

CSC236 Worksheet 8 Solution

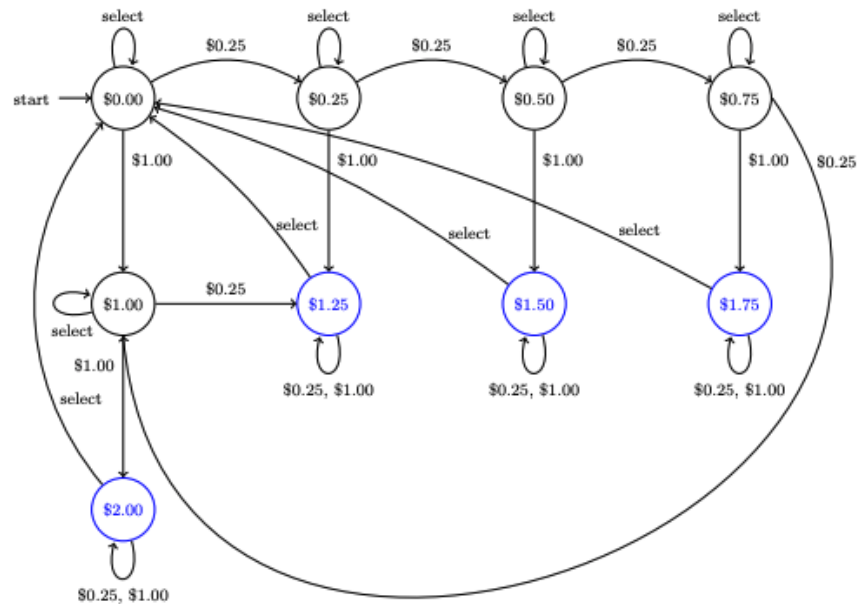
Hyungmo Gu

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Question 1

Notes:

- **Deterministic Finite State Automaton (DFSA):** is a mathematical method of machine which, given any input string x , **accepts** or **rejects** x .
- Applications of DFSA
 1. Vending Machine



2. Protocol analysis
3. Text parsing
4. Video game character behavior

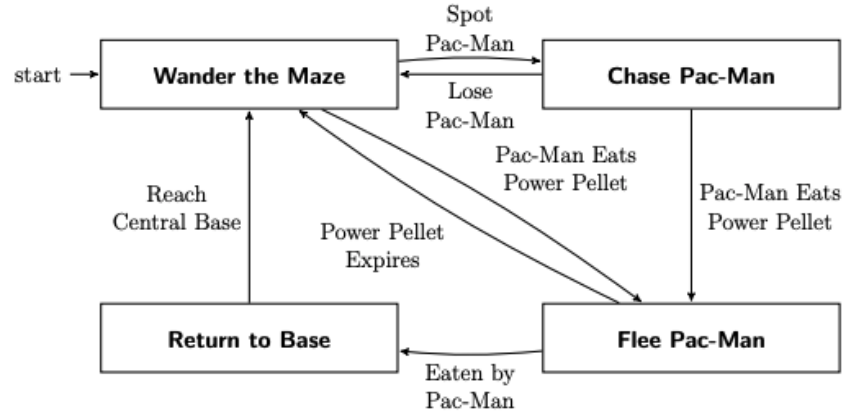


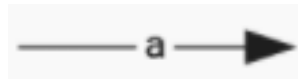
Figure 3: Behavior of a Pac-Man Ghost

5. Security Analysis
6. CPU control units (**)
7. Natural Language Processing (**)
8. Speech Recognition (**)

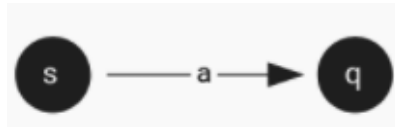
- Definitions and Syntax

– *DFSA* M is a quintuple $M = (Q, \Sigma, q_0, F, \delta)$, where

- * Q : a finite set of **states**.
 - Represents status of system,
 - i.e. automatic sliding door at walmart has two states: either close or open
 - i.e. traffic light has three states: red, yellow, green
- * Σ : a finite non-empty alphabet
 - is set of symbols in each transition



- * $q_0 \in Q$: the start or initial state
- * $\delta : Q \times \sigma \rightarrow Q$: a transition function
 - is a connection between two states.
 - is represented by an arrow



- * $F \subseteq Q$: the set of accepting states
 - Is represented by a double circle
 - Multiple accepting states may exists
 - Purpose: When processing ends, the output is either *accept* or *reject*