Definition 1 (Circuits). An \( n \)-input single-output Boolean circuit \( C \) is a directed acyclic graph with:

- \( n \) sources (nodes with no incoming edges), labelled 1 to \( n \), and
- one sink (a node with no outgoing edges).

All non-source vertices are called \emph{gates}, and are labelled with \( \land \), \( \lor \), or \( \neg \):

- \( \land \)-gates and \( \lor \)-gates have in-degree 2 (exactly two incoming edges),
- \( \neg \)-gates have in-degree 1 (exactly one incoming edge).

If \( C \) is an \( n \)-input single-output Boolean circuit and \( x \in \{0,1\}^n \) is a string, then the output \( C(x) \) of \( C \) on \( x \) is defined by plugging in \( x \) in the source nodes and applying the operators of the gates, and taking for \( C(x) \) the resulting value in \( \{0,1\} \) of the sink gate.

Definition 2 (Circuit families). Let \( t : \mathbb{N} \rightarrow \mathbb{N} \) be a function. A \( t(n) \)-size circuit family is a sequence \( \{C_n\}_{n \in \mathbb{N}} \) of Boolean circuits, where each \( C_n \) has \( n \) inputs and a single output, and \( |C_n| \leq t(n) \) for each \( n \in \mathbb{N} \).

Definition 3 (SIZE(\( t(n) \))). Let \( t : \mathbb{N} \rightarrow \mathbb{N} \) be a function. A language \( L \subseteq \{0,1\}^* \) is in \( \text{SIZE}(t(n)) \) if there exists a constant \( c \in \mathbb{N} \) and a \( (c \cdot t(n)) \)-size circuit family \( \{C_n\}_{n \in \mathbb{N}} \) such that for each \( x \in \{0,1\}^* \):

\[
x \in L \iff C_n(x) = 1, \text{ where } n = |x|.
\]

Definition 4 (TIME(\( t(n))/a(n) \)). Let \( t, a : \mathbb{N} \rightarrow \mathbb{N} \) be functions. The class \( \text{DTIME}(t(n))/a(n) \) of languages decidable by \( O(t(n)) \)-time Turing machines with \( a(n) \) bits of advice contains every language \( L \subseteq \{0,1\}^* \) such that there exists a sequence \( \{\alpha_n\}_{n \in \mathbb{N}} \) with \( \alpha_n \in \{0,1\}^{a(n)} \) for each \( n \in \mathbb{N} \) and an \( O(t(n)) \)-time deterministic Turing machine \( M \) such that for each \( x \in \{0,1\}^* \):

\[
x \in L \iff M(x, \alpha_n) = 1, \text{ where } n = |x|.
\]