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## CMPSC 360: Homework 02

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## PROBLEM 1

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Explain how propositional states can be applicable for translating discrete math into the automata systems for the robot applicable to workshop safety using a hash function?

Propositional states can be used by implementing sensor conditions and known data in order to automate a robot to perform tasks. For this example, the robot must know if the sensor detects an object on the ground, then it must go and pick the object up which can be implemented by discrete functions.

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## PROBLEM 2

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Write each propositional state that represents the described situation.

- States:
  - A: Robot locates object
  - B: Robot picks up object
  - C: Robot loses 4 points
  - D: Robot gains 10 points
  - E: Person steps on object
  - F: Person has stopped walking
  - G: Person restarts walking
  - H: Person is slower than robot
  - I: Robot increases speed
  - J: Robot does not increase speed
- Propositions:
  - Robot locates an object and must pick it up.  $A \implies B$
  - Robot locates an object, picks it up and gains points.  $(A \wedge B) \implies D$
  - Person steps on an object the robot has not picked up and the robot loses points.  $(\neg B \wedge E) \implies C$
  - Person stops walking and restarts, but is slower than the robot.  $(F \wedge G \wedge H) \implies J$
  - Person stops walking and restarts, but is faster than the robot.  $(F \wedge G \wedge \neg H) \implies I$

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PROBLEM 3

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Write each propositional state that represents the described situation.

