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Section: ~~27~~ 21

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Assignment -2

1 No. Que Ans

a) Assume, L is regular and p be the pumping length.

So, Let, $w = 0^{p+1} 1^{p}$; $|w| \geq p$

Here, $i = p+1$; $j = p$; So, $\nexists\ i > j$

Let, $p = 2$, So, $w = 0^{p+1} 1^{2} = 0^{3} 1^{2} = 00011$

Here, $xy = 00$

$x = 0$, $y = 0$, $z = 011$

Now, we need to prove that for all $i \geq 0$; $xy^i z \in L$

Let, $i = 1$; $xy^1 z = 00011 \in L$

$i = 2$; $xy^2 z = 0000011 \in L$

$i = 0$; $xy^0 z = 0011 \notin L$

So, given L is not regular language as contradiction happens. (Proved)

(b) ~~$L = \{w \in \{1\}$~~

Assume, L is regular and p is the pumping length.

Let, $w = 1^p$; $|w| \geq p$

, $p = 3$; so, $w = 1^3 = 111$

where, $xy = 11$, so, $x = 1$, $y = 1$, $z = 1$

Now, we need to prove for all $i \geq 0$; $xy^i z \in L$,

for, $i = 0$, $xy^0 z = 11 \in L$

$i = 1$, $xy^1 z = 111 \in L$

$i = 2$; $xy^2 z = 1111 \notin L$

So, given L is not regular, as contradiction happens. (proved)

(c) Assume, L is regular and p is the pumping length.

Let, $w = 0^p 1 0^p$; $|w| \geq p$

Let, $p = 2$ so, $w = 0^2 1 0^2$

$= 00100$

$xy = 00$ so, $x = 0$, $y = 0$, $z = 100$

Now, proving $xy^i z \in L$ for all $i \geq 0$

For, $i = 1$; $xy^1 z = 00100 \in L$

$i = 2$; $xy^2 z = 000100 \notin L$

so, given L is ~~not~~ regular as contradiction happens.

(proved)

d) Assume, L is regular, and p is the pumping length.

Let, $w = 1^p 0 1^p$; $|w| \geq p$

Let, $p = 2$; so, $w = 1^2 0 1^2 = 11011$

$xy = 11$; so, $x = 1$, $y = 1$, $z = 011$

proving $xy^i z \in L$ for all $i \geq 0$

For, $k = 1$; $xy^1 z = 11011 \in L$

$k = 2$; $xy^2 z = 111011 \notin L$

$\therefore$ L is not regular as contradiction happens. (Proved)

e) Assume L is regular and p is the pumping length.

Let, $w = 0^{p+1} 1^p$; $|w| \geq p$

Let, $p = 2$; so, $w = 0^{2+1} 1^2 = 00011$

so, $xy = 00$; $x = 0$, $y = 0$, $z = 011$

proving $xy^i z \in L$ for all $i \geq 0$

For $i = 1$, $xy^1 z = 00011 \in L$

$i = 2$, $xy^2 z = 000011 \in L$

$i = 0$, $xy^0 z = 0011 \notin L$

so, given L is not regular as contadiction happens (Proved)

f) Assume L is regular and p is the pumping length.

Let, $w = a^p b^{p+1}$; $|w| \geq p$

$p = 2$; so, $w = a^2 b^{2+1} = a^2 b^3$

$= aabbb$

so, $xy = aa$

so, $x = a$, $y = a$, $z = bbb$

Now, proving $xy^i z \in L$ for all $i \geq 0$

for $i = 1$; $xy^1 z = aabbb \notin L$

$i = 2$, $xy^2 z = aaabbb \notin L$

∴ L is not Regular as contradiction happens

(Proved)