\[ \lg^* n = \min k \text{ s.t. } \underbrace{\lg \lg \lg \ldots \lg}_{k \text{ times}} n \leq 1 \]

\[
\begin{align*}
\lg^* 2 &= 1 \\
\lg^* 2^2 &= 2 \\
\lg^* 2^3 &= 3 \\
\lg^* 2^{16} &= 4 \\
\lg^* 2^{65536} &= 5
\end{align*}
\]
\documentclass{article}

\begin{document}

\begin{itemize}
  \item \texttt{MakeSet} \quad ABCD
  \item \texttt{EFGHI}
  \item \texttt{C} \quad \texttt{D}
  \item \texttt{E}
  \item \texttt{F}
  \item \texttt{G}
  \item \texttt{H}
  \item \texttt{I}
\end{itemize}

\texttt{G} \texttt{<} \texttt{rank} \quad \texttt{A} \quad \texttt{B} \quad \texttt{C} \quad \texttt{D} \quad \texttt{E} \quad \texttt{F} \quad \texttt{G} \quad \texttt{H} \quad \texttt{I}

\texttt{union}(\texttt{A}, \texttt{B})

\underline{\text{same rank}}

- \text{text}: if same rank
- first points to second
- rank increases

\texttt{fact} \quad \texttt{if root has rank \texttt{k} then}

- at least \(2^k\) nodes
- height \(k\)

\texttt{union}(\texttt{E}, \texttt{F})

\texttt{union}(\texttt{C}, \texttt{D})

\texttt{union}(\texttt{G}, \texttt{H})

\end{document}
\text{union}(A, C)

\text{union}(F, H)

\text{union}(L, G)

H^3

I

r_A = B \quad r_C = D

I \text{ smaller}