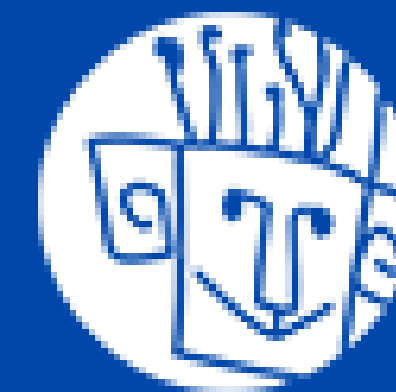




ReST€LA

STEM Labs Unlimited!

Project Number: 2022-1-CY01-KA210-SCH-000081449



Scuola di
Robotica



NAO

Humanoid robot



**TAL
TECH**

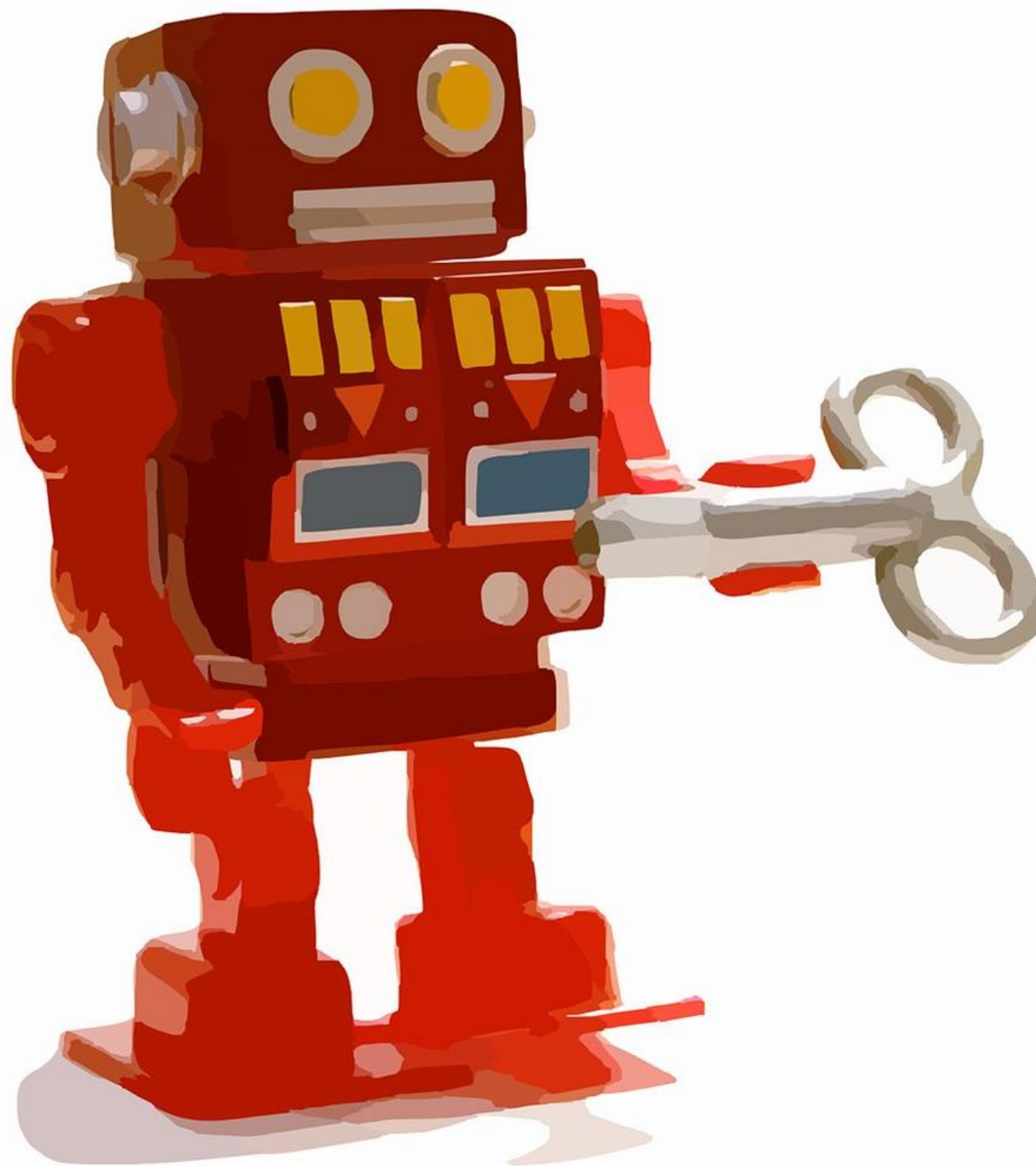


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What is a Robot?



What is a Robot?

- A machine
- Programmable
- With sensors
- That moves autonomously



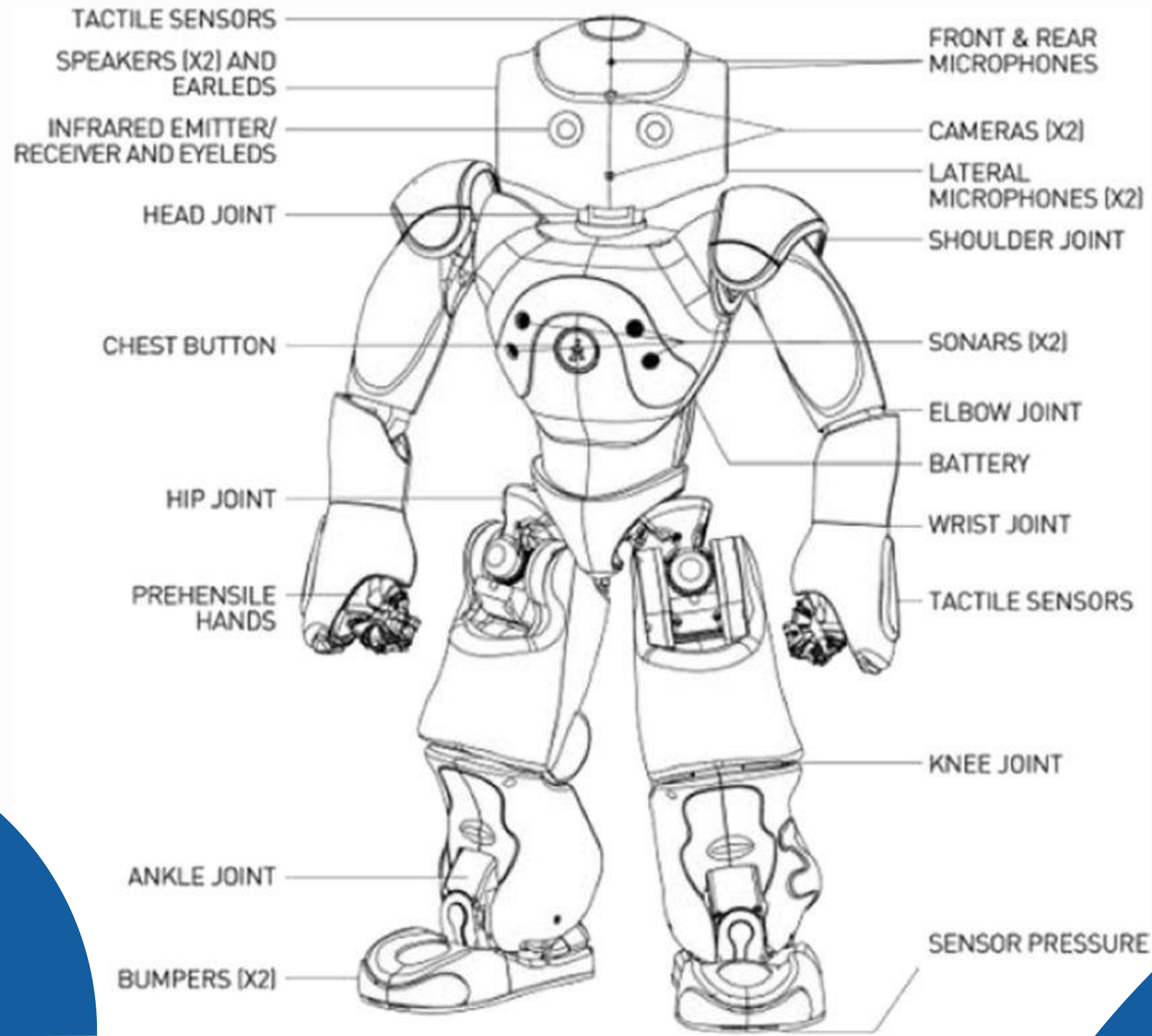
What is an Humanoid Robot?

A humanoid robot is an autonomous machine that has a human-like appearance and is able to interact with its surroundings.

We can also speak of an android, any robot with a human-like appearance but with a certain level of artificial intelligence.



NAO Humanoid Robot



NAO robot in education

- Integration of technology and education
- Enhancing the learning experience in classrooms with interactive and experiential learning
- Customised interactions through individual student experiences, learning styles and preferences
- Adaptability promotes inclusivity and empowers students to take ownership of their learning journey



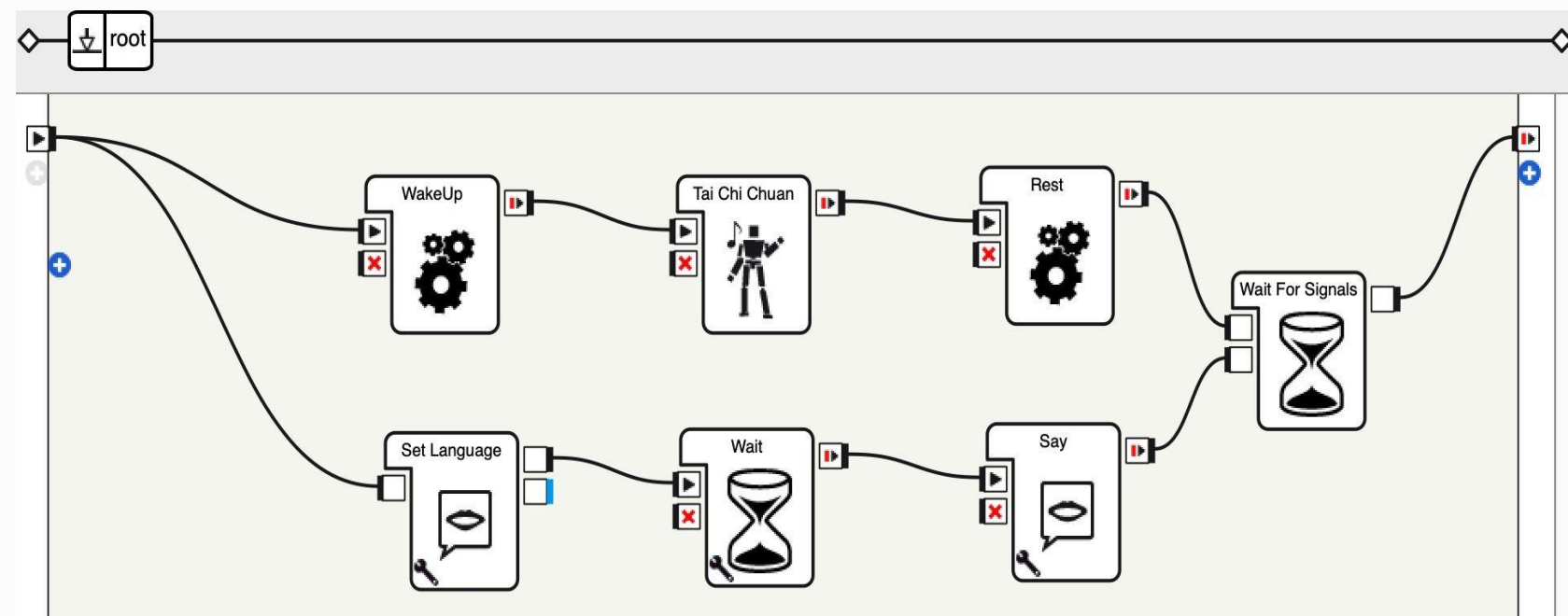
NAO robot in education

Through customizable activities and engaging exercises, students can explore:

- STEM (Science, Technology, Engineering, and Mathematics) fields and academic subject
- Develop critical thinking and problem-solving skills
- Emotive assistance and support in cognitive and emotional development in special education



NAO - Choregraphe software





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NA Activities



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NAO activities

Unit #1: Exploring Movements with NAO

Activity summary :

Students will gain skills in animation and programming movements of the NAO humanoid robot, by using the Coregraphe software to simulate and later connect movements to the real NAO robot.

Target group:

12+

Duration:

2x 120' sessions

Setup:

- Alderbaran NAO humanoid robot
- Computer/Laptop
- Coreographe Software

Objectives

Explore concepts like:

- joints
- degrees of freedom
- movement precision



Activity 1

Activity #1: Introduction

1.1 Setting the Scene (10 minutes)

The teacher will start by explaining the activity, inspired by iconic movie scenes from Rocky or Superman, must note that despite the cinematic inspiration, they will be starting with simpler movements.

1.2 Basic Concepts (20 minutes)

Explain the basic concepts of joints, degrees of freedom, and movement precision. The student should understand how the NAO robot's arm and head motors work to ensure accurate programming.

Activity 2 and 3

Activity #2: Practice with the simulator

2.1 Guide to Using Coregraphe (20 minutes)

We'll provide a detailed guide on how to use the simulator in Coregraphe. Students will start with simpler exercises, ensuring a gradual understanding of animation dynamics.

2.2 Practical Exercise (20 minutes)

Next, students will have the chance to experiment, creating more complex animations inspired by reference movies. The teacher will give continuous feedback during the practical activity, addressing questions to ensure effective participation.

Activity #3: Programming Degree by Degree

3.1 Lesson on Joints and Motors (20 minutes)

We'll spend more time on a detailed lesson about the NAO robot's joints and motors. Practical examples of degree-by-degree adjustments will be given, ensuring students have a clear understanding of how to tweak motor parameters.

3.2 Practical Programming Activity (20 minutes)

During the practical activity, students will apply what they've learned. The focus will be on precisely modifying motors to enhance and refine their animations.

Activity 4

Activity #4: Connecting with NAO robot

4.1 Introduction to RESTELA and Robot Connection (15 minutes)

A clear introduction to RESTELA and connecting simulated movements to the real NAO robot will help students understand the transition from simulation to real execution.

4.2 Practical Activity with the Robot (15 minutes)

During the practical activity with the NAO robot, students will be guided through the process of connecting animations and observing real movements. The teacher will assess precision, providing feedback for any necessary corrections.

Activity 5

Activity #5: Discussion and Reflection

5.1 Sharing Experiences (10 minutes)

Students will share their experiences and challenges faced during the activity. A more in-depth discussion about the differences between simulation and real execution will be encouraged, creating a space for doubt resolution and solution sharing.

5.2 Final Reflection (10 minutes)

The concluding discussion will explore more deeply the potential real-world applications of programming movements in humanoid robots. The class will reflect on the acquired skills and how these skills could be useful in various real-world scenarios.



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