

Control a line tracing robot

• LEGO MINDSTORMS

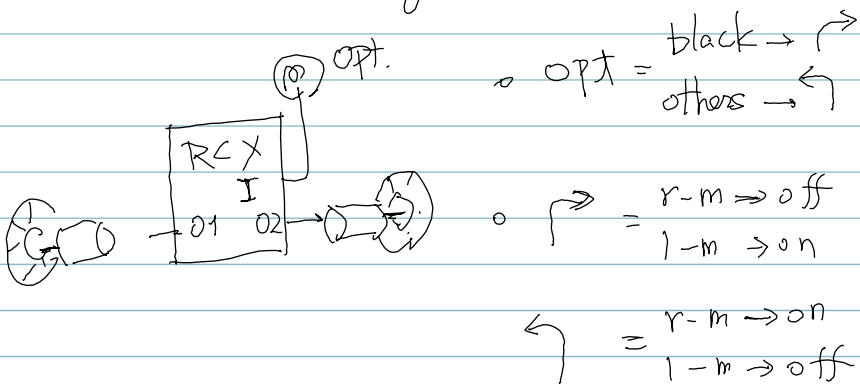
↳ RCX (Robotic Command eXplorer)

- 3 input ports
- 3 output ports

• Optical sensor \Rightarrow input port
to detect a black line.

• Two motors \Rightarrow 2 output ports
to drive ~~motors~~
wheels

• A robot moves along a black line

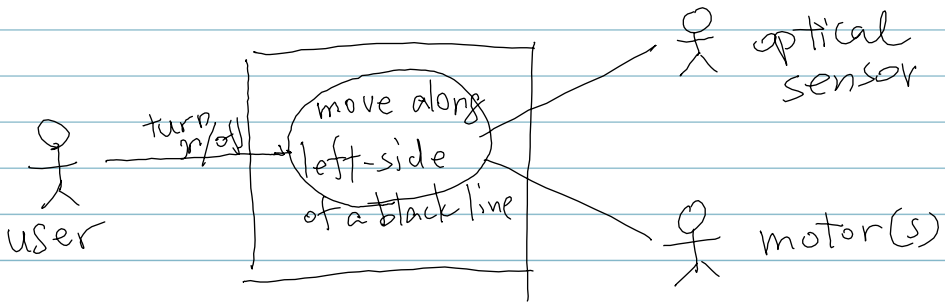


Requirement Analysis

- Use case diagram

→ use "event flow"
for exception.

↳ use "activity diagram"
for "synchronization"



- Use case description

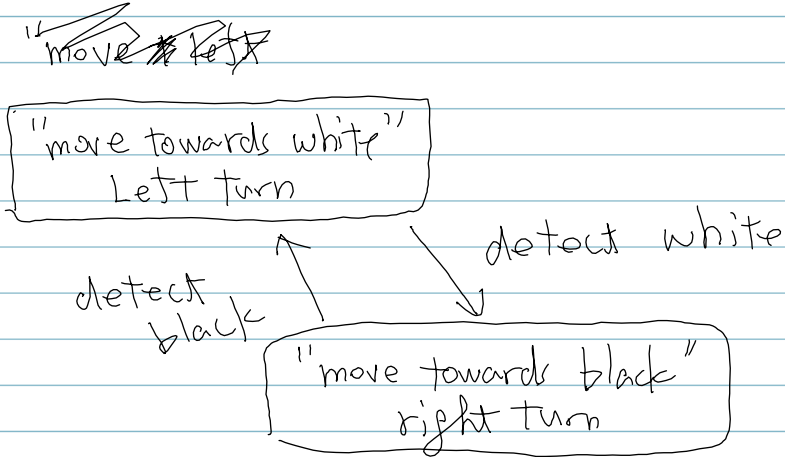
"move along the left-side of a black line"

- ①. if it's on the b.l. → turn left
- ②. if it's off the b.l. → turn right
- ③. repeat ① - ②

* can be started at ②.

Requirement Analysis (cont.)

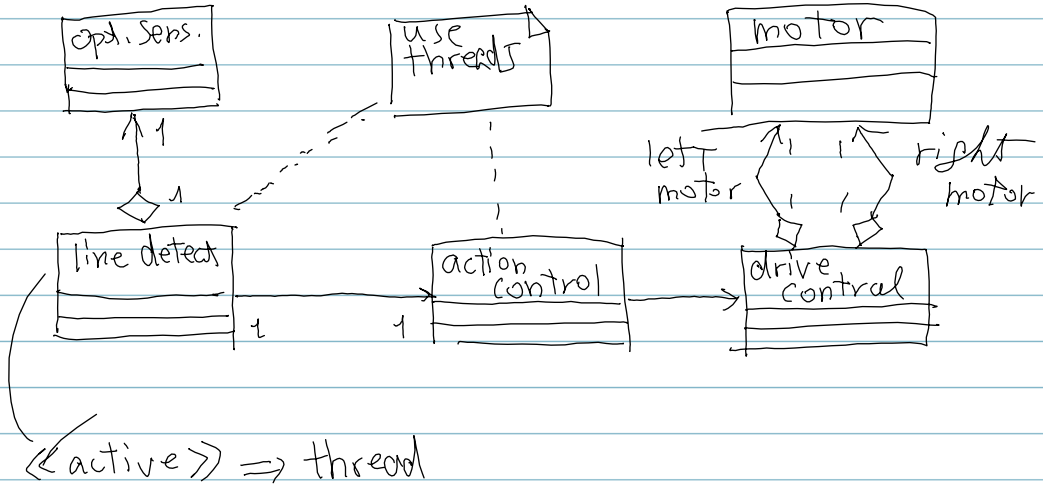
• State Diagram.



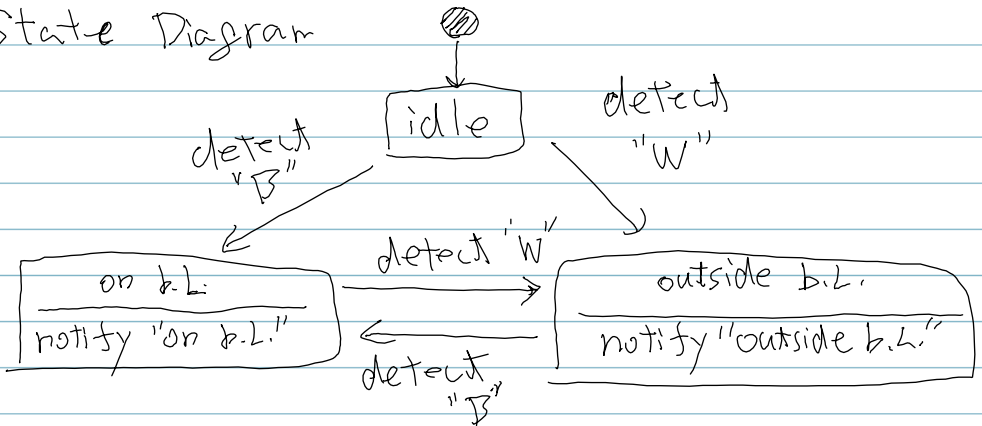
System Analysis.

- use Class, State, Interaction (sequence) Diagram

• Class Diagram

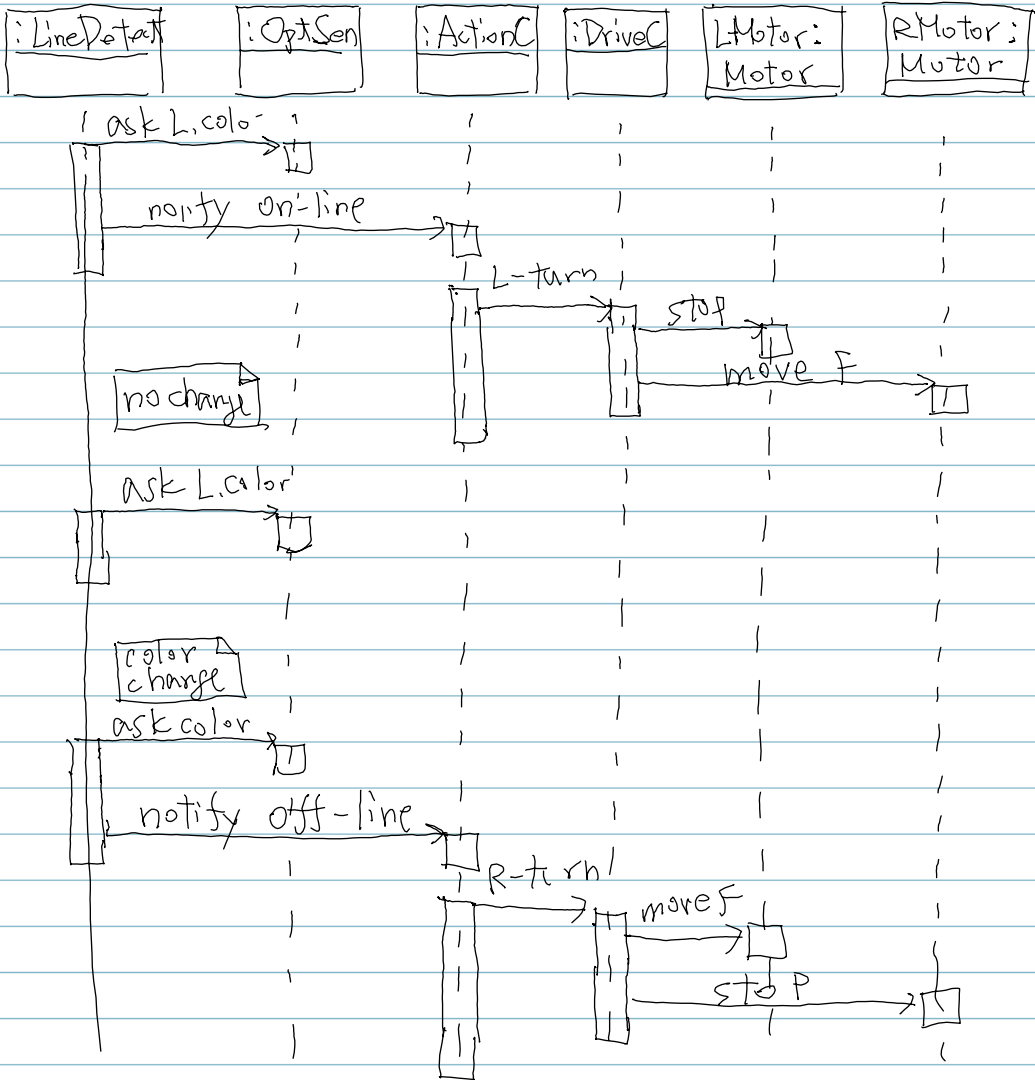


• State Diagram

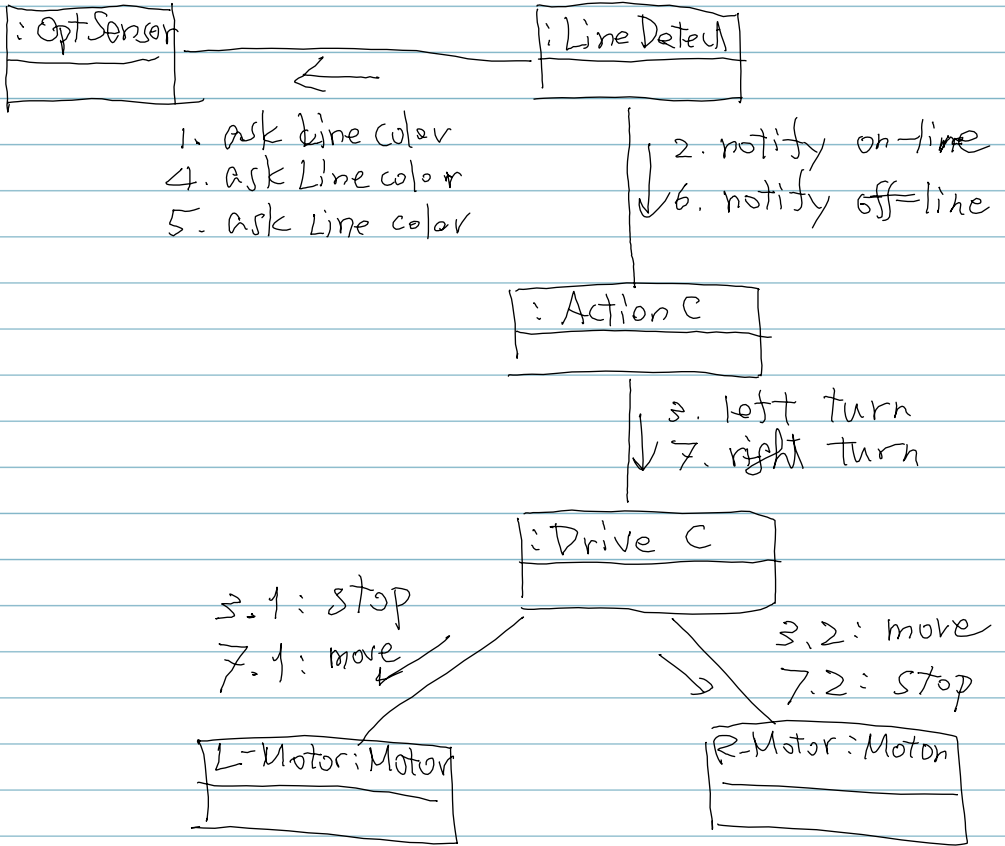


Interaction Diagrams.

◦ Sequence Diagram



Collaboration Diagram



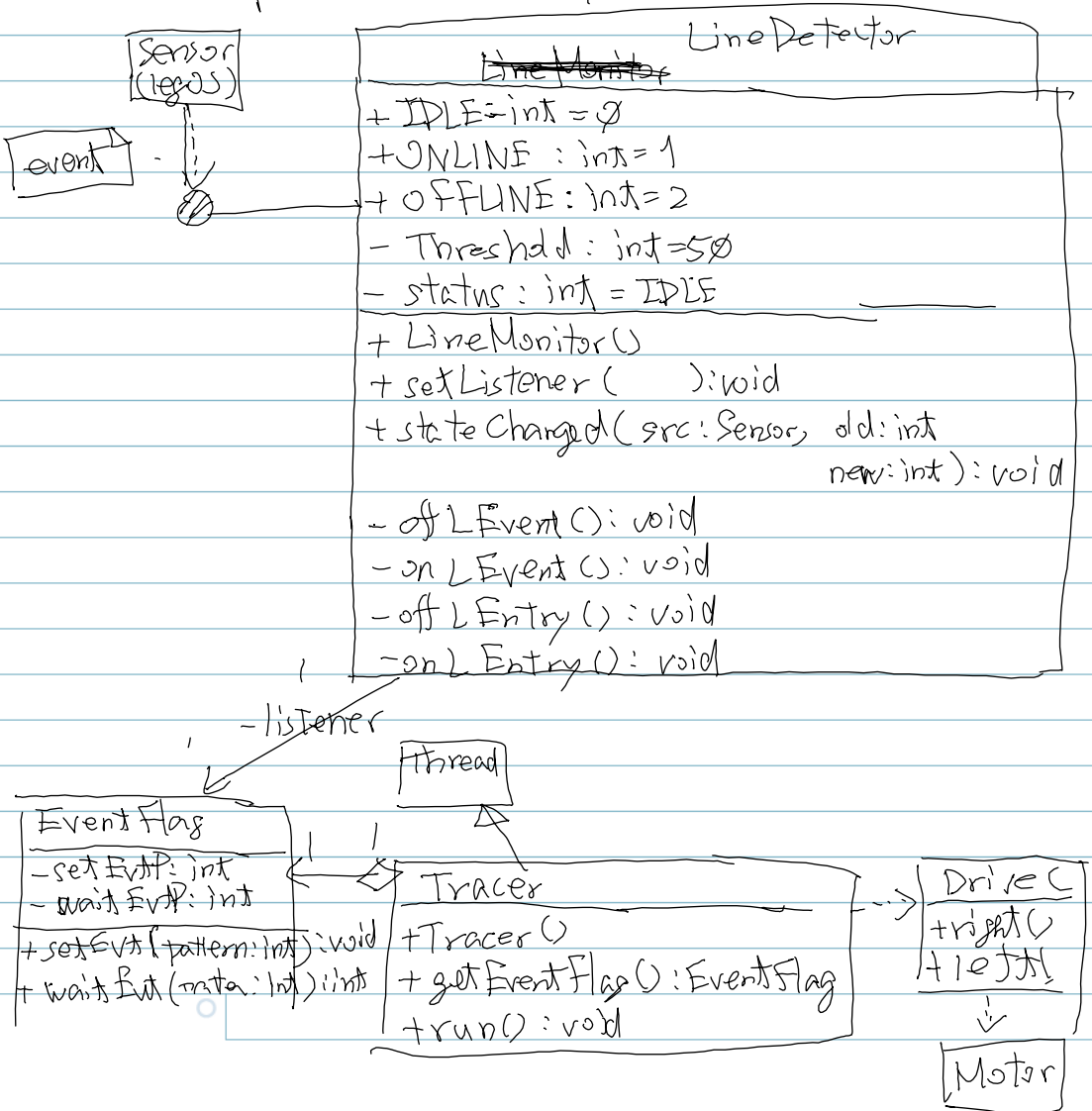
~~Design~~

"Design"

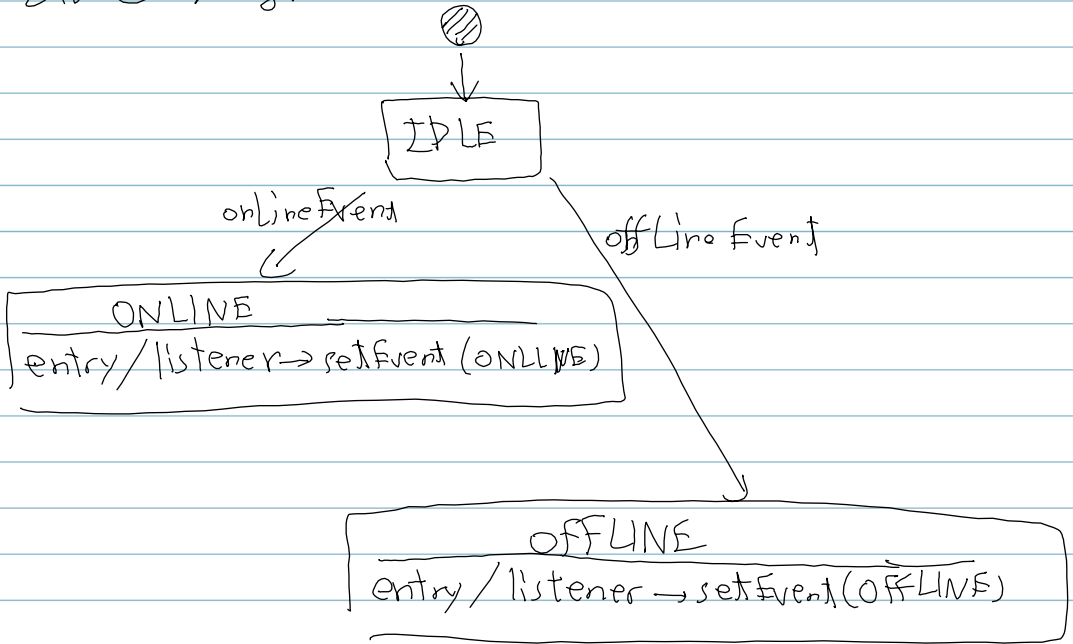
"logOS" → C++

"leJOS" → Java

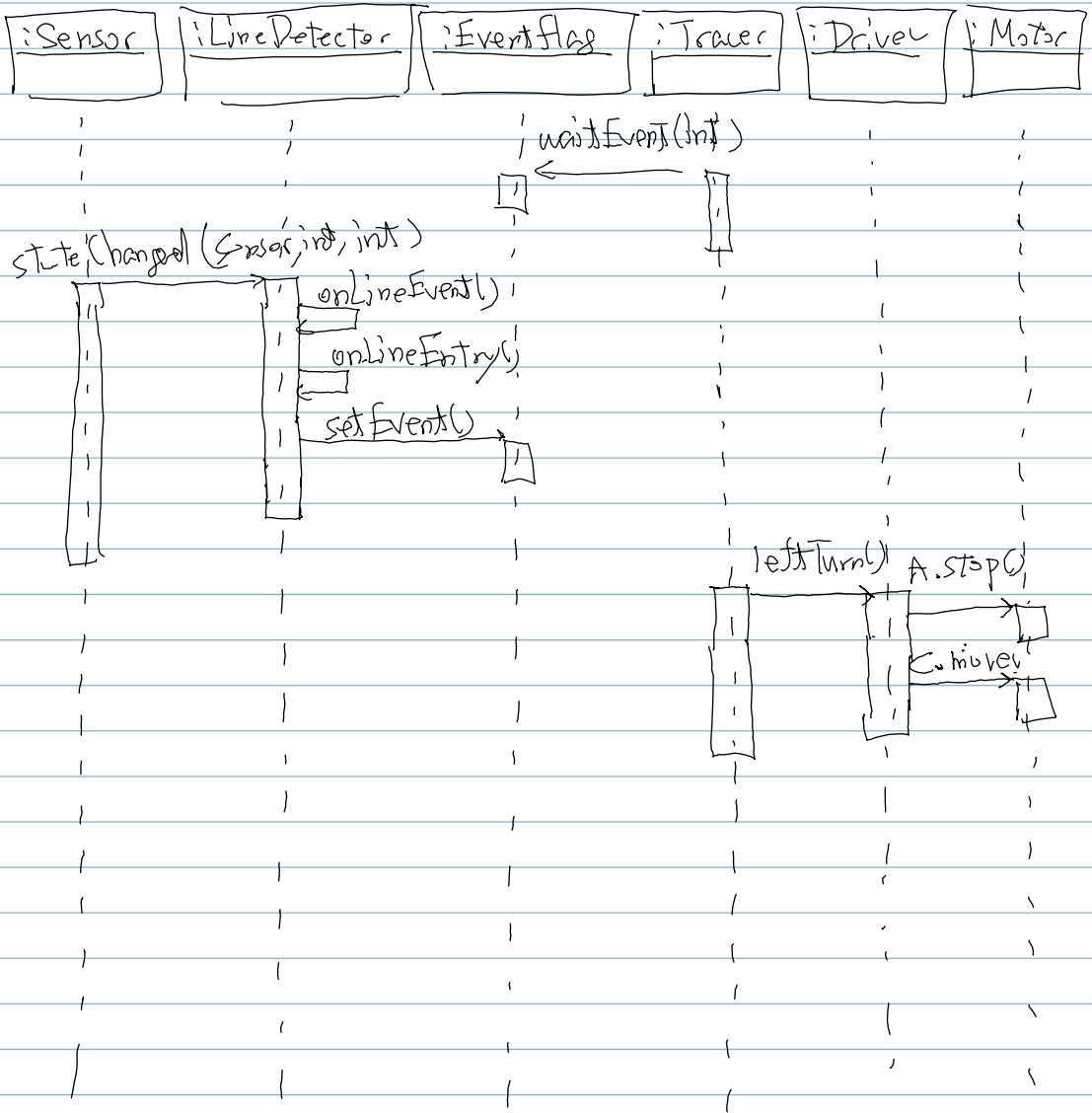
- Break down class, state, sequence, collaboration into implementation level.



State Diagram



Sequence Diagram



Collaboration Diagram

