

# 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



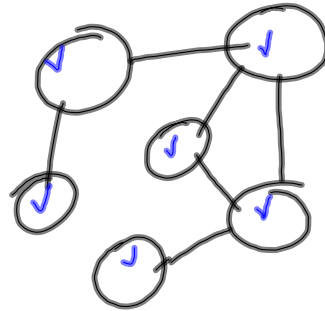
encode to  
tape

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$\mathcal{O}$

$\langle \mathcal{O} \rangle$

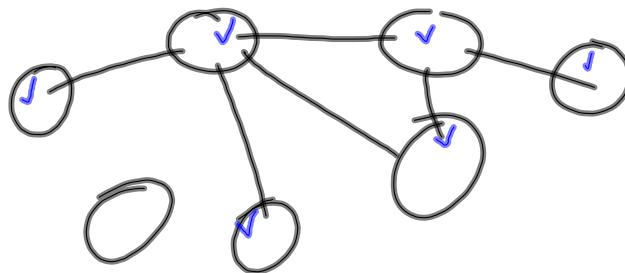
A: language of all strings representing <sup>(undirected)</sup> graphs that are connected



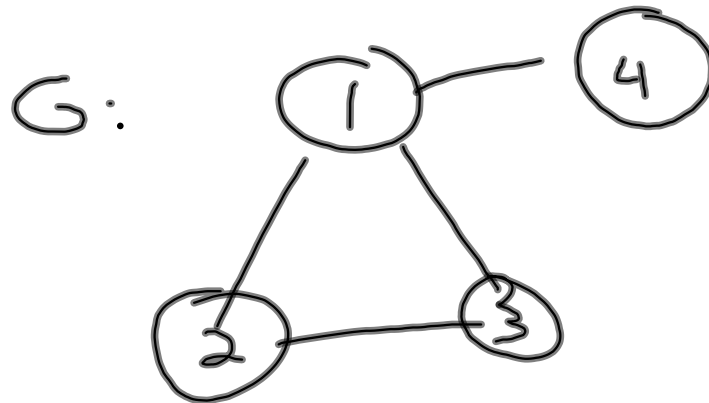
Machine  $M$  decides  $A$  (high level)

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

1. select 1<sup>st</sup> 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



$$\langle G \rangle = (1, 2, 3, 4) (\underline{(1,2)}, \underline{(1,3)}, (2,3), \underline{(1,4)})$$

0. check input

1. mark a node

2/3 mark w/ -

