Robotics

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The Robot Helps

Maths and ICT

Using robots, as an educational help, with the aim of taking advantage of students ' curiosity towards the discovery and learning of basic concepts within Physics, Mathematics and Computers. Planning and presentation of experimental activities, by and for students, stimulating and promoting the interest in Science and self-learning.

The Robot Helps

- Learning objectives:
  - Improve logical and programming skills
  - Improve the knowledge of some general concepts in Math and Physics
  - Stimulate students to learn Math, Physics and Programming using Project Based Learning

PBL

- In Project Based Learning (PBL), students go through an extended process of inquiry in response to a complex question, problem, or challenge.

http://www.bie.org/about/what_is_pbl

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PBL

Maths and ICT

- While allowing for some degree of student "voice and choice," rigorous projects are carefully planned, managed, and assessed to help students learn key academic content, practice 21st Century Skills (such as collaboration, communication & critical thinking), and create high-quality, authentic products & presentations.

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PBL

Maths and ICT

- Project Based Learning:
  - **is intended to teach significant content**
  - **requires critical thinking, problem solving, collaboration, and various forms of communication**
  - **requires inquiry as part of the process of learning and creating something**
  - **is organized around an open-ended Driving Question.**

PBL

- Project Based Learning:
  - **creates a need to know essential content and skills**
  - **allows some degree of student voice and choice**
  - **includes processes for revision and reflection**
  - **involves a public audience**

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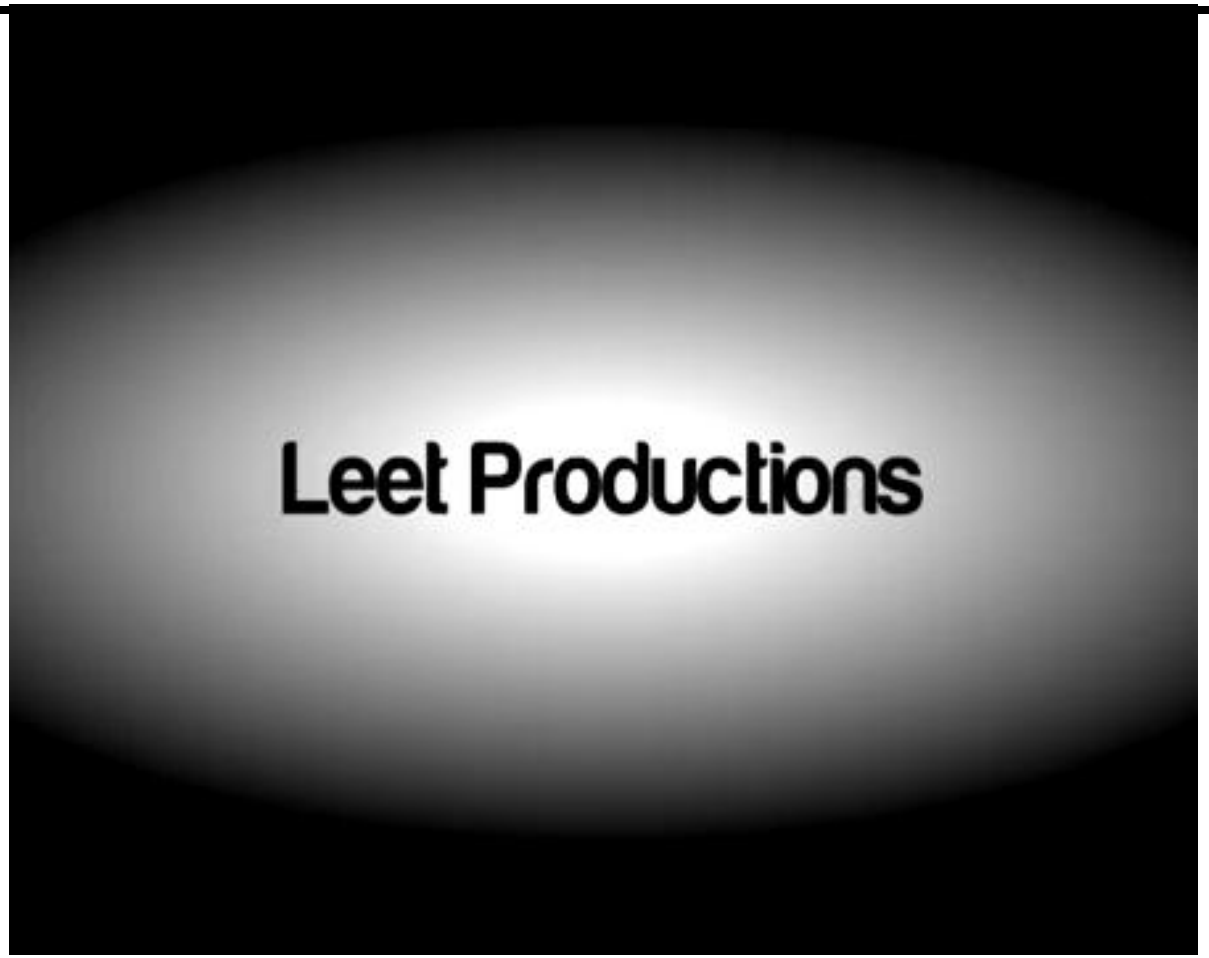
Projects

Lisbon, Portugal
31st May – 2nd June 2012

Maths and ICT



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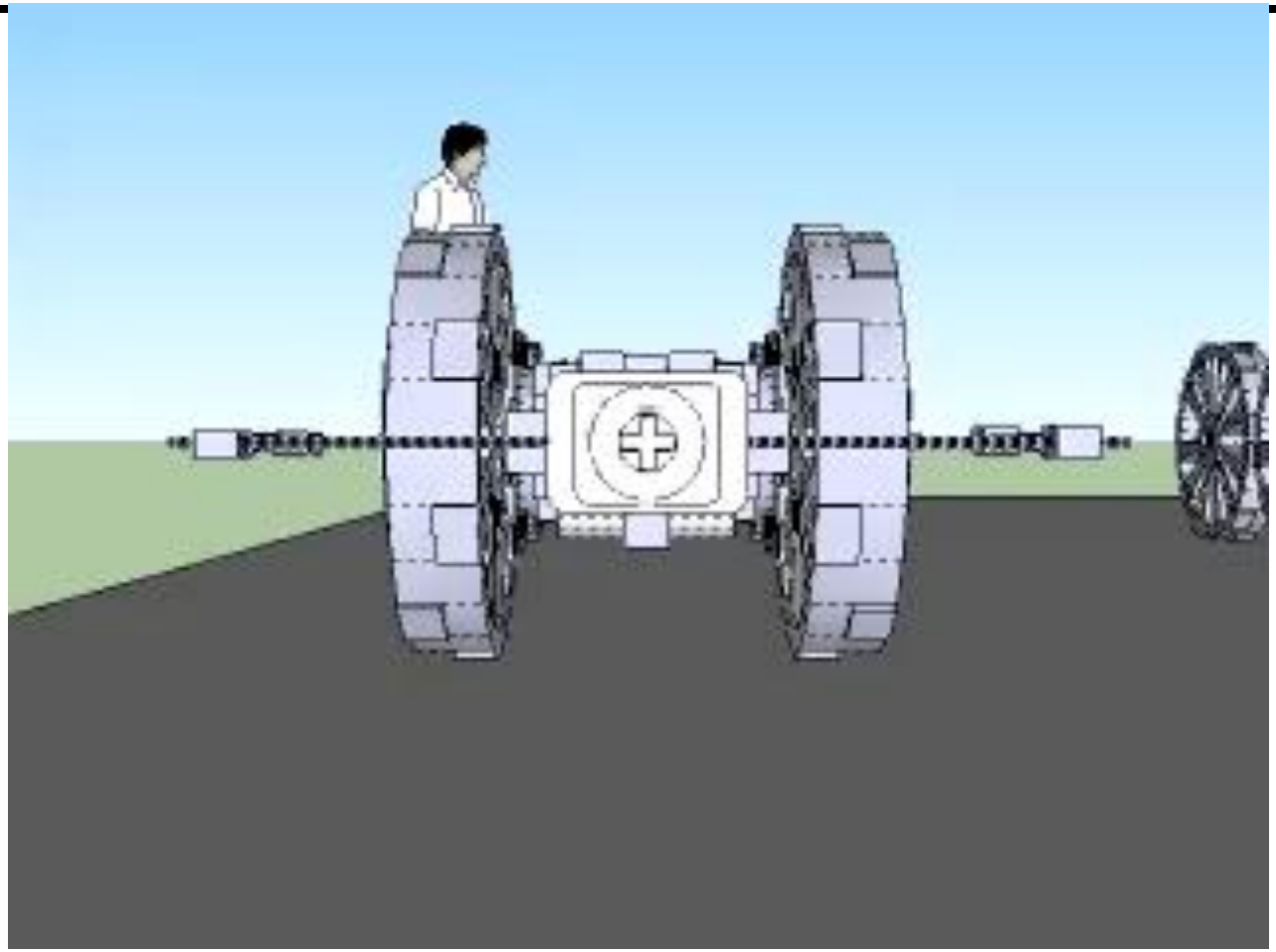
Projects

Maths and ICT



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Projects

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Projects

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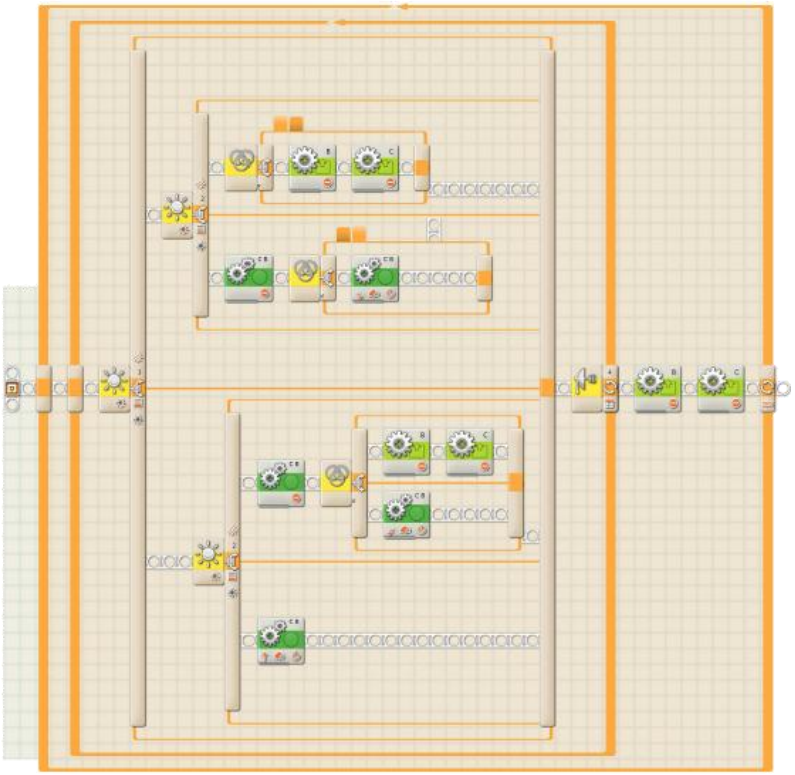
Robotics

- NXT - MindStorm

Robotics

- **NXT -G**



Robotics

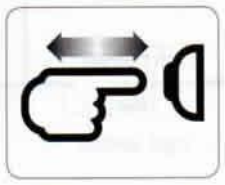
- Touch Sensor
  - Allows the robot to know when it´s touched
  - The sensor detects when it is pressed or released

Robotics

- Pressed

- Released

- Bumped



Robotics

- **Uses:**
  - It can be used to make the robot grab objects: a robotic arm equipped with a touch sensor allows the robot to detect if there is an object near the arm that can be grabbed or released.

Robotics

- **Uses:**
  - It allows the robot to obey a command: by pressing the touch sensor it is possible that the robot talks, walks, closes a door or turn on a television, for example.

Robotics

- **Sound Sensor**
- Allows the robot “ear”;
- Detects:
  - Decibels (dB) – all sound are measured with the same sensibility, includins very high or low sounds for the human ear. It measures up to 90dB.
  - Decibel A-weighting (dBA) – the sensibility is adapted to the same as the human ear.

Robotics

- **Uses:**
  - Sound controlled robot;
  - You can talk and the robot will answer;
  - When you clap your hands and the robot pick up an object and bring it to you .

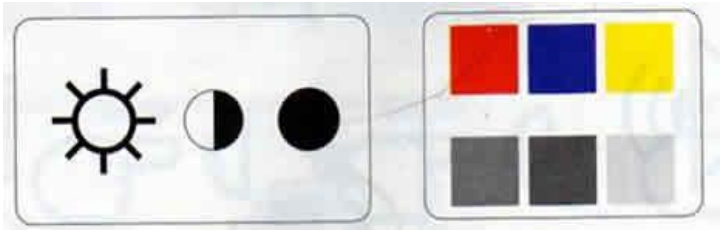
Robotics

- **Light Sensor**

  - Allows the robot to “see”;
  - The light sensor differences between black and white surfaces;
  - Measures light intensity in a room;
  - Measures light intensity in coloured surfaces.

Robotics

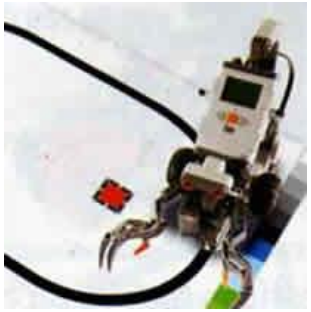
- **Light Sensor**



- This is what you see
- This is what the robot "sees" using the Light Sensor

Robotics

- **Uses:**
  - Build a burglar alarm: when an intruder turns on a light, the robot should execute an action to defend the place;
  - A line follower robot;
  - A robot that selects objects based on its colour.



Robotics

- **Ultrasonic Sensor**
  - Allows the robot “see” and detect objects;
  - Allows the robot to avoid obstacles, measures distances and detect movements;
  - Measure distances in inches or centimeters;
  - Measure range: from 0 to 255cm ± 3cm.

Robotics

- **Uses:**
  - Build and programme a robot to move around your house avoiding objects and walls;
  - Build a burglar alarm triggered by movement;
  - In the picture, the scorpion robot “stings” if you get too close

Thank you

and

don´t forget:

The Robot helps!