

EXAMPLE OF ROBOT DESIGN -

EXPLANATION

Motor B controls the arm and hand (claw) when the arm is raised the claw opens, when the arm lowers the claw closes.

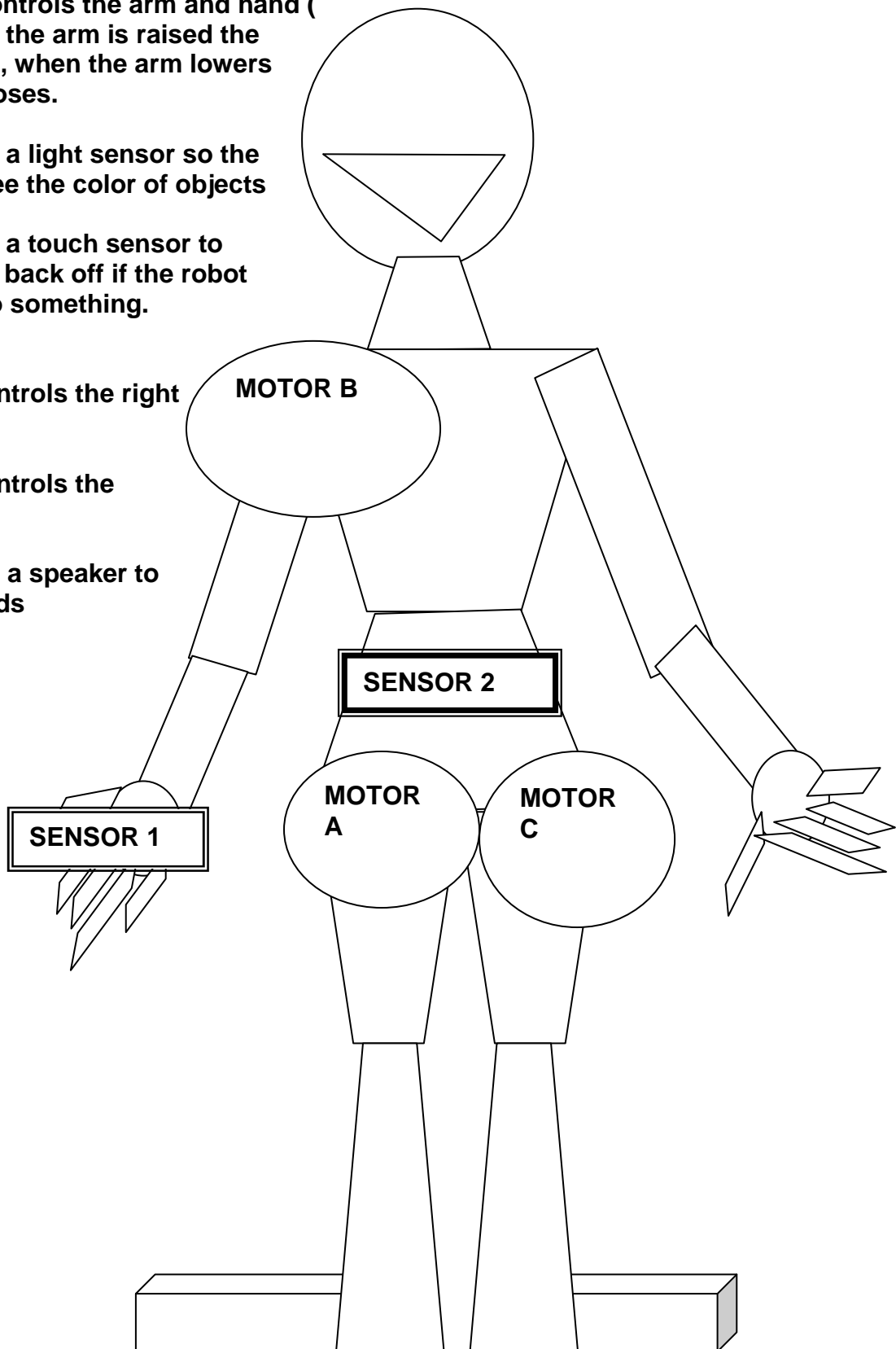
Sensor 1 is a light sensor so the claw can see the color of objects

Sensor 2 is a touch sensor to program to back off if the robot Bumps into something.

Motor A controls the right leg

Motor C controls the Left leg

Output B is a speaker to Make sounds

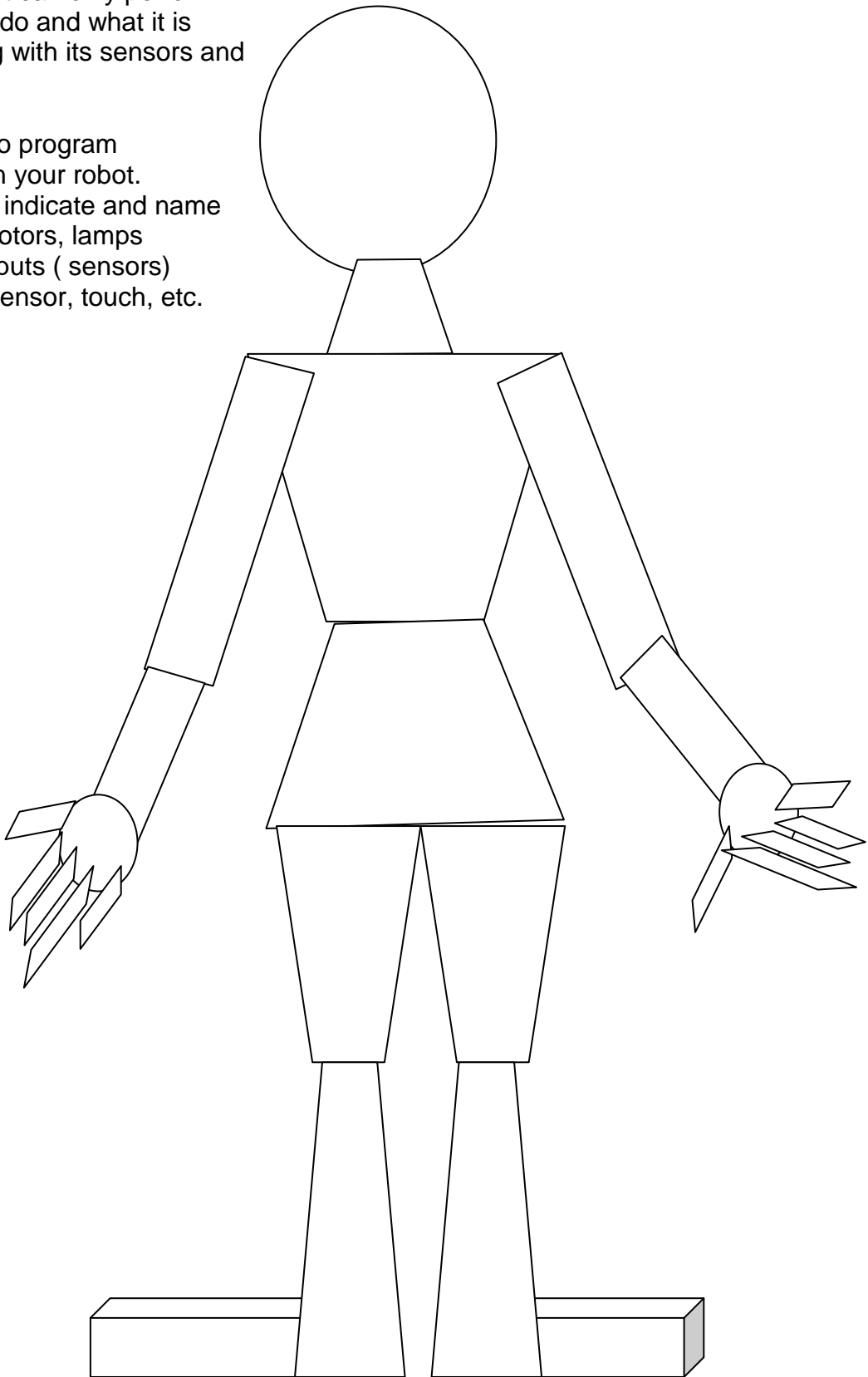


ROBOT DESIGN

PRINT 1 PER GROUP

Rules: The robot can only perform what it is told to do and what it is capable of doing with its sensors and outputs.

Before starting to program
You must design your robot.
On this diagram indicate and name
Your outputs- motors, lamps
Sound, and inputs (sensors)
Light sensor, touch, etc.



You may use your human “robot” to measure number of steps, etc to help you write the commands.

Note- your “robot has several “outputs”, outputs DO something and you must give clear instructions to each output

Examples of outputs are:

Left leg, Right Leg, Left arm, hand, fingers, right arm, hand, fingers, head.

Can you think of any more?

Your robot has several “inputs”, these tell us something about the environment, think of them as sensors/senses.

Examples of inputs could be :

Eyes- colour recognition, size recognition, shape,

Touch- texture recognition

Can you add any more?

GROUP COMMANDS

You are only allowed to use group commands if you have specified what they are .

A group command is a command that requires several outputs or inputs to do something at once, or sequentially repeating. In robotics this would be called a sub routine

An example of a group command would be “Walk forward”.

To “walk forward” the robot must – move its left leg forward one pace, then stop the left leg, then move the right leg forward one pace, then stop the left leg, repeat

You must write every single instruction that is needed. If you use a group command you must give it a number.

You may use a group command more than once in your instructions so they are helpful in making your instructions shorter.

OTHER USEFUL WORDS

Repeat five times

Wait until.....

If

Now – use the programming sheet to write down every instruction to your robot.

Make sure you number every command.

The “robot”

The robot must only do what it is commanded to do, it cannot think for itself, it can malfunction

Design the Robot first

The robot can only perform actions and sense it’s environment if it actually has these inputs and outputs to enable it to “sense and do”. Print out the robot design sheet , 1 per group, the group must show, name and label all the outputs (an output DOES something eg: motors, lights, sounds) and Inputs (sometimes called sensors eg- light sensor, touch sensor etc)

ACTIVITY- Programming – giving clear instructions

Robots are given precise instructions by programmers, this game will show you just how exact these instructions must be..

In this activity, one person (student/teacher) will be the robot, the other's in the group are it's programmers.

The "robot" must not hear any of the programmers planning instructions or see the selected items.

SET-UP

Arrange 3 different coloured items on a table, an apple, orange and a banana would do as the students will probably use colour (light) to differentiate the items. They should be on a white sheet of paper.

THE AIM

The programmers aim is to navigate the robot from one side of the room, avoiding furniture etc. to the items and then pick up the one nominated item from the group

THE RULES

The programmers must design their robot first by nominating the inputs (sensors for feedback) and outputs eg- motors, lights and showing where they are located on the robot. Use the ["Robot Design"](#) sheet to do this. Robots can only react / move if they have the appropriate sensors /motors to do so. (see end of this document)

Teaching idea – Consider the senses that humans have. Which of these senses can be replicated by a robots sensors?

The programmers must write down all their instructions before the robot starts.

Only the written instructions are read out to the robot, they are read in order, nothing may be added or subtracted.

The "robot" is only permitted to do exactly what it is instructed to do.

If the robot goes off course, you must start the game again from the beginning. Programmers may re write and add instructions at this point.

You will need about 20 items. Some must be the same or similar. You must have several of the same items. Place them all together in one place in the room.

Position your "robot" across the room and well away from the items.

Use sticky labels on the "robot" to indicate inputs and outputs and their names.

PROGRAMMERS

The programmers task is to write down **every single instruction** needed to get their robot from it's position in the room, to the items and then to select 1 specific item from the group of objects One person will read out the commands sequentially, to the robot, this includes any "group" commands.