Student Information

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Answer 1

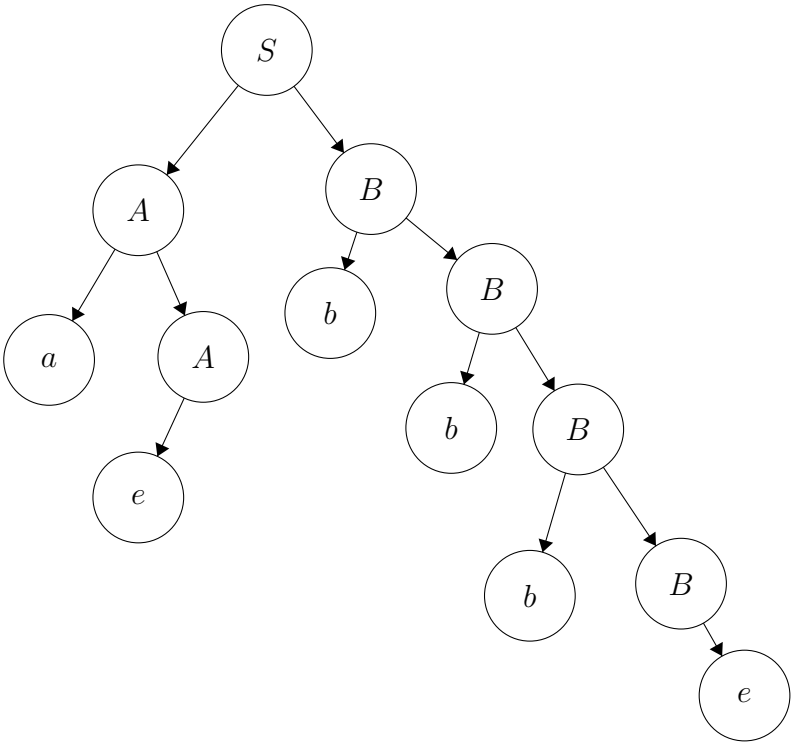
a)
G_1 represents the languages with equal number of 1's and 0' in the following way: 1^n0^n or 0^n1^n or e.
b)
It is ambigous because we can get an empty string both using $S \longrightarrow A$ and $S \longrightarrow B$

Answer 2

a) Consider the string aaa. We can get this string at least two different leftmost derivations.
$S \longrightarrow AB \longrightarrow aAB \longrightarrow aaAB \longrightarrow aaaB \longrightarrow aaa$ and
$S \longrightarrow AB \longrightarrow aAB \longrightarrow aaAB \longrightarrow aaaAB \longrightarrow aaaB \longrightarrow aaa$

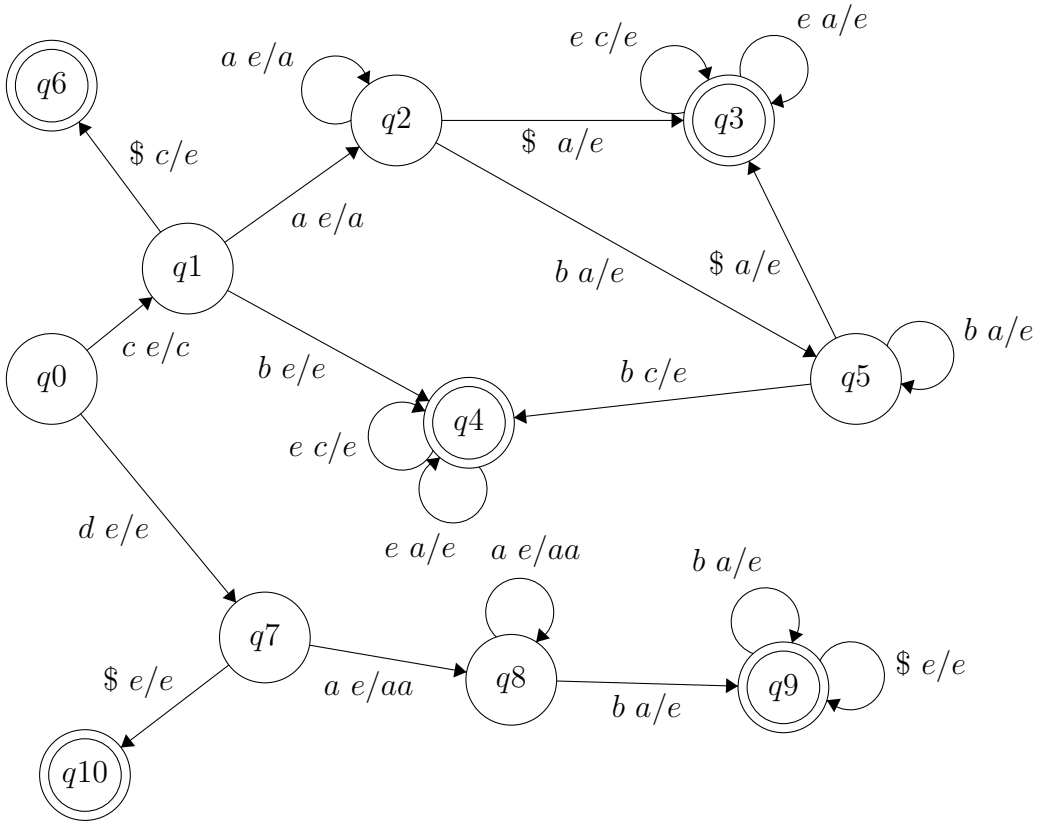
b)
$S \longrightarrow AB$
$A \longrightarrow aA \| e$
$B \longrightarrow bB \| e$

c)
S
AB
aAB
aB
abB
abbB
abbbB
abbb

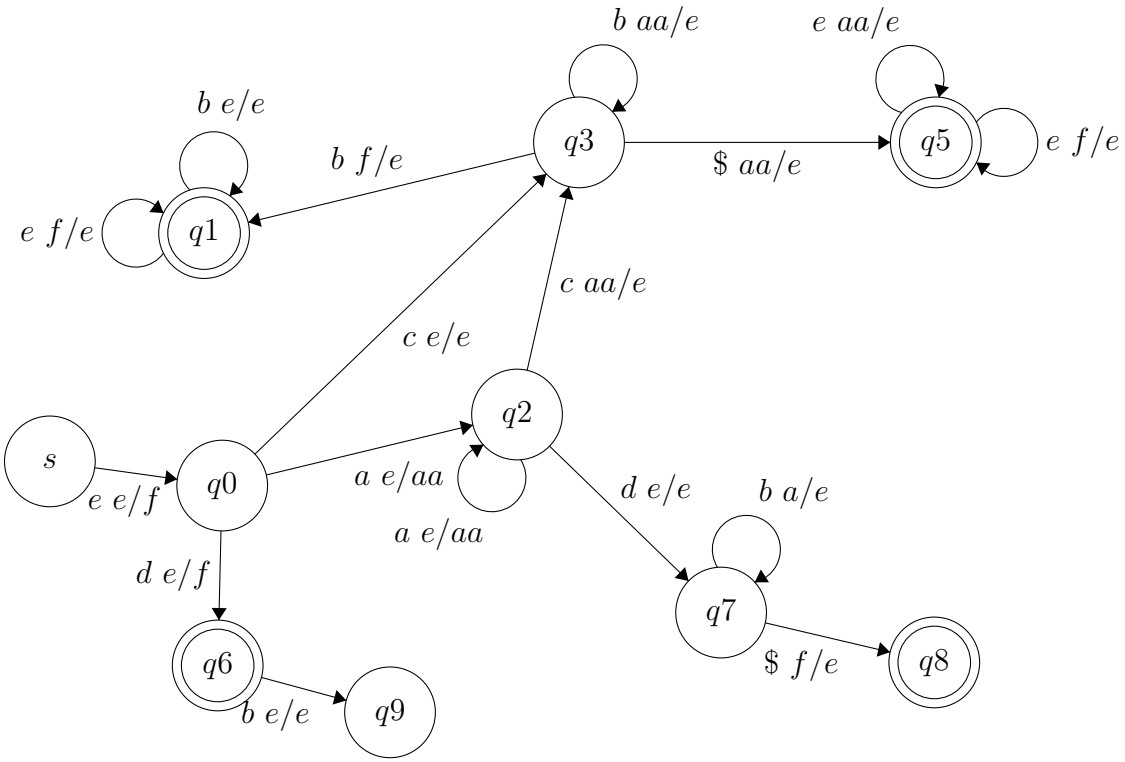


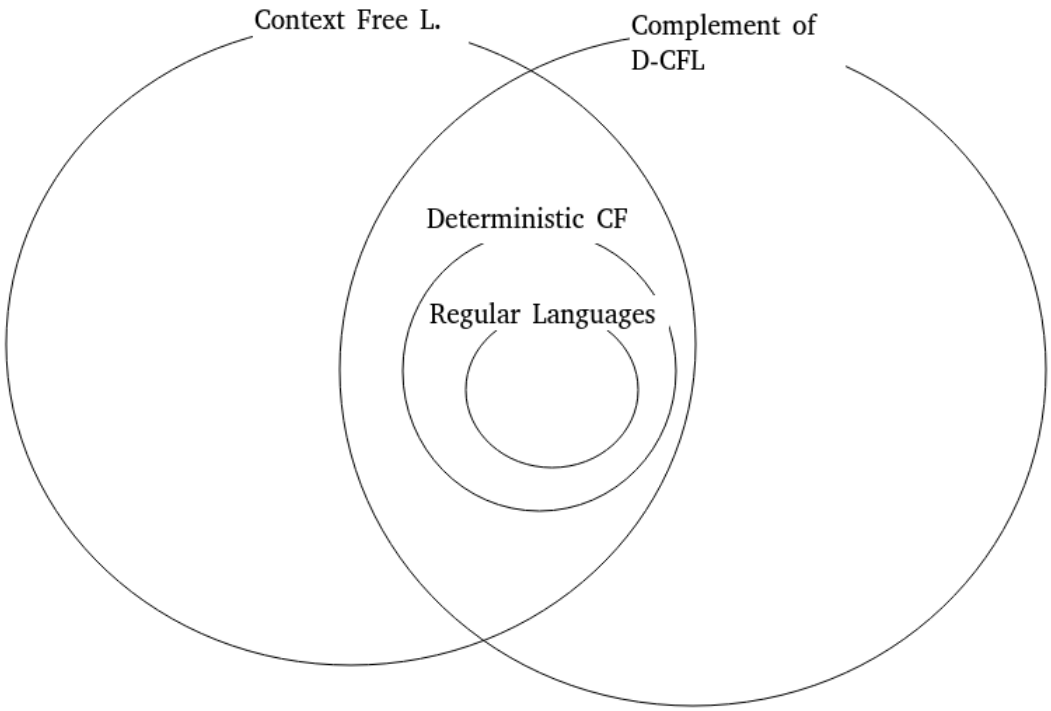
Answer 3

a)
We can merge the languages deterministically as follows:
1)
We should put a $ to the end of the string in order to make the machine deterministic. We can construct the machine like below:



2) We can perform a similar approach for this too. Adding $ to the end of string and constructing the DPDA and push 'f' for checking stack is empty or not as follows:


b aa/e
e aa/e
b e/e
q3
q5
e f/e
b f/e
$ aa/e
e f/e
q1
c aa/e
c e/e
q2
s
q0
a e/aa
d e/e
b a/e
e e/f
a e/aa
d e/f
q7
q6
$ f/e
q8
b e/e
q9


Context Free L.
Complement of
D-CFL
Deterministic CF
Regular Languages