Suppose \( \text{shuffle}(L_1, L_2) \) is a CFL for any CFLs \( L_1 \) and \( L_2 \). Let \( L_1 = \{a^n b^n | n \geq 1\} \). Let \( L_2 = \{c^n d^n | n \geq 1\} \). Let \( n \) be the constant of the pumping lemma for \( \text{shuffle}(L_1, L_2) \). Take \( z = a^n c^n b^n d^n \), clearly a member of \( \text{shuffle}(L_1, L_2) \). Then \( z = uvwx \) such that \( |vwx| \leq n \), \( vx \) is not \( \epsilon \), and for all \( i \), \( uv^i wx^i y \) is in \( \text{shuffle}(L_1, L_2) \). Note that since \( |vwx| \leq n \), \( vwxy \) contains at most two distinct symbols. Let \( i = 2 \), then it must be the case that the resulting string has either a different number of \( a \)'s compared to the number of \( b \)'s or has a different number of \( c \)'s compared to the number of \( d \)'s (this can be checked by cases), so this resulting string is not in \( \text{shuffle}(L_1, L_2) \), contradicting the pumping lemma. So our assumption was false, and \( \text{shuffle}(L_1, L_2) \) is not a CFL. So in general \( \text{shuffle}(L_1, L_2) \) may not be a CFL for two arbitrary CFLs \( L_1 \) and \( L_2 \).