Suppose that to obtain \( n \) words, we need \( L \) lines (most of which will get repeated many times, as described above). We write the script as follows

\[
\begin{align*}
\text{line 1} &= \text{<text of line 1 here>} \\
\text{line 2} &= \text{<text of line 2 here>} \\
\vdots \\
\text{line } L &= \text{<text of line } L \text{ here>} \\
\text{For } i &= 1, 2, \ldots, L \\
\quad &\text{For } j = 1, 2, \ldots, i \\
\quad &\text{Sing lines } j \text{ through } 1 \\
\text{Endfor} \\
\text{Endfor}
\end{align*}
\]

Now, the nested \texttt{for} loops have length bounded by a constant \( c_1 \), so the real space in the script is consumed by the text of the lines. Each of these lines in the script has length at most \( c_2 \) (where \( c_2 \) is the maximum line length \( c \) plus the space to write the variable assignment). So in total, the space required by the script is \( S = c_1 + c_2 L \).

Recall that \( n \) denotes the number of words this produces when sung. \( n \) is at least \( 1 + 2 + \cdots + L = \frac{1}{2}L(L - 1) \); hence, \( \frac{1}{2}(L - 1)^2 \leq n \), and so \( L \leq 1 + \sqrt{2n} \). Plugging this into our bound on the length of the script, we have \( f(n) = S \leq c_1 + c_2\sqrt{2n} = O(\sqrt{n}) \).