

Answer on Question#38638 – Math - Other

For a string w in $L = \{w \mid w \text{ has equal number of } a\text{'s and } b\text{'s}\}$, let j and k be the number of a 's and b 's in w respectively. Then observe that L consists of strings in which $j = k$, so L consists of strings in which $j \neq k$, but that any two of these suffice by transitivity, so in particular we take $j \neq k$.

We can create a *PDA* (pushdown automaton) and this *PDA* accepts any string over the alphabet $\Sigma = \{a, b\}$ in which the number of a 's does not equal the number of b 's by only accepting if $j > k$ or $k > j$. Notice that $j > k$ or $k > j$ if and only if $j \neq k$.

CFLs (context-free languages) are closed under union, so the union of the two languages recognized by these *PDAs* are context free. We've already argued that the union of these two languages is L , so we conclude that L is context free.

Answer: B.