TM algorithms (descriptions)

1. formal description
   - states
   - transitions
   - r/w head moves.

2. implementation description
   - tape changes
   - r/w head moves
   
   e.g. move r/w head right to the first blank

3. high level descriptions
   - describes what the alg. does
   - ignore r/w head
Objects
- polynomials
- graphs
- grammars

\[ \langle 0 \rangle \]
A: language of all strings representing graphs that are connected

Machine $M$ decides $A$ (high level)

$M = \text{On input } \langle G \rangle, \text{ the encoding of a graph } G \text{ as a string.}$

1. select 1st node and mark it
2. repeat step 3 until no new nodes are marked
3. For each node in $G$
   mark it if there is an edge from $G$ to a marked node.
4. Check if all nodes have been marked. If so, accept. If not, reject.
Implementation Level

\( G: \quad \begin{array}{c}
\text{1} \\
\text{2} \\
\text{3} \\
\text{4}
\end{array} \)

\( \langle G \rangle = (1, 2, 3, 4)(1, 2, 1, 3, 2, 3, 1, 4) \)

0. Check input
1. Mark a node
2/3 Mark \( \sim \)

\( G: \quad \begin{array}{c}
\text{1} \\
\text{2} \\
\text{3} \\
\text{4}
\end{array} \)