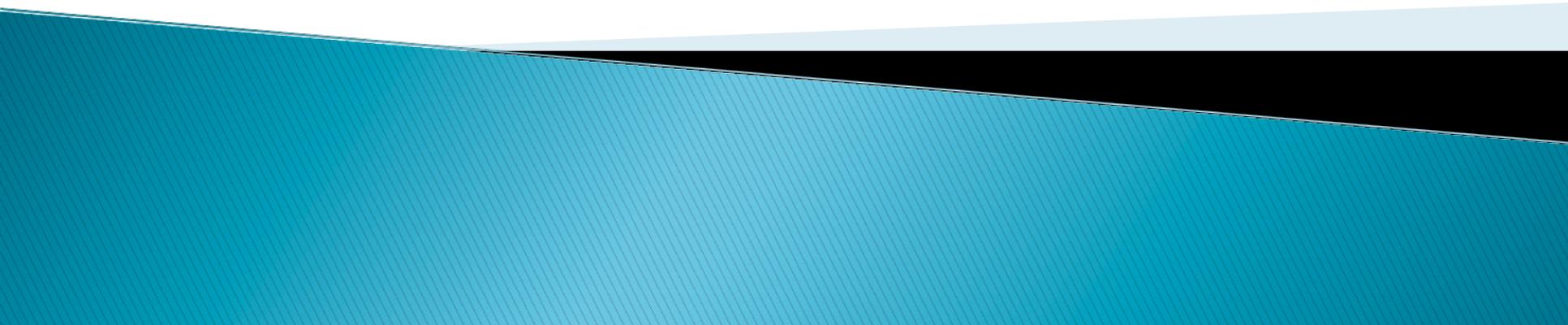
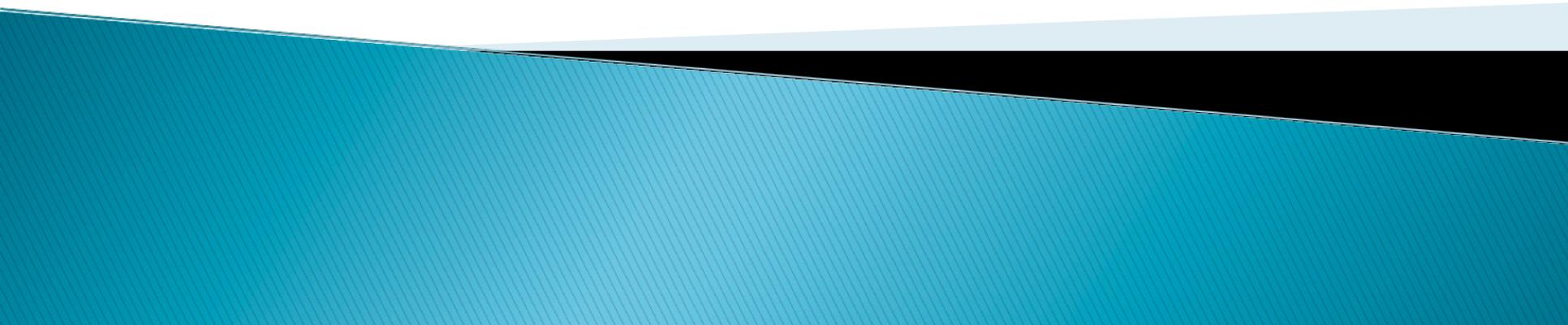


Robô sensorizado com LEGO Mindstorms

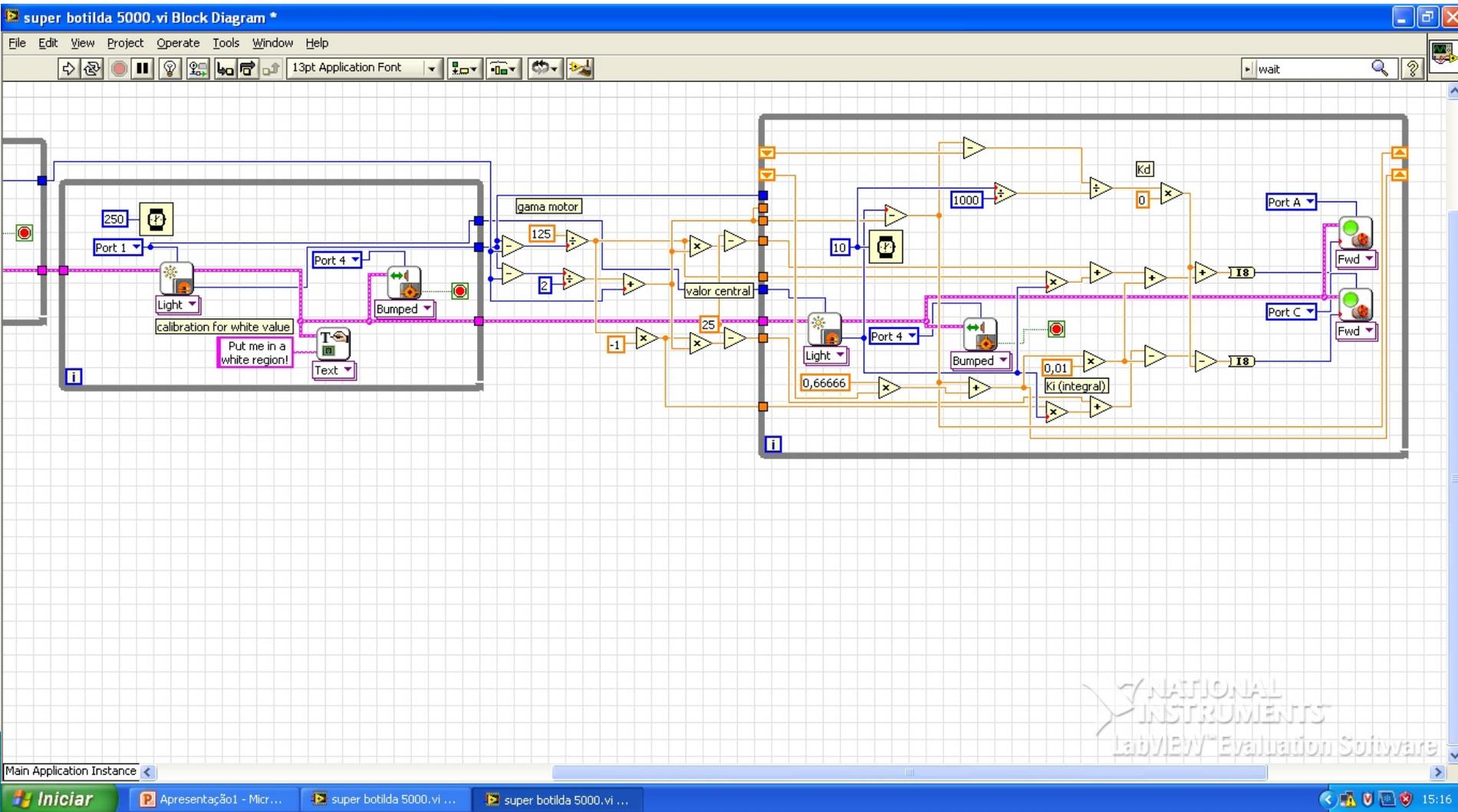


Robô sensorizado com LEGO Mindstorms

Escola de Verão de Física 2011



LabVIEW



NATIONAL
INSTRUMENTS
LabVIEW™ Evaluation Software

A Botilda

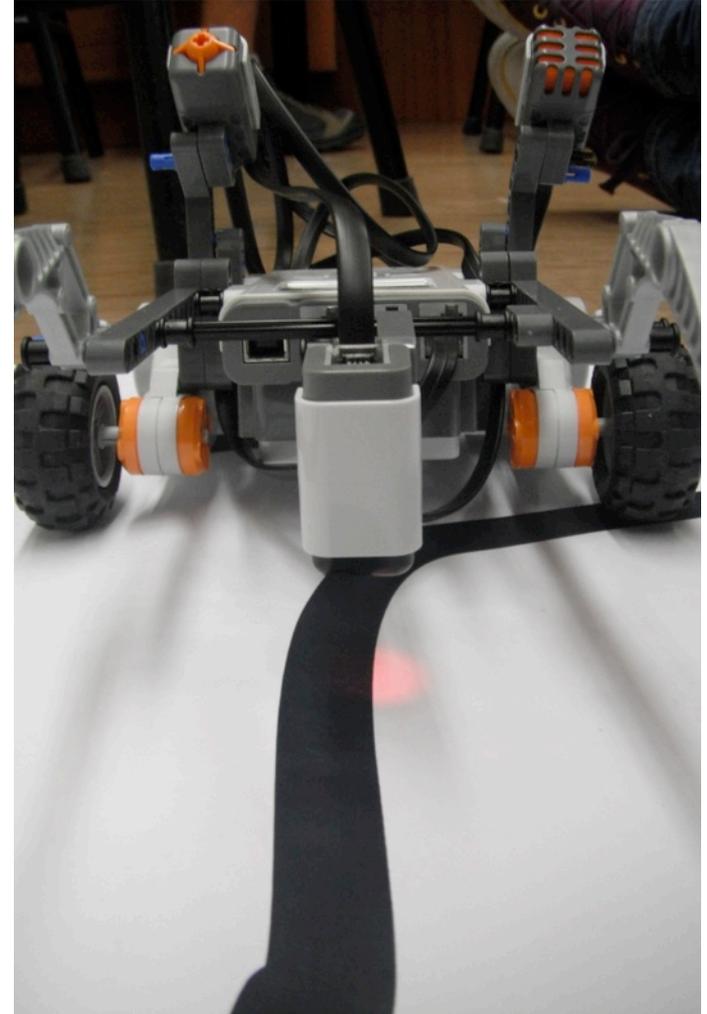


Objetivo



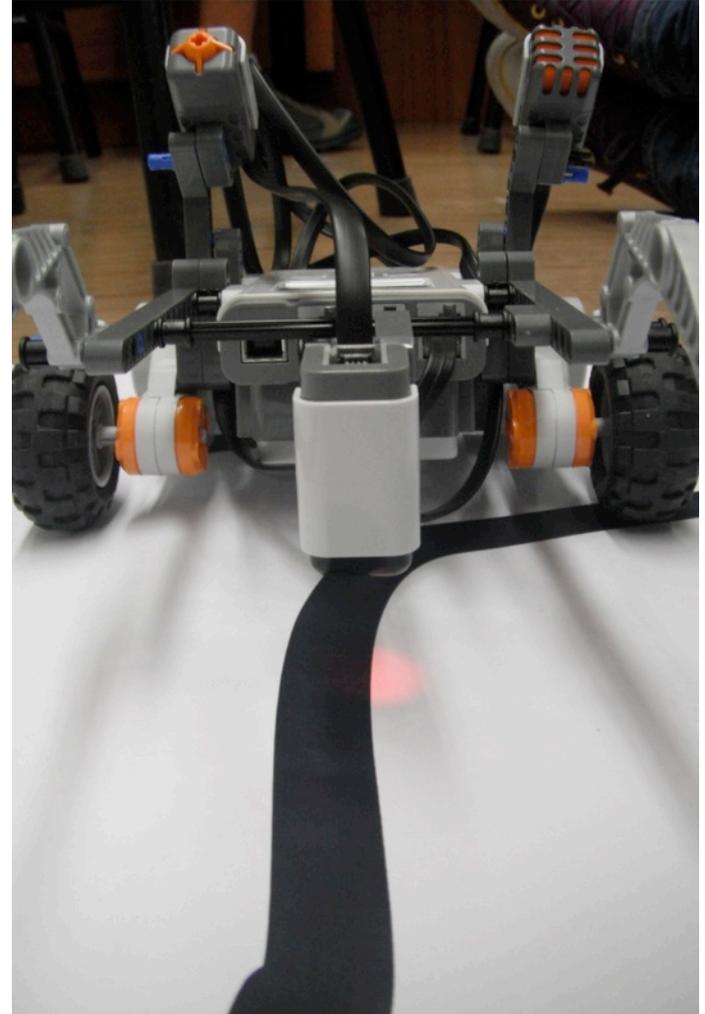
Objetivo

- Qual?



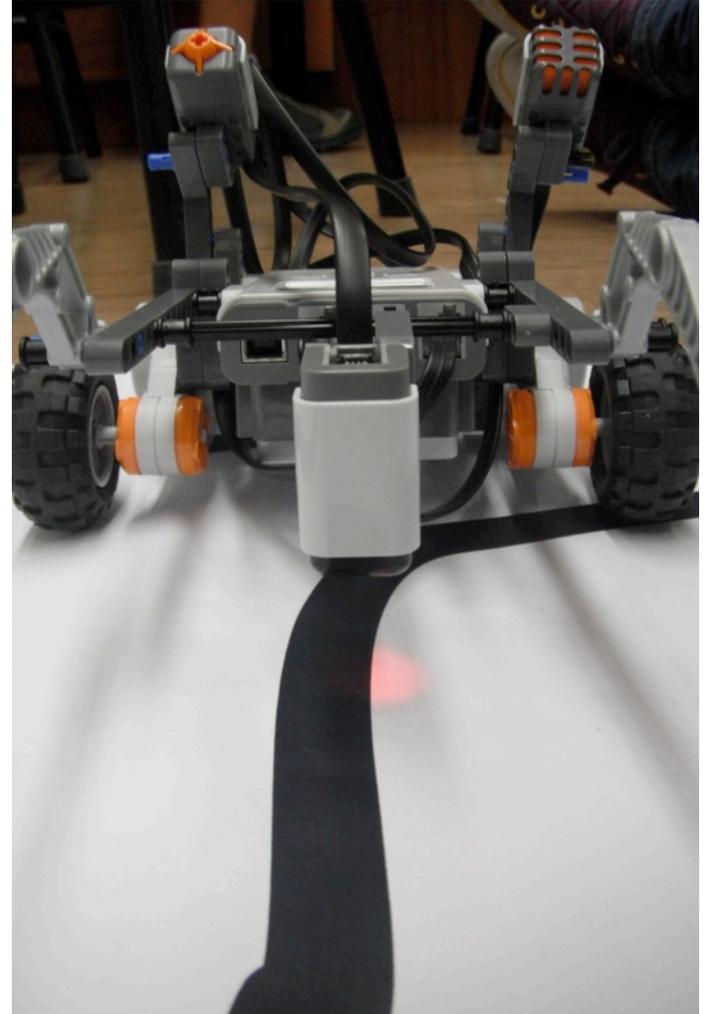
Objetivo

- Qual?
- Como?



Objectivo

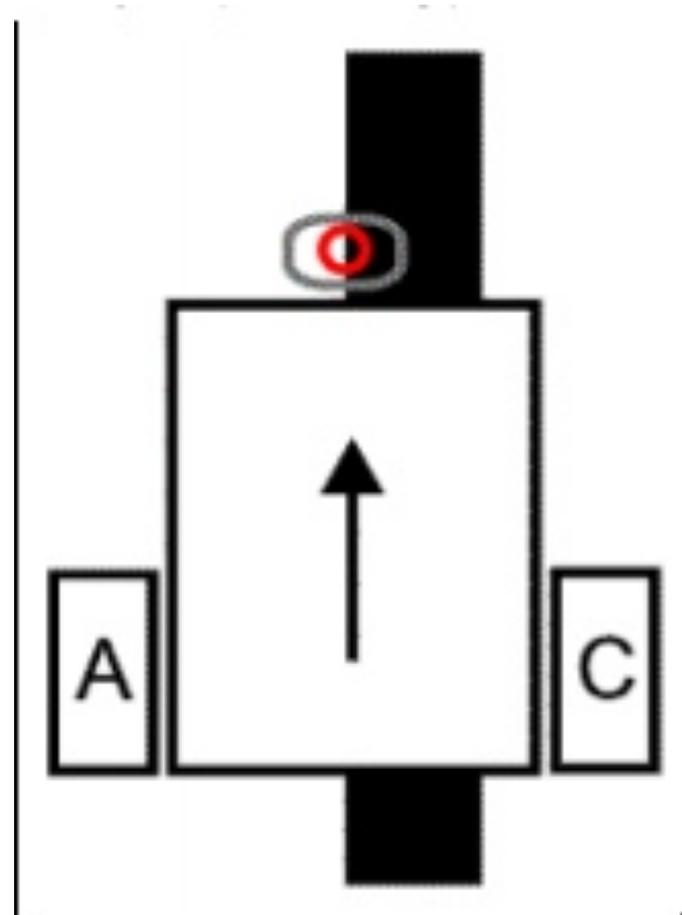
- Qual?
- Como?
- Porquê?



2-Level

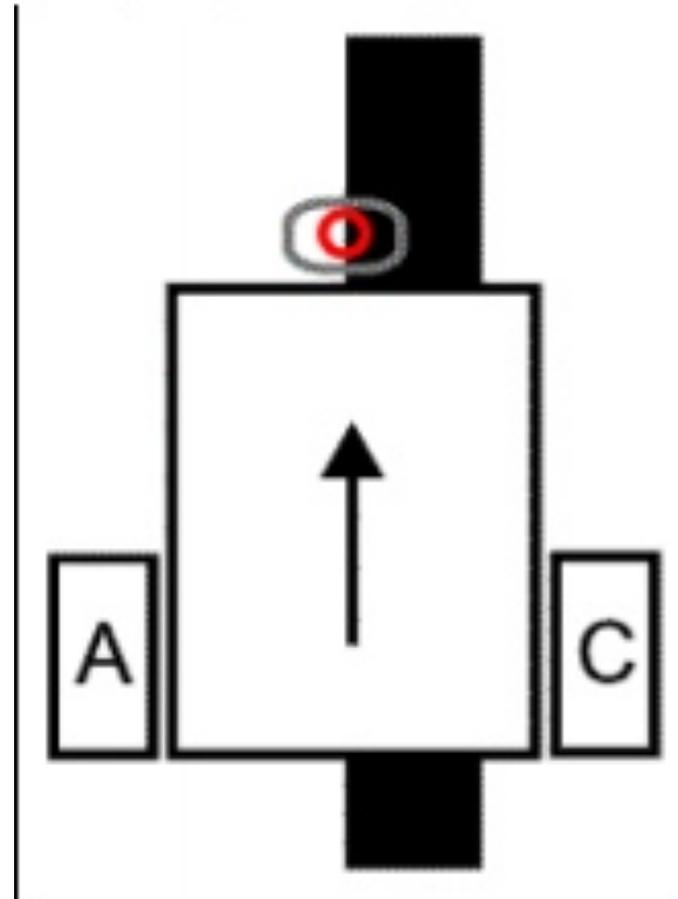


2-Level



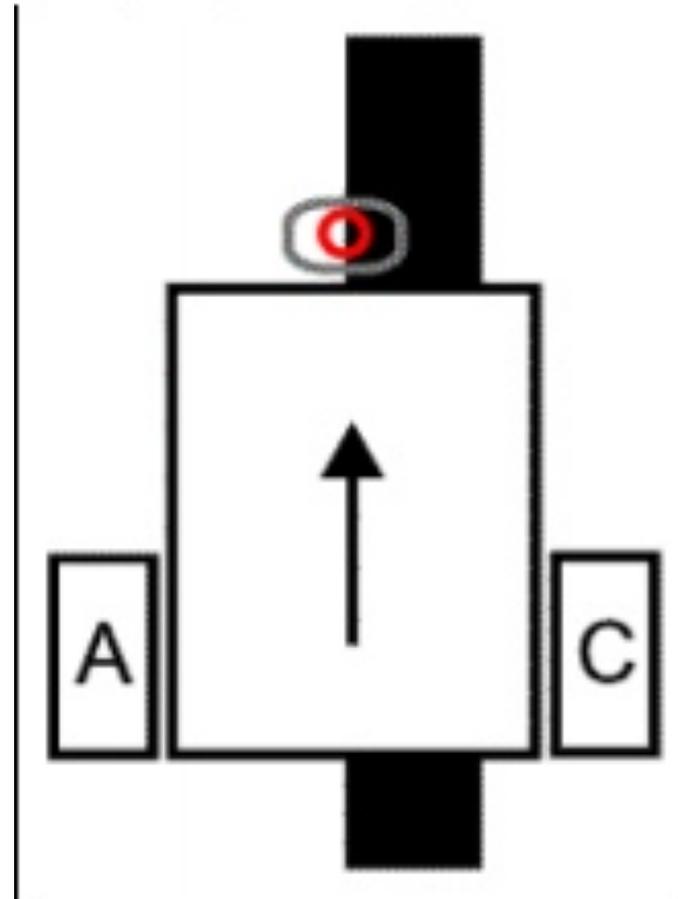
2-Level

- ▶ Medem dois valores: um para o branco e outro para o preto



2-Level

- ▶ Medem dois valores: um para o branco e outro para o preto
- ▶ Em função dos valores dá mais potência a um dos motores





Proporcional

Proportional Line Follower

Turn

Turn Right

Go Straight

Light Sensor Reading

40

50

Turn Left

2-Level Line Follower

Turn

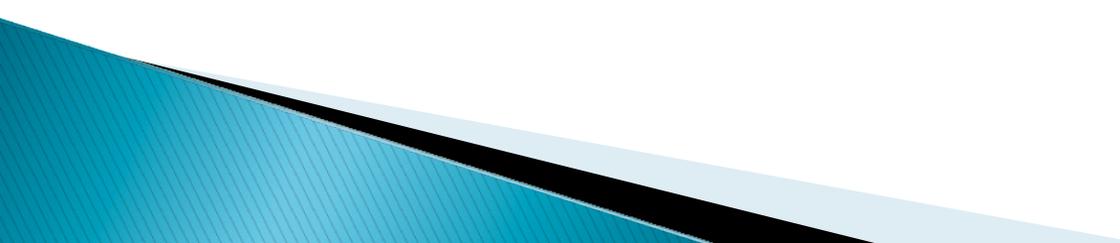
Turn Right

Light Sensor Reading

40

50

Turn Left



PID (Proporcional Integral Derivativo)

Proporcional

Presente – Usa as medições feitas em tempo real

Integral

Passado – Usa os desvios medidos anteriormente

Derivativo

Futuro – Usa as medições feitas e prevê o que virá a seguir

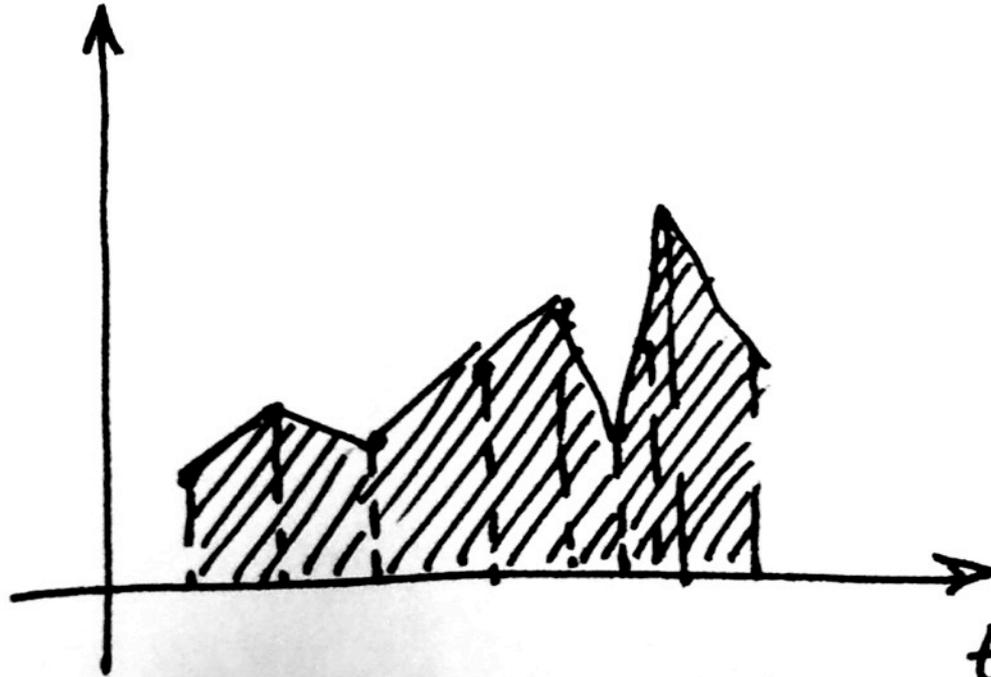
PID (Proporcional Integral Derivativo)

Proporcional

Integral

Derivativo

valor



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feitas e prevê o que virá a seguir

PID (Proporcional Integral Derivativo)

Proporcional

Presente – Usa as medições feitas em tempo real

Integral

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Derivativo

Futuro – Usa as medições feitas e prevê o que virá a seguir

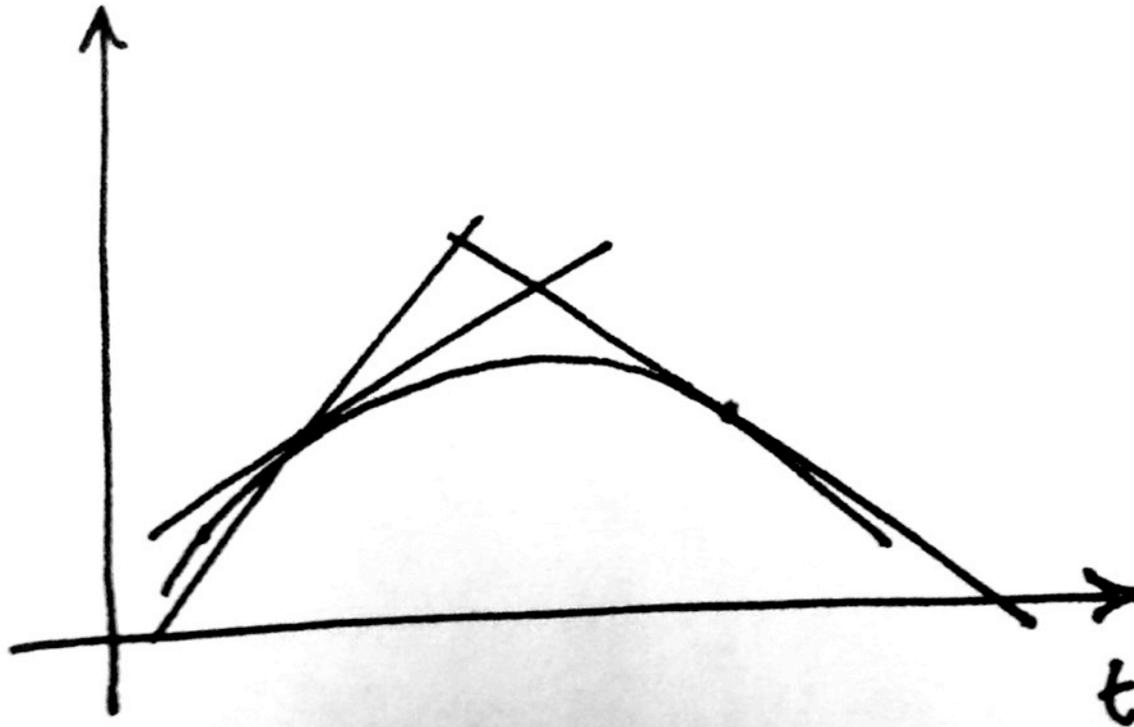
PID (Proporcional Integral Derivativo)

Pro

Int

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valor



PID (Proporcional Integral Derivativo)

Proporcional

Presente – Usa as medições feitas em tempo real

Integral

Passado – Usa os desvios medidos anteriormente

Derivativo

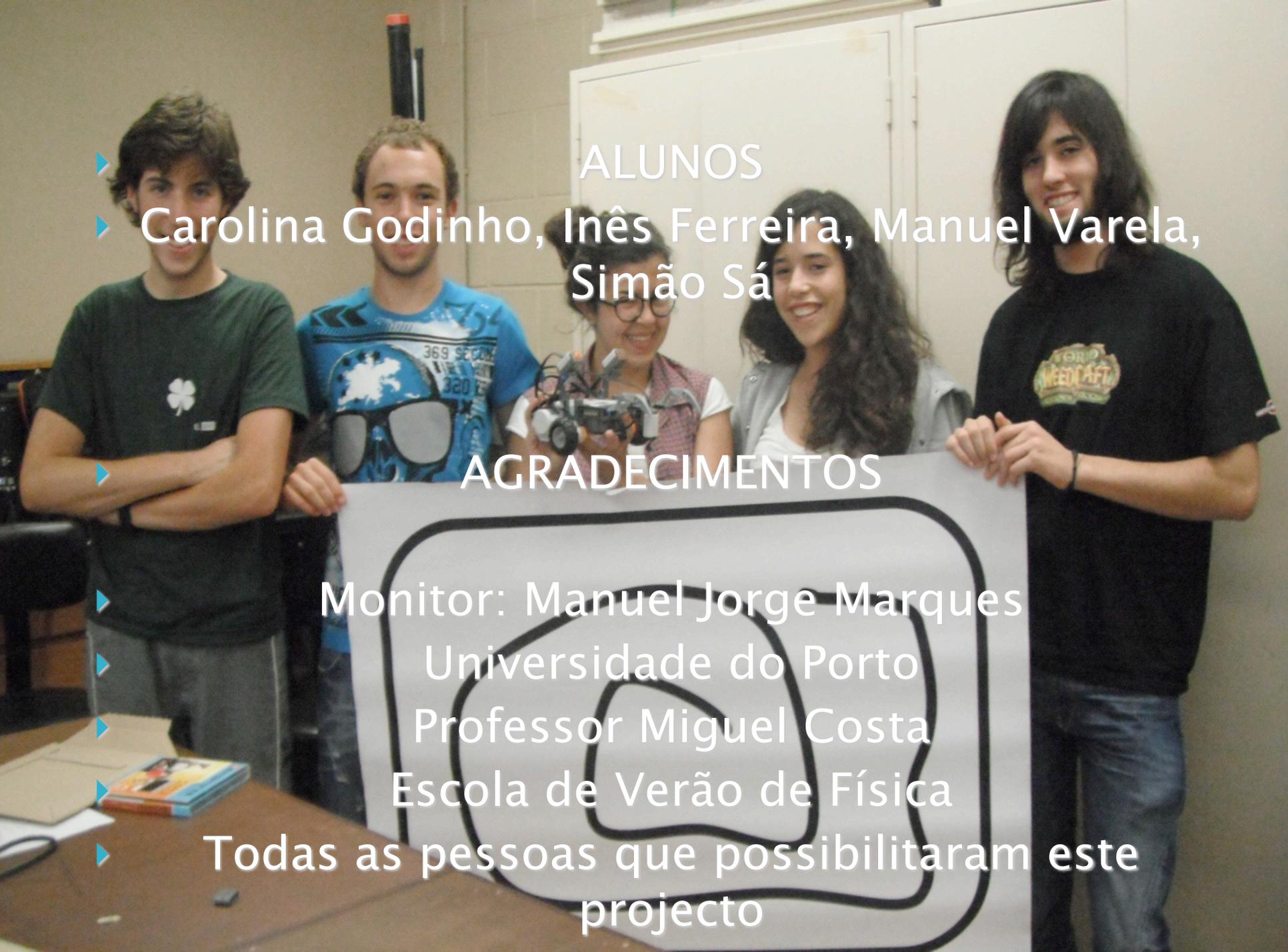
Futuro – Usa as medições feitas e prevê o que virá a seguir

Controlo de velocidades



Sensores adicionais



A group of five students (three men and two women) are standing behind a table in a workshop or classroom. They are holding a large white sign with a thick black outline of a stylized '@' symbol. The student on the far left is wearing a dark green t-shirt with a white shamrock. The student next to him is wearing a blue t-shirt with a graphic of a person wearing sunglasses and the text '369 SECONDS'. The student in the center is a woman with glasses holding a small robot. The student next to her is a woman with long dark hair. The student on the far right is wearing a black t-shirt with a 'WORLD NEED CRAFT' logo. The background shows white lockers and a wooden table with some papers and a book.

ALUNOS

- ▶ Carolina Godinho, Inês Ferreira, Manuel Varela, Simão Sá

AGRADECIMENTOS

▶ Monitor: Manuel Jorge Marques

▶ Universidade do Porto

▶ Professor Miguel Costa

▶ Escola de Verão de Física

▶ Todas as pessoas que possibilitaram este projecto