

Assignment #1, Part 1
(Course: CS 301)

For regular students, the deadline is **September 17**, Tuesday in class.

For special needs students, the deadline is **September 24**, Tuesday in class.

No late assignments will be accepted.

Special note: Any answer that is not sufficiently clear even after a reasonably careful reading will not be considered a correct answer, and only what is written in the answer will be used to verify accuracy. No vague descriptions or sufficiently ambiguous statements that can be interpreted in multiple ways will be considered as a correct answer, nor will the student be allowed to add any explanations to his/her answer after it has been submitted.

Problem 1 (20 points):

Fig. 1 shows a toy for a young child. A marble can be dropped either at X or at Y . Levers α , β and γ cause the marble to fall either to the left or to the right. When a marble hits a lever, it causes the lever to change its direction, so that the next marble to encounter the lever will take the opposite branch.

Model the toy as a deterministic finite automaton (DFA) and show the transition diagram of the DFA. Denote a marble dropped at X as input 0 and a marble dropped at Y as input 1. A sequence of inputs is accepted if the last marble comes out at A .

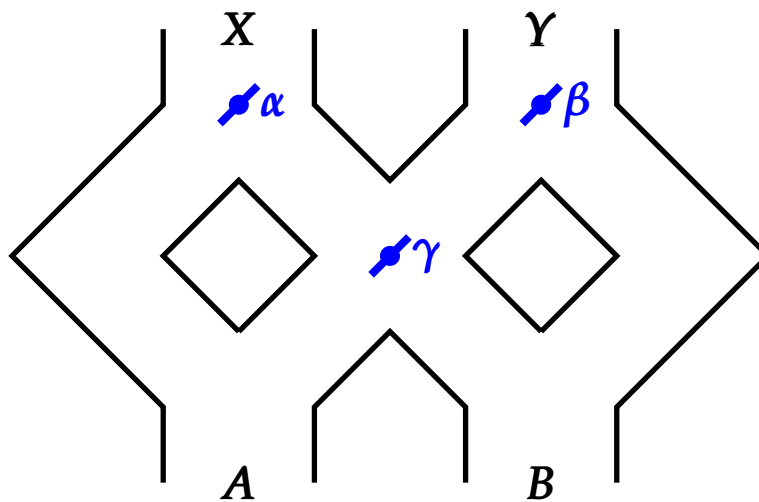


Figure 1: A toy for children's play.