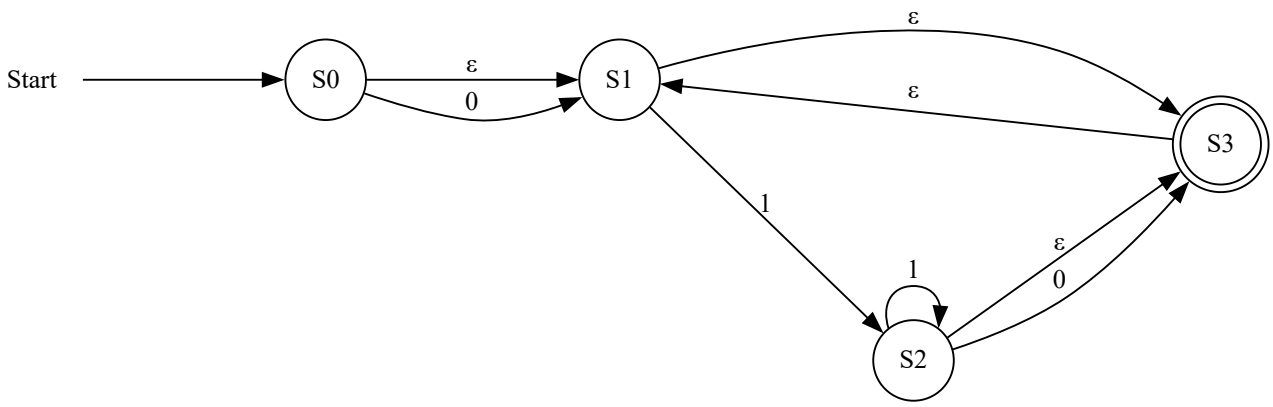
```
(0|1)*1(0|1)*1(0|1)*1(0|1)*
```

(c)

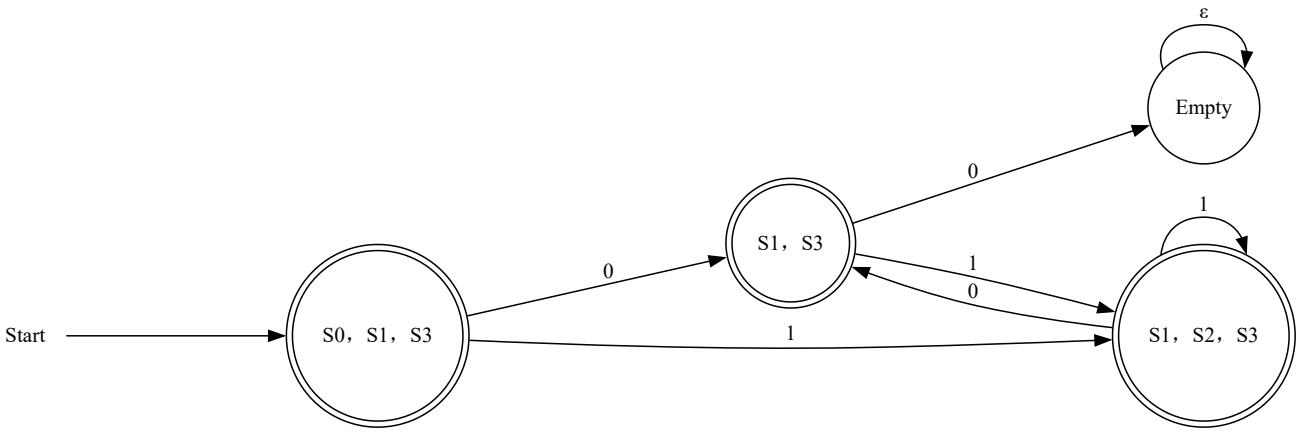
```
(00|11)*
```

Convert your regular expression from (1a) to a DFA.

For the expression `0?(1+0?)*`, the corresponing NFA is:



and convert the NFA to DFA, we have:


ε
Empty
0
1
S1，S3
1
0
0
Start
S0，S1，S3
1
S1，S2，S3