Context-Free Grammar

Task: The grammar from the lecture is shown on the left. Modify the grammar so that it can represent a secondary structure where both loops can have a length of up to 4 bases. Use the remaining space to show a sequence in your new grammar.

$$
\begin{aligned}
P = \{ & S_0 \rightarrow S_1 \\
& S_1 \rightarrow CS_2G, \\
& S_1 \rightarrow AS_2U, \\
& S_2 \rightarrow AS_3U, \\
& S_3 \rightarrow S_4S_9, \\
& S_4 \rightarrow US_5A, \\
& S_5 \rightarrow CS_6G, \\
& S_6 \rightarrow AS_7, \\
& S_7 \rightarrow US_7, \\
& S_7 \rightarrow GS_8, \\
& S_8 \rightarrow G, \\
& S_8 \rightarrow U, \\
& S_9 \rightarrow AS_{10}U, \\
& S_{10} \rightarrow CS_{10}G, \\
& S_{10} \rightarrow GS_{11}C, \\
& S_{11} \rightarrow AS_{12}U, \\
& S_{12} \rightarrow US_{13}, \\
& S_{13} \rightarrow C\}
\end{aligned}
$$

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& S_5 \rightarrow CL_1G, \\
& S_9 \rightarrow AS_{10}U, \\
& S_{10} \rightarrow CS_{10}G, \\
& S_{10} \rightarrow GS_{11}C, \\
& S_{11} \rightarrow AL_1U, \\
& L_1 \rightarrow B \mid BL_2, \\
& L_2 \rightarrow B \mid BL_3, \\
& L_3 \rightarrow B \mid BB, \\
& B \rightarrow A \mid C \mid G \mid U\}
\end{aligned}
$$

A generic solution for loops with any base composition