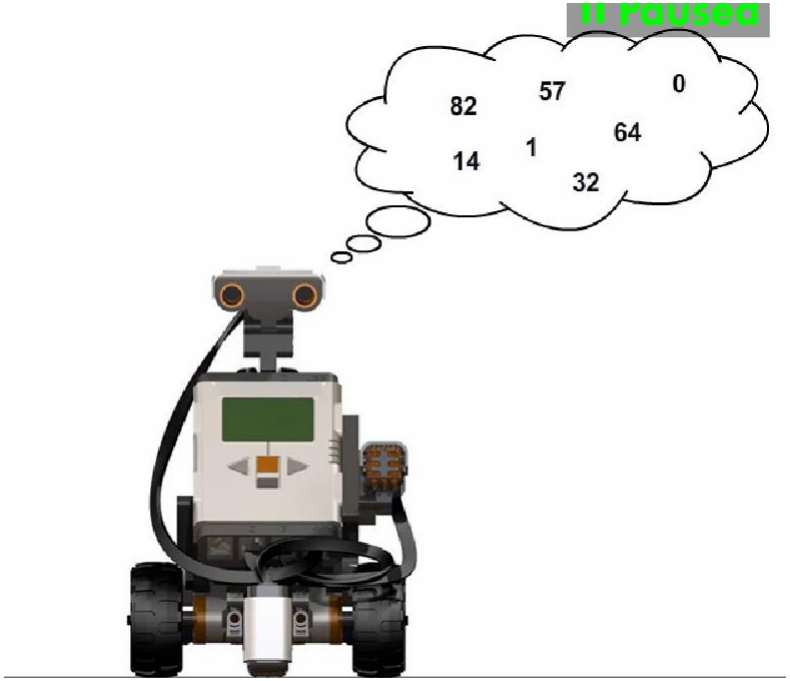
Robot Decision Making

CISC1003

How a Robot Thinks

- Robot can ‘learn’ the world using their sensors
- Sensors return data in number format



http://cmra.rec.ri.cmu.edu/previews/nxt_products/nxt_video_trainer2/

How a Robot Thinks

- The robot can answer ‘yes’ or ‘no’ questions
- Example:
  - Is the touch sensor bumped?
  - Is the audio level in the room above 50%?
- This ability is based on a special logic
  - Called ‘***Boolean logic***’

How a Robot Thinks

- Programmers can give the robot its decision-making capability
  - By combining the numbers provided by the sensor with robot ability to answer questions
- This requires the following:
  - Robot is programmed to ask questions
  - Act one way if the answer is ‘yes’
    - and another if the answer is ‘no’

How a Robot Thinks

- Boolean operators are used when asking the questions, such as:
  - < ‘less then’ ,
  - > ‘more than’,
  - == ‘‘equal to’
  - etc.

How a Robot Thinks

- Example: We want the robot to stop moving before it runs into a wall
  - Use the feedback from an ultrasonic sensor
  - Use ‘less than’ operator
    - with a certain distance threshold
      - E.g., 10 inch
- This will result in a program that moves the robot until it detects an obstacle
  - Within the distance specified (10 inch)

How a Robot Thinks

- How does the program work?
- The robot moves forward
- It repeatedly asks the questions:
  - "Am I 10 inch away from anything?"
- If the answer is no, the robot continues moving forward
  - If the answer is 'yes', it stops

Conditional Statements

- The parts of the program where the robot choose an action
  - Depending on a certain condition

Summary

- We can create conditional statements
  - by combining sensor output and Boolean operators
- This allows the robot to make decisions

How a robot thinks

- What kinds of questions can a robot ask?
  - "yes" or "no" questions
  - Questions that have only two possible answers
- What can a robot do with the answer to the question?
  - Use the answers to choose between two different actions
    - E.g., move forward or stop


QUESTIONS