

## Eddy's Secret : Sensors

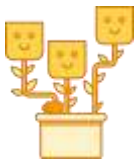
### 1. Online game : room contents

Robots use sensors to obtain information about their environment, similar to how humans use their five senses. This information allows robots to have a certain autonomy, i.e. to react and adapt to their environment. This differentiates them from automatons which execute their instructions without taking their environment into account.

In the sensor room there are many clickable elements that correspond to different types of sensors used in robots or in everyday life.



Here are the different clickable elements as well as the text displayed in the game:



This potted plant is equipped with a moisture sensor, called a hygrometer. Perhaps it is there to remind the scientists working here to water it! Hygrometers are also widely used to measure air humidity, for example, for weather forecasting.



This is a huge radar! Did you know that it works like the sonar of bats which allows them to hunt for insects in the dark of night?



A smoke detector, just like the ones used in people's homes! It is very important for detecting fires.



This thermometer indicates 20°C. It is a device used to measure temperature. This sensor uses a liquid that rises or falls according to the temperature of the room.



This microphone records sound peaks of 22 decibels. They are as regular as the ticking of the clock behind it. The microphone picks up sound and converts it to an electrical signal. Sound is measured on a scale of approximately 0 to 130 decibels.



This distance sensor indicates 50 centimetres. That is probably how far it is from the shelf in front of it. Distance sensors often work using ultrasound or infrared light, which is invisible to the naked eye – like the TV remote control.



This prism breaks down white light into several colours, like a rainbow! By using several sensors, each sensitive to a different colour (e.g. red, green and blue), the robot can detect the colour of an object.



This is an accelerometer! Accelerometers detect tilt, acceleration and rotation. They are the components that ensure the orientation of your smartphone screen adjusts automatically when you turn it.



Is measuring time useful? Of course! That is what stopwatches are for. These sensors are much more accurate than an hourglass, and thankfully so!

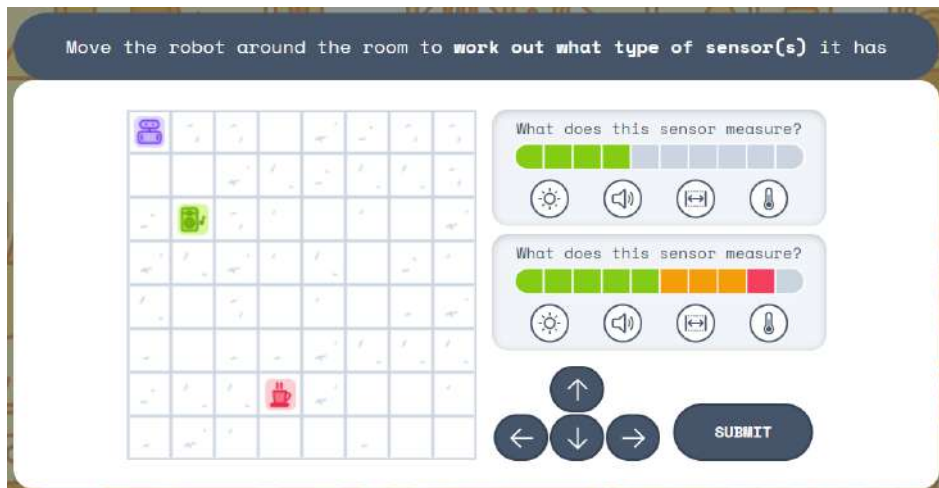


A camera can capture and record video. Useful? Yes! But you need very advanced programming to analyse the resulting images automatically.

Click on the screen displaying a graph and the room symbol and the main puzzle starts!



In this puzzle, you will move a robot on a grid and bring it close to different elements (light bulb, speaker, hot coffee, recharging base). Then observe how its sensors react. For each of the three levels deduce what each sensor displayed measures (sound, temperature, distance or brightness). The code to find is 3241.



## 2. Additional puzzles on paper

### Activity 1: Sensor crossword

Difficulty: ★★☆☆

Crossword with the names of different sensors encountered in the game and the units of measurement of some of them.

*Objectives:* Identify the roles of the different types of sensors  
Recognise the units of measurement of some sensors  
Summarise the information from the game

### Activity 2: Which sensor for which robot?

Difficulty: ★☆☆☆

To build a robot you need to choose the right sensors according to what it should be able to detect its environment. Here, we want to build three robots, and we have nine sensors available. Start by cutting out the sensor cards. Your task is then to find the correct three sensors needed for each robot according to its description. Then for each robot put the three cards together to get a number from the secret code.

*Objectives:* Recognise the function of a robot and then the sensors it needs  
Recall the role of the different types of sensors

### Activity 3: Sensors and the five senses

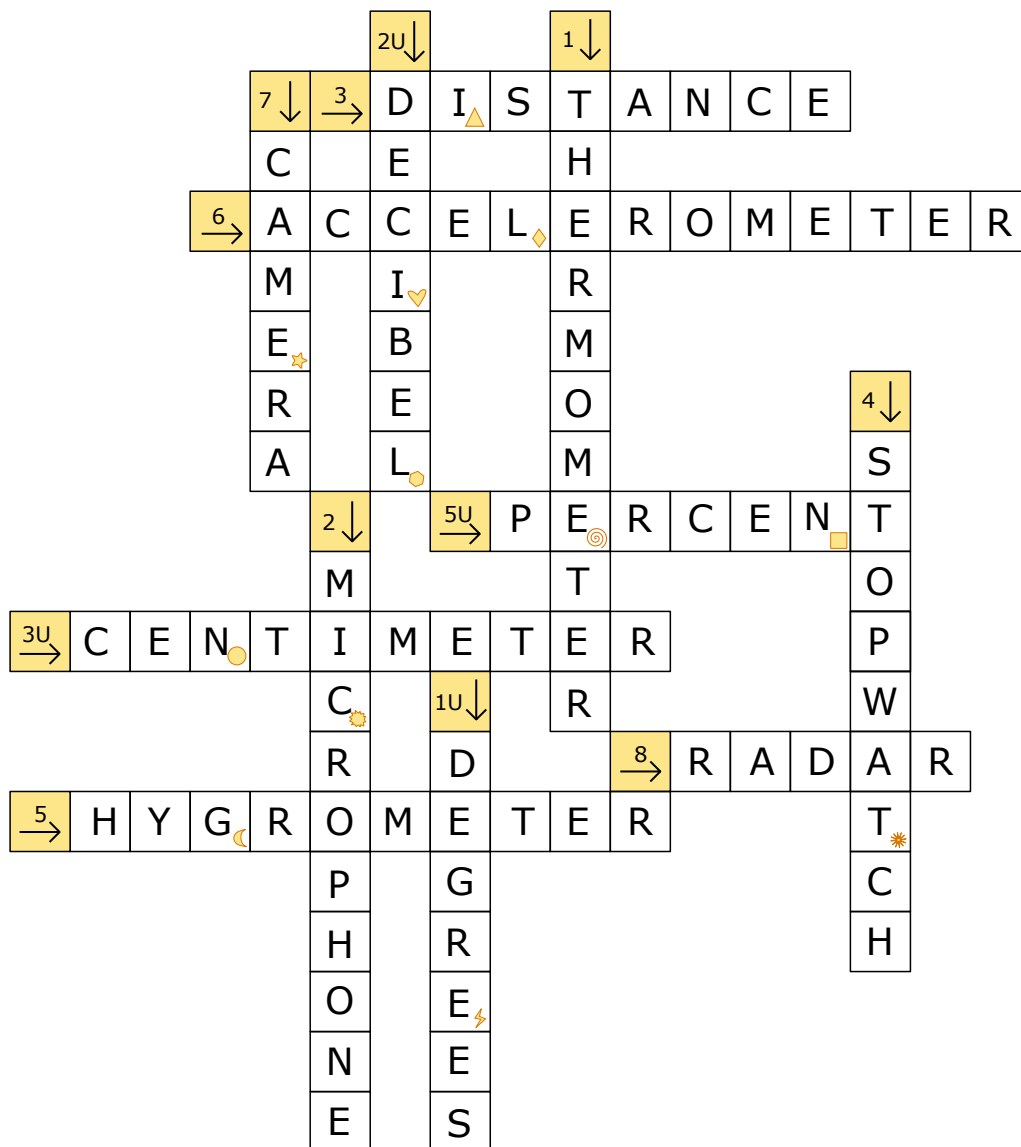
Difficulty: ★★☆☆

Link each of the 5 human senses to the corresponding robot's sensor or measurement that best matches it. The secret code will appear in the coloured areas. Be careful to connect the dots precisely and with a ruler.

*Objectives:* Compare the sensors of a robot to the 5 human senses  
Recognise the role of sensors in the functioning of a robot

## 3. Answer to the additional puzzles

### Sensor crossword



- 1 - Measuring, by means of a liquid that rises or falls, different values in summer and winter.
- 1U - In what unit is the temperature measured?
- 2 - Singers use this sensor for a recording or a concert.
- 2U - Unité du capteur de son.
- 3 - "Attention, obstacle" - "The way is clear" - this \_\_\_\_\_ sensor can detect obstacles.
- 3U - Unit of sound sensor.
- 4 - This sensor is more accurate than an hourglass and is used in races.
- 5 - Is the air dry or humid? To find out, use this sensor.
- 5U - Unit of measurement for air humidity.
- 6 - In your phones, this sensor always knows which way to turn the picture.
- 7 - Film, selfie or frame by frame, it records everything!
- 8 - Watch your speed, this sensor can detect if you are exceeding the speed limit!

**Code secret:**



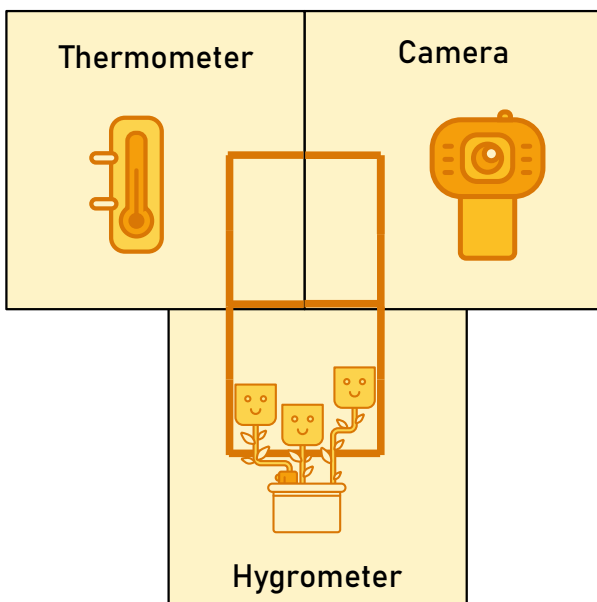
## Which sensors for which robot ?

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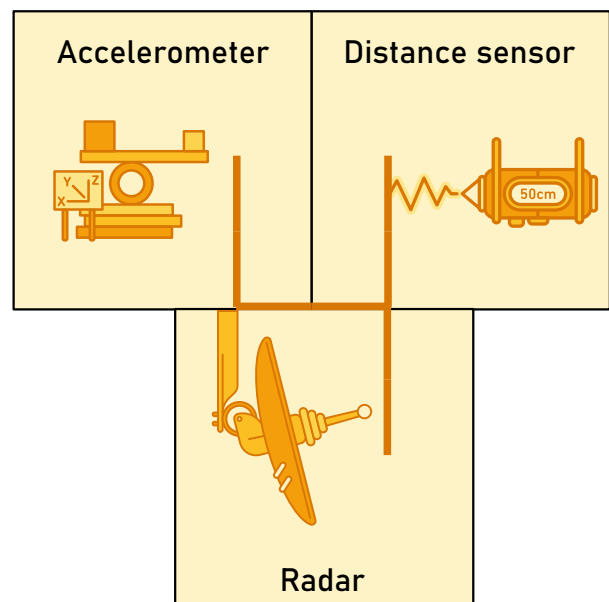
**A**

I am an explorer robot, all-terrain, I analyse the weather (temperature and humidity) and take pictures of remote areas.



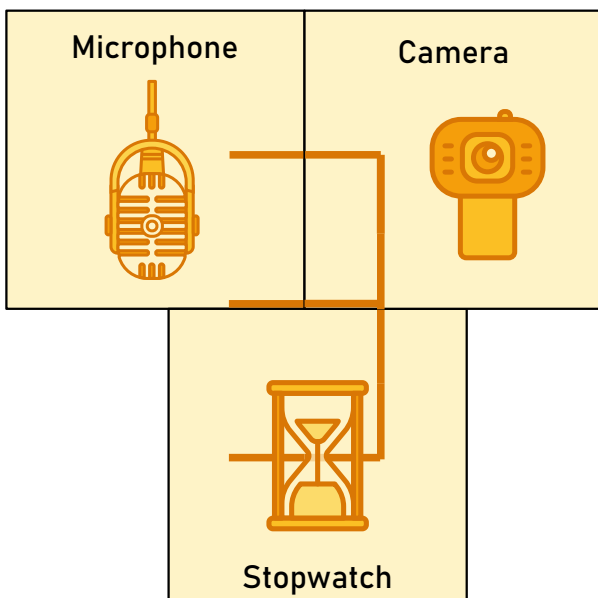
**B**

I am an autonomous car : I control my acceleration according to speed and distance from other cars.



**C**

I am a humanoid robot at a hotel reception. I film faces, record voices, and measure the time spent with each person.



**Secret code:**

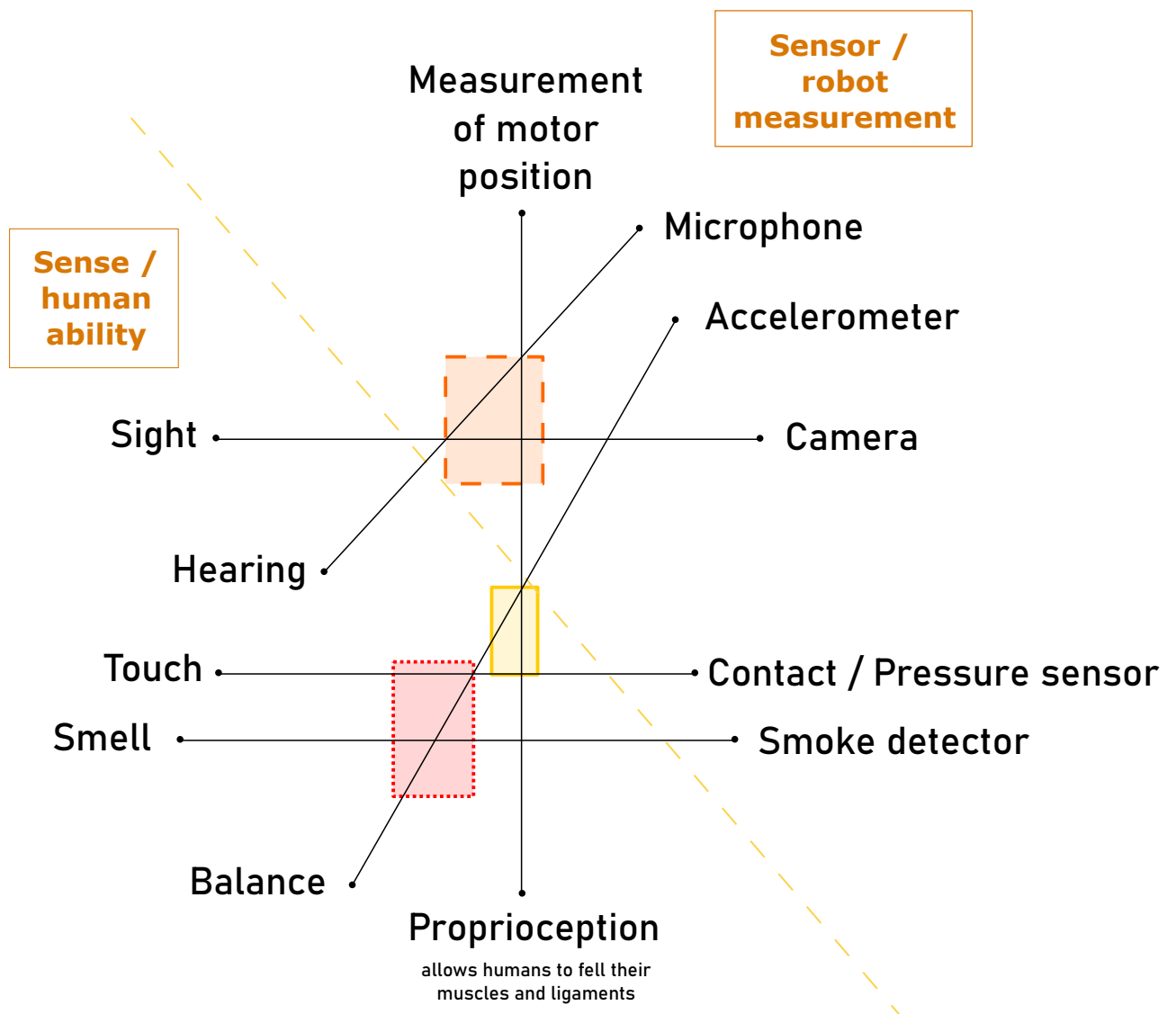
8	4	3
<u>    </u>	<u>    </u>	<u>    </u>
A	B	C

## Sensors and the five senses

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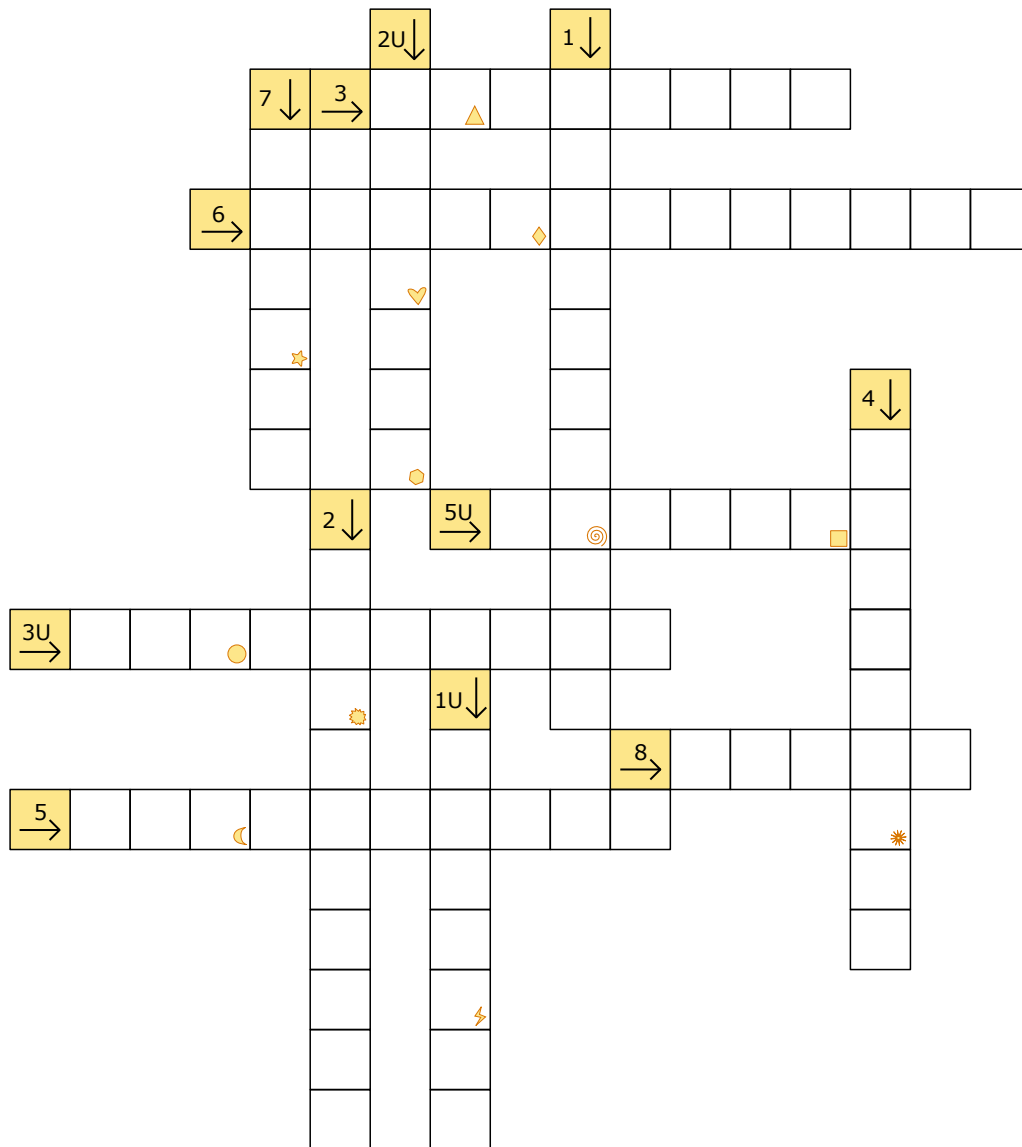
Be careful to connect the dots precisely and with a ruler.



**Secret code:**

4 7 1

## Sensor crossword



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### Code secret:



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**C**

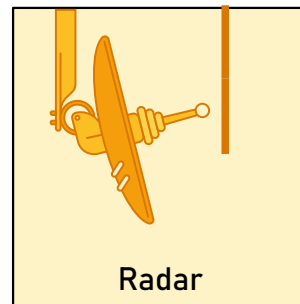
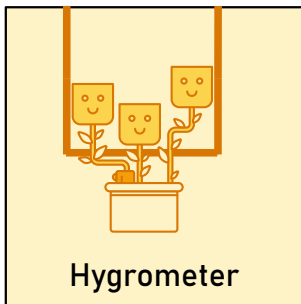
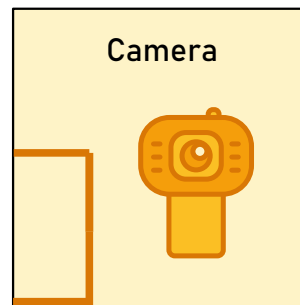
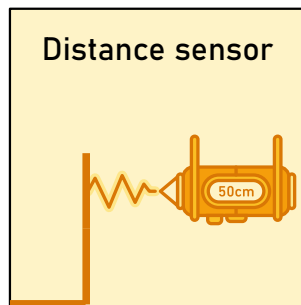
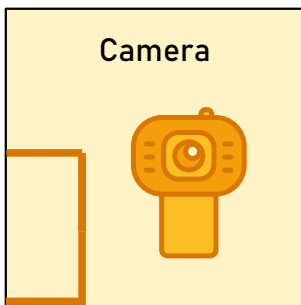
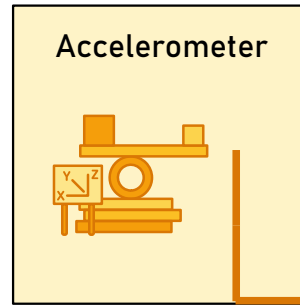
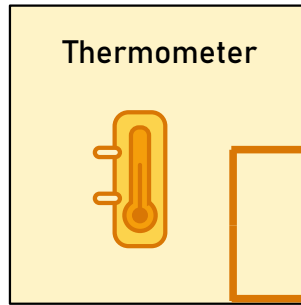
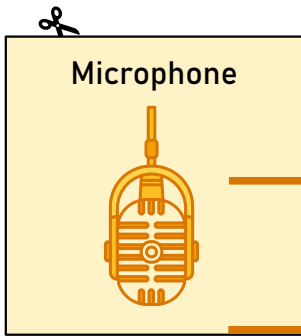
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**Secret code:**

                
**A**    **B**    **C**



Which sensors for which robot ?

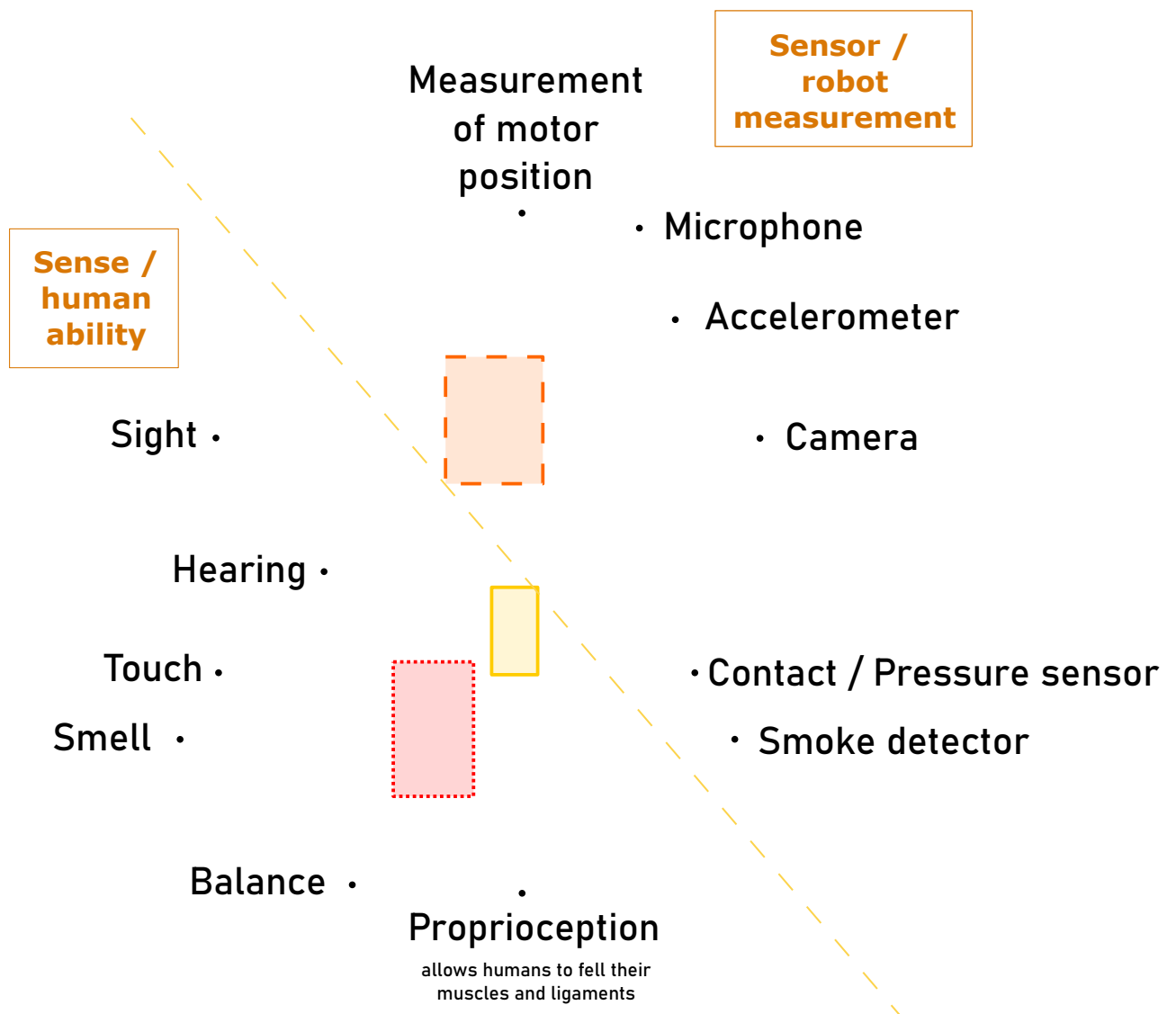


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**Secret code:** [red dashed box] [pink dotted box] [yellow solid box]