Robotic Merit Badge Session #3

- August 8, 2015
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Agenda

- Schedule
- Robotics in Space
- Elements of Design
- Advanced Edison programming
- Robotics Showcase Competition
- Team Exercise

Schedule

Class Dates	Description	Special Topics
7/11	Introduction, Material Distribution, Safety	Programming
7/25	Sensors and Mechanical Design	Gears and Mechanics
8/8	Design Review	Robotics in Space
8/22	Robotics in Industry	Open Source and Robotics
8/29	Robotics Showcase	

Robots in Space

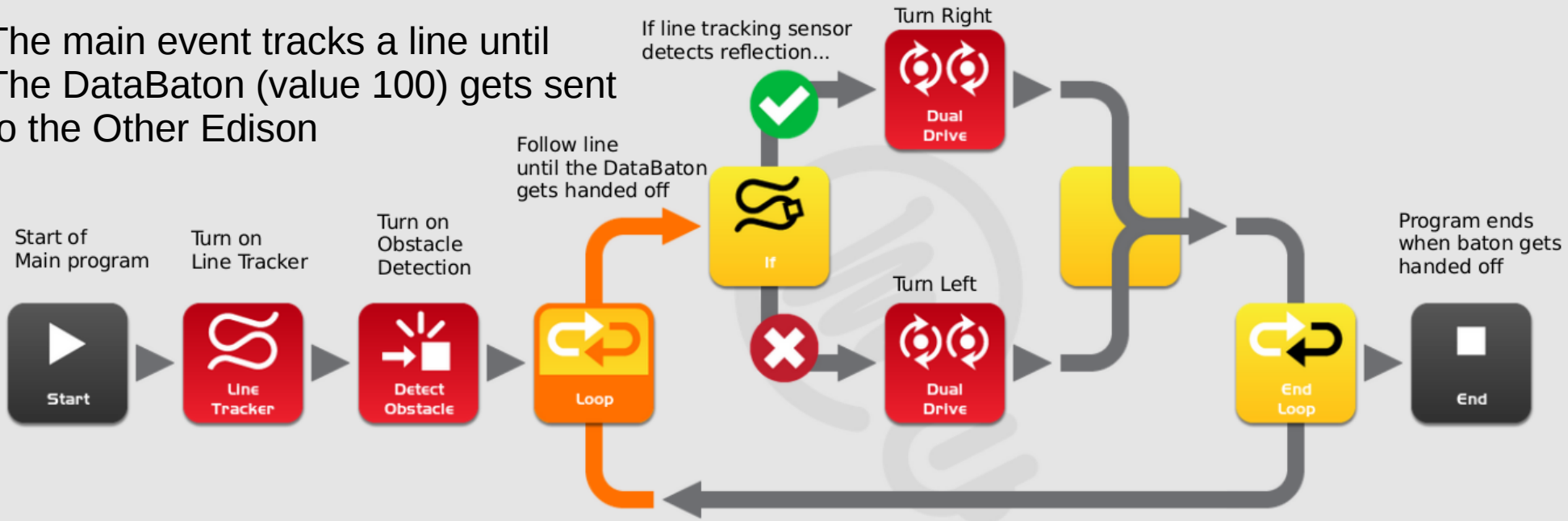
- What aspects of outer space environment make it a good application of robotics?
- Videos
  - Using Robots to repair Satellites https://www.youtube.com/watch?v=bSyii3vluUU
  - Cubesats https://youtu.be/7RrWZJHkREI

Elements of Design (Engineering Notebook)

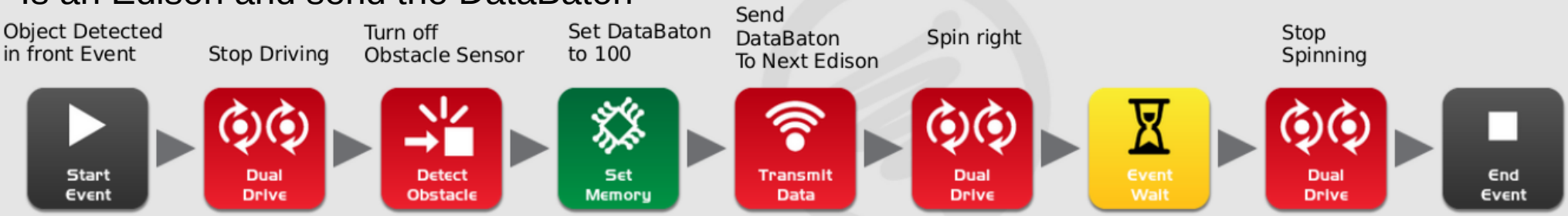
- Overview – Describe the task(s) for the robot.
- Ideas – Possible approaches to accomplish the task, highlight the approach you have chosen.
- Mechanical – How will the parts fit together? Diagrams and sketches are useful
- Electrical – How will the robot be powered? What sensors does it utilize?
- Programming logic – Flow chart of what the program does.
- Tests – Different scenarios you will use to test your robot functionality. After building the robot, record the results of your tests.
- Improvements – How would you improve your robot for the next version?

Example Line Tracking/Hand-off Logic

The main event tracks a line until
The DataBaton (value 100) gets sent
to the Other Edison

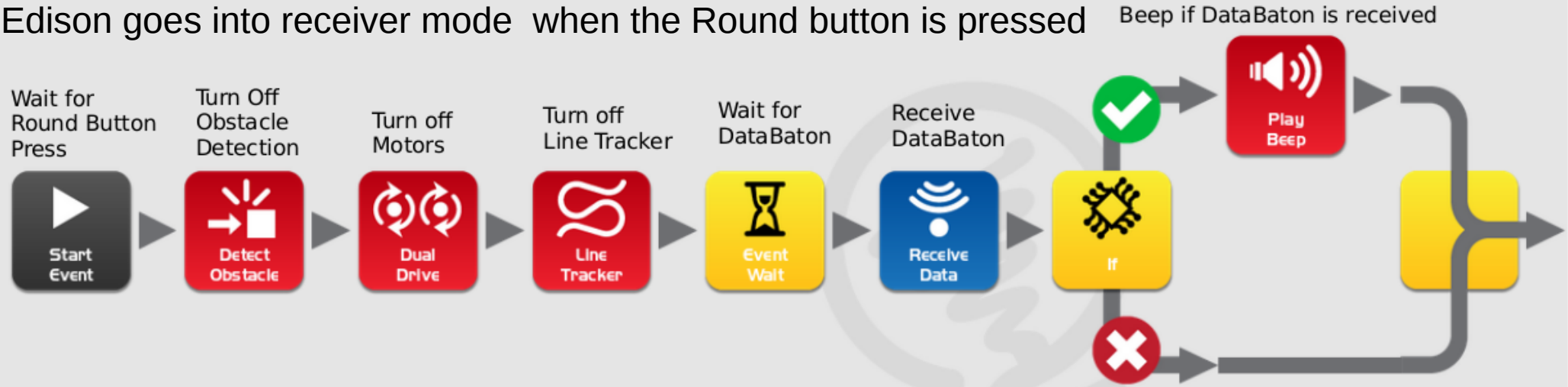


Assume that an object detected
Is an Edison and send the DataBaton

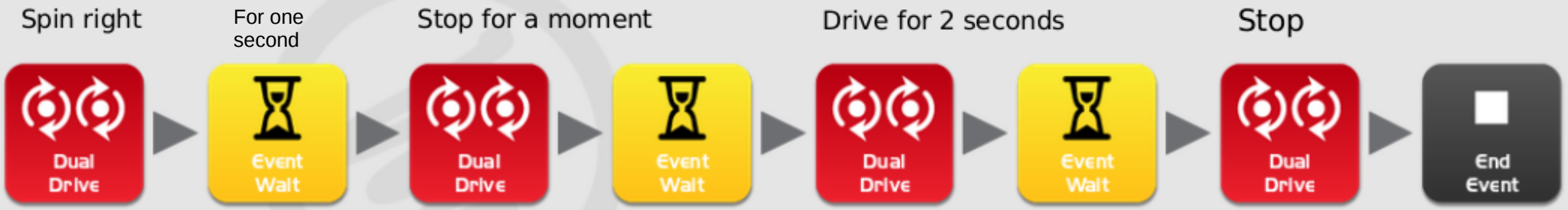


Example Receiver Logic

Edison goes into receiver mode when the Round button is pressed



After receiving the DataBaton, turn around, drive forwards and stop



Robotics Showcase

- Demonstrate individual robots
- Bot Relay competition with 2 teams

X Team	Y Team
Brennan	Mateo
Tin	*Matthew
*Ryan	David
Caleb	Praneet
Tyson	Yannik
Xian Lun	Logan
Spencer	Connor

* **Team Captain**
- Represents the team
- Coordinates with team members to develop a strategy.
- Ensures that
  - Hand offs are smooth between robots
  - Design & development is on schedule
  - The over-all design and implementation achieve the objectives

Competition Details

- One competition course with 7 segments
- Each segment exercises one or more sensors of the Edison
- Points awarded for each event
- Penalties for breaking rules
- Team that wins the most points wins the over-all competition.
- Hand offs are autonomous (no human control)

Competition Course Segments

Segment	Description
1	Autonomously head toward the light and avoid obstacles, find the line to the hand-off area
2	Autonomously follow a Line Maze. Next robot is waiting at the exit!
3	Get 3 ping pong balls into a container with walls about 1 inch high.
4	Speedway. Who can go the fastest? Need to stay in bounds!
5	Push three 6 oz cans into a target area.
6	Get through a maze by controlling your robot with clapping.
7	Autonomously find a target using line sensor and head to the finish line where the light is.

Team Exercise

- Choose a name for your team
- Assign each scout one segment of the course.
- Program your robots to cause a chain reaction. i.e. have the first robot activate the 2nd which activates the 3rd, etc. All robots need to be stationary to start with.

Assignment

- Review preliminary design with counselor before implementing
- Write up more detailed design for your personal robot
- Design for competition segment
  - Competition robot may be same as your personal robot
- Develop a personal demo course to exercise/test your robot
- Finish any remaining Workbook sections