# Q4

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$L_2 = \{ ww^R w \mid w^R \text{ is the reverse of } w, w \in \{0,1\}^* \}$

Assume Context free

$S = uvxyz$ and $S \in L$ $|S| \geq p$

$\exists p \in Z^+$

$\exists u, v, x, y, z$

$|vxy| \leq p$

$|vy| \geq 1$ such that $\forall i \in Z^{n \cap neg}$, $uv^i xy^i z \in L$

$S = 0^p 1^p 1^p 0^p 0^p 1^p$

$vxy = 0^a$ $\forall i \neq 1$ $0^{p+b(i-1)} 1^p 1^p 0^p 0^p 1^p \notin L$

$vy = 0^b$ $1 \leq b \leq a$ $0^p 1^p 1^p 0^{p+b(i-1)} 0^p 1^p \notin L$

$0^p 1^p 1^p 0^p 0^{p+b(i-1)} 1^p \notin L$

$L_2$ is not Context free