Student Information

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Answer 1

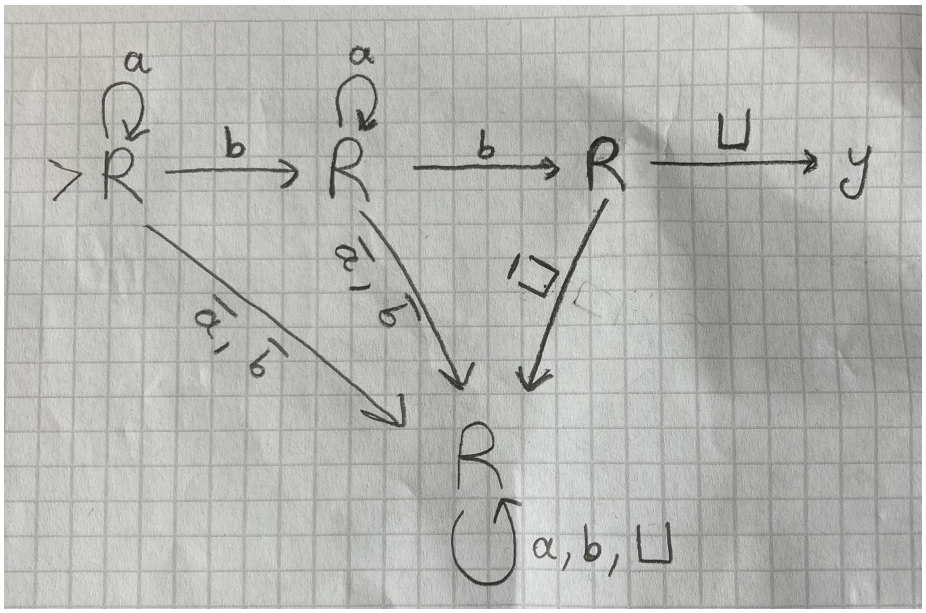
i: 1954
ii: Enigma
iii: Turing test
iv: The Chemical Basis of Morphogenesis
v: The Imitation Game

Answer 2

a)

$M = (K, \Sigma, \delta, s, H)$ where
$K = \{q_0, q_1, q_2, q_3, y\}$,
$\Sigma = \{a, b, \sqcup, \triangleright\}$,
$s = q_0$,
$H = \{y\}$,
δ is:
$\delta(q_0, a) = (q_0, \rightarrow)$,
$\delta(q_0, b) = (q_1, \rightarrow)$,
$\delta(q_0, \triangleright) = (q_0, \rightarrow)$,
$\delta(q_0, \sqcup) = (q_3, \rightarrow)$,
$\delta(q_1, a) = (q_1, \rightarrow)$,
$\delta(q_1, b) = (q_2, \rightarrow)$,
$\delta(q_1, \triangleright) = (q_1, \rightarrow)$,
$\delta(q_1, \sqcup) = (q_3, \rightarrow)$,
$\delta(q_2, a) = (q_3, \rightarrow)$,
$\delta(q_2, b) = (q_3, \rightarrow)$,
$\delta(q_2, \triangleright) = (q_2, \rightarrow)$,
$\delta(q_2, \sqcup) = (y, \sqcup)$,
$\delta(q_3, a) = (q_3, \rightarrow)$,
$\delta(q_3, b) = (q_3, \rightarrow)$,
$\delta(q_3, \triangleright) = (q_3, \rightarrow)$,
$\delta(q_3, \sqcup) = (q_3, \rightarrow)$.

b)



Answer 3

1) Tape-1 takes a and b as input.
2) Copy b to tape-2.
3) Write integer 1 to tape-3.
4) If the content of tape-2 is greater than zero; while it is greater than zero, multiply the content of tape-3 by a (by calling $M_{\times}$) and decrement the content of tape-2 by 1 (by calling M_{-}). If the content of tape-2 is zero, the machine halts and outputs the content of tape-3.