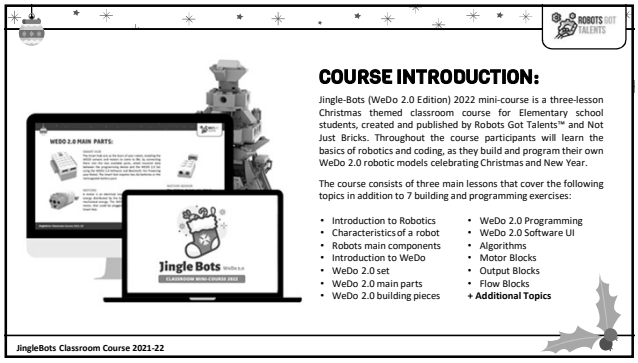


COURSE INTRODUCTION:

Jingle-Bots (WeDo 2.0 Edition) 2022 mini-course is a three-lesson Christmas themed classroom course for Elementary school students, created and published by Robots Got Talents™ and Not Just Bricks. Throughout the course participants will learn the basics of robotics and coding, as they build and program their own WeDo 2.0 robotic models celebrating Christmas and New Year.

The course consists of three main lessons that cover the following topics in addition to 7 building and programming exercises:

- Introduction to Robotics
- Characteristics of a robot
- Robots main components
- Introduction to WeDo
- WeDo 2.0 set
- WeDo 2.0 main parts
- WeDo 2.0 building pieces
- WeDo 2.0 Programming
- WeDo 2.0 Software UI
- Algorithms
- Motor Blocks
- Output Blocks
- Flow Blocks

+ Additional Topics

TOPICS COVERED:

- Introduction to robotics
  Book page/s: 3-4
- Introduction to WeDo 2.0
  Book page/s: 9-10
- WeDo 2.0 Main Parts
  Book page/s: 11
- Building Exercise 1 – Explore the WeDo 2.0 set
- Programming Exercise 1 – Explore the WeDo 2.0 app

WHAT IS THE FIRST THING THAT COMES TO YOUR MIND WHEN YOU THINK OF A ROBOT ?

For many people, it is a machine that imitates human begins or has superpowers like the androids in Star Wars or the Terminator. However most of these robots which capture our imagination, only inhabit Science Fiction Movies, and it is impossible to find them wandering in the streets anytime soon, although many organizations from all over the world are working on creating similar humanoid robots like Honda's Asimo, Pepper by Softbank, and Atlas by Boston Dynamics, but, of course, no one has reached the level of Awesomeness we see in SCI-FI Movies or read about in novels, yet. The types of robots that you will encounter most frequently are robots that are developed for doing tasks that are too dangerous, boring, onerous, or repetitive. Let's take for example the robots that work in factories (Industrial Robots), some of these robots were designed for lifting heavy objects, while others were developed for doing operations that need a very high accuracy level, in that case, although these two robots work in the same application/use, each one comes up with a certain design, shape and size. It is very important to understand that robots have unlimited applications and uses, from Space Exploration to Entertainment.

A ROBOT HAS THESE ESSENTIAL CHARACTERISTICS:

You might now be asking what is the standard definition for a robot? or how could I define the word robot? Although we have been dealing with robots for decades, there is no standard definition for the word robot. However, there are some essential characteristics that a robot must-have, which would help you decide whether a certain machine is a robot or not and It will also help you decide what features or parts does a machine needs to be counted as a robot.

Sensing: A robot must be able to sense its surroundings using one or many methods, this is done using electronic devices names sensors

Movement: A robot must be able to move in its environment, either moving all its parts or moving any of them, of course mechanical movements could be done using different types of motors.

Power/ Energy: A robot must also be able to power itself, which could be done using a new power source, wired or wireless power source

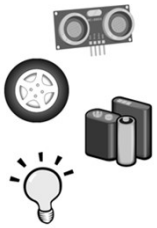
Intelligence: A robot must be able to take decisions and do tasks correctly according to its code/program, this is done using the Microcontroller, which is considered the brain of the robot.

SENSING: First of all a robot should be able to sense its surroundings It would do this in ways that are not similar to the way that we sense our surroundings, but robots need sensors to do that. Giving your robot sensors as light sensors (eyes), touch and pressure sensors (hands), chemical sensors (nose), hearing and sonar sensors (ears), and taste sensors (tongue) will give your robot awareness of its environment.

MOVEMENT: Moreover a robot needs to be able to move around its environment. Whether rolling on wheels, walking on legs or propelling by thrusters or even moving a claw. To count a machine as a robot either the whole robot moves or just parts of the robot moves.

POWER: Also a robot needs to be able to power itself. It might be solar-powered, electrically-powered, or even battery-powered. The way your robot gets its energy will depend on what your robot needs to do.

INTELLIGENCE: Finally A robot needs some kind of Intelligence this is where programming enters the picture, a programmer is a person who gives the robot its 'intelligence' The robot will have to have some way to receive the program so that it understands what it is developed to do.



MAIN COMPONENTS OF A ROBOT

6V Rechargeable Battery

Power source: In order to function a robot must have power. For example human beings get their energy from food, the food is broken down and converted into energy by our cells. Most robots get their energy from electricity. Stationary robotic arms like the ones that work in car factories can be plugged in like any other appliance. Robots that move around are usually powered by batteries. Our robotic space probes and satellites are often designed to collect solar power.

Microcontroller: The Microcontroller is the main part of the robot which coordinates all motion of the mechanical system by delivering power from the power source to the motors according to the program/code, The Microcontroller also receives and uses inputs from the environment through the sensors.

ATMEGA328 Microcontroller

MAIN COMPONENTS OF A ROBOT

Ultrasonic Sensor

Sensors: A sensor is a device, module, machine, or subsystem whose purpose is to detect events or changes in its environment and send the information to the Microcontroller, giving your robot sensors as light sensors (eyes), touch, pressure and force sensors (hands), chemical sensors (nose), hearing and sonar sensors (ears), and taste sensors (tongue) will give the robot awareness of its environment.

Motors: Robot bodies consist of metal, plastic and similar materials. Inside these bodies are small motors, which mimic the action of human muscle to move parts of the robot's body. The simplest robots consist of an arm with a tool attached for a particular task. Robot vehicles need to move around on wheels or treads. Humanoid robots have arms and legs that mimic human movement. There are many types of motor each has its own use.

12V DC Motor

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Ultrasonic Sensor

SENSING

ATMEGA328 Microcontroller

INTELLIGENCE

12V DC Motor

MOVEMENT

6V Rechargeable Battery

POWER

WeDo INTRODUCTION:

The LEGO® EDUCATION WEDO robots may not be a type of robots that will go buy the breakfast every day or take care of your grandfather, but it could teach many things that will help you in your life from computational thinking to building LEGO® models. Since the creation of the MINDSTORMS Platform in 1998, LEGO Have tried to create an Educational Platform for Elementary School Students that would help them learn STEM in easy and fun ways.

The first Version of WEDO (9580) was released on 2009, it included two sensors, one motor and a USB Smart Hub. In 2016 WEDO 2.0 (45300) was released, with upgraded sensors, motors and Smart Hub.

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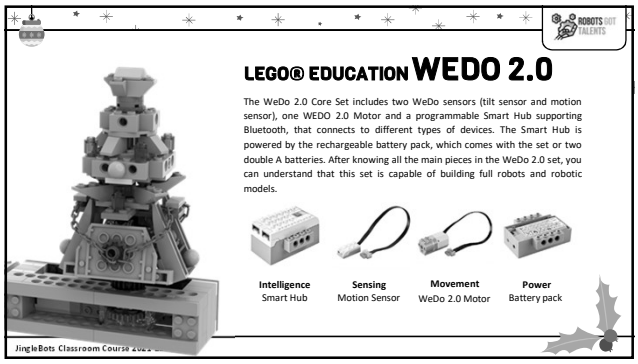
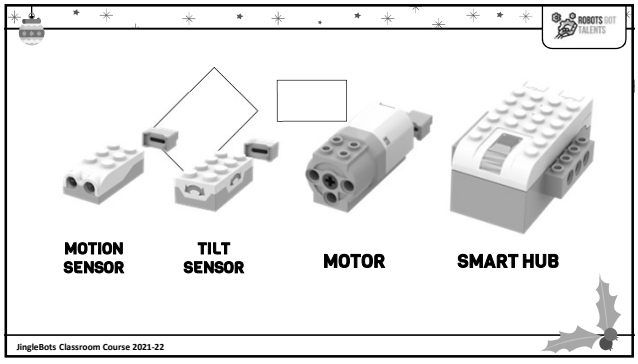

LEGO® EDUCATION WEDO 2.0
The WeDo 2.0 Core Set includes two WeDo sensors (tilt sensor and motion sensor), one WEDO 2.0 Motor and a programmable Smart Hub supporting Bluetooth, that connects to different types of devices. The Smart Hub is powered by the rechargeable battery pack, which comes with the set or two double A batteries. After knowing all the main pieces in the WeDo 2.0 set, you can understand that this set is capable of building full robots and robotic models.
Intelligence
Smart Hub
Sensing
Motion Sensor
Movement
WeDo 2.0 Motor
Power
Battery pack
JingleBots Classroom Course


MOTION SENSOR
TILT SENSOR
MOTOR
SMART HUB
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WEDO 2.0 MAIN PARTS:

SMART HUB

TheSmart Hub acts as the brain of your robots, enabling the WEDO sensors and motors to come to life, by connecting them into the two available ports, which transmit data between the programming device and the WEDO 2.0 Set using the WEDO 2.0 Software and Bluetooth, For Powering your Robot, The Smart Hub requires two AA batteries or the rechargeable battery pack.

MOTORS

A motor is an electrical machine that converts electrical energy distributed by the battery in the Smart Hub into mechanical energy. The WEDO 2.0 Core Set includes one motor, that could be plugged into any of the ports in the Smart Hub.

MOTION SENSOR

The Motion Sensor can detect objects up to about 15 cm away. The motion sensor emits Infrared rays then measures distance by calculating the time it takes for an IR ray to hit an object and return.

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WEDO 2.0 MAIN PARTS:

SMART HUB

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MOTORS

A motor is an electrical machine that converts electrical energy distributed by the battery in the Smart Hub into mechanical energy. The WEDO 2.0 Core Set includes one motor, that could be plugged into any of the ports in the Smart Hub.

TILT SENSOR

The WEDO 2.0 tilt sensor detects the movement of your robot, its rotation and vibration, it could detect changes within six different positions: Tilt Right, Tilt Left, Tilt Up, Tilt Down, No Tilt and Shake.

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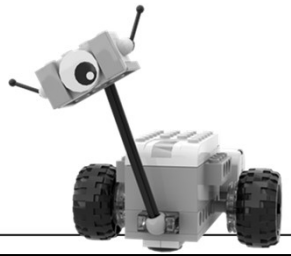
EXPLORING WeDo 2.0 SET:

"Knowledge is of no value unless you put it into practice". – Anton Chekhov. The best way to understand everything about the set is to start building WeDo 2.0 robots yourself. In this exercise you will follow the building instructions provided by LEGO Education to build a simple WeDo 2.0 robot named MILO:

Download Instructions

View Instructions online



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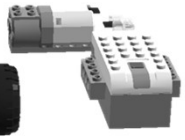
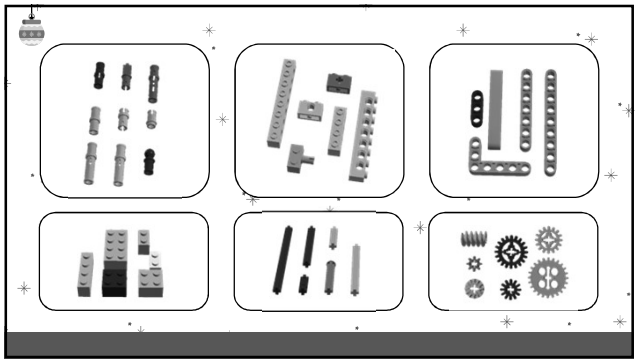
WeDo 2.0 BUILDING PIECES:

Head

Base

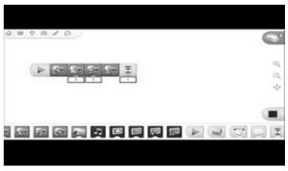
WeDo Motor & Hub

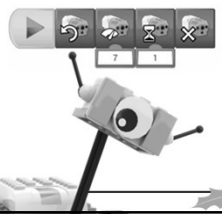




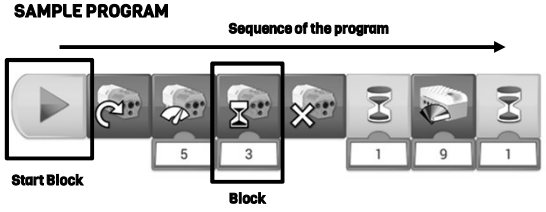
EXPLORING THE SOFTWARE:

The WeDo 2.0 Software has an intuitive, graphics-based format that is available for different types of devices. Please follow the tutorial below to create your first WeDo 2.0 program. After finishing this exercise, download the program to your robot and try guessing which command is responsible for every move.





SAMPLE PROGRAM



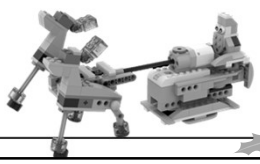
TOPICS COVERED:

- Introduction to WeDo programming
  Book page/s: 21
- WeDo 2.0 software basics
  Book page/s: 21-24
- WeDo 2.0 building pieces
  Book page/s: 12-13
- Building Exercise 2 – Christmas Tree
- Algorithms
  Book page/s: 14
- WeDo 2.0 Motor Blocks
  Book page/s: 25
- Programming Exercise 2

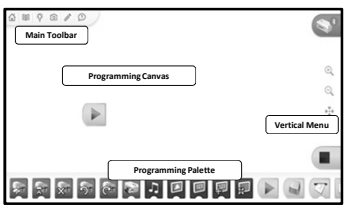
WeDo 2.0 PROGRAMMING:

The WeDo 2.0 Software has an intuitive, graphics-based format that is available for different types of devices. Although WeDo 2.0 robots could now be programmed using Scratch 3.0, Tickle, Tynker, and Open Roberta Lab the Drag and Drop Original WeDo 2.0 Software, is still the most common method of programming the WeDo Robots.

The Language used to program WeDo bots is based on graphical commands or in other words "Blocks", each Block does a particular command and includes many variables that you could adjust. The sequence of the program runs from left to right, starting from the yellow labelled block "Start Block", and when each block is completed, the next one is started. Before learning the Blocks available to program a robot, you should first learn the User Interface of the WeDo Software.



SOFTWARE USER INTERFACE:



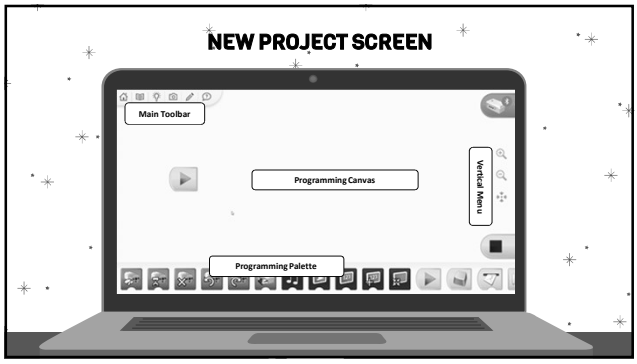
Main Toolbar: This menu includes the following buttons, from left to right (Home Button, Project Library, Design Library, Capture Tools, Documentation Tools, and Help)

Programming Canvas: The Area where you add the Blocks together to create the program.

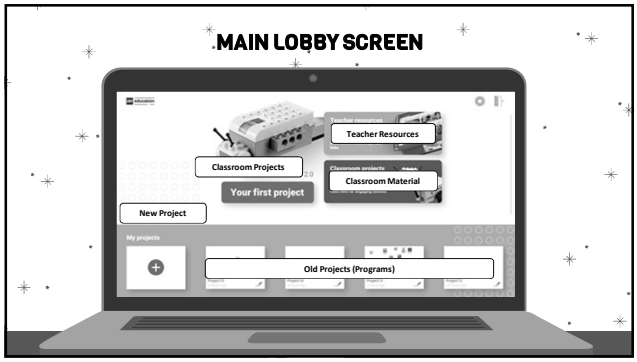
Vertical Menu: This area includes the following buttons, (download to the SmartHub, Zoom in, Zoom out, Adjust and the Stop Button).

Programming Palette: The Area where all the WeDo 2.0 Blocks are available, to add a block to your program

NEW PROJECT SCREEN



MAIN LOBBY SCREEN



MOTOR BLOCKS

- Motor Power Block
- Motor On For Block
- Motor Off Block
- Motor to Left
- Motor to Right

OUTPUT BLOCKS

- Light Block
- Play Sound
- Display Background
- Display Block
- Display Calculations
- Display Size

FLOW BLOCKS

- Start Block
- Start On Key Press Block
- Start On Message Block
- Send Message Block
- Wait For
- Repeat Block

INPUT BLOCKS

- Sound Sensor Change
- Number Input
- Text Input
- Display Input
- Random Input

BRICKS

Bricks (System bricks) are basic Building pieces of all LEGO Models. LEGO bricks are measured and identified by the number of the studs they have on top. The smaller number always comes first, so you say "a 2-by-4 brick", not "a 4-by-2 brick." The width of a 1x1 LEGO brick is the Fundamental LEGO Unit, or module (1 module or 1M is about 8 mm).

TECHNIC BRICKS

Technic bricks are normal Lego Bricks with holes passing through them, in this holes you can insert pegs, cross axles to connect it with other Beams, Technic Bricks or other Building Pieces. Technic bricks are measured by the number of their studs. Except for the 1x1 Technic brick (A), there are no Technic bricks with an odd number of studs.

BEAMS

Beams are basically used to hold cross-axles and other LEGO® components together, so they are the framework of most TECHNIC and MINDSTORMS® models. There are 2 main types of beam: Straight and Angular. Straight beams are usually found only with circular holes in them while angular beams have a mixture of circular and cross-shaped holes, normally with the cross-shaped ones at either end. The straight beams come in sizes from 2 to 15M. These two groups can then be condensed down again into half-beams, beams and bricks.

CONNECTOR PEGS

There are 3 types of connector pegs:

Round Pegs, Cross-shaped Pegs, Half-half Pegs

The round pegs can be used to connect beams together so that they can both swing freely. The second cross-shaped peg can be used to hold two beams together so that they cannot move, and the last peg can be used to connect a free-spinning beam to a fixed beam. There are also longer versions of the round pegs that can be used to connect multiple beams together. A longer version of the cross-shaped peg is an axle. Some pegs might also be different colours. The black and blue connectors are friction connector pegs, while the other pegs are smooth.

CROSS AXLES

Cross-Axles are cross-shaped rods that can be used to hold wheels, gears, beams etc. They are colour coded by their length or you can measure it using a counting the holes of a beam the same size, even-numbered lengths (2M,4M,6M etc) are black while odd-numbered lengths (3M,5M,7M etc) are grey. You can place a cross-axle through a circular hole so it can spin freely. This is a handy connection for building with gears and wheels.

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GEARS

A gear is a piece that conveys rotational force to another gear or appliance. There are many types of gears that are currently used in LEGO® constructions. The common ones are listed in the following page:

- Spur Gear: A gear that has radial teeth (teeth that spread from the center outwards) parallel to the axis **[1.2]**
- Bevel Gear: A gear that can engage another Bevel gear on a different angle (usually 90 degrees) **[1.3]**
- Crown Gear: A gear wheel with teeth positioned at a 90 degree angle to its plane. **[1.5]**
- Worm Gear: A short rotating screw that meshes with the teeth of another gear. **[1.4]**
- Rack Gear: A toothed block that another gear can mesh (interlock) **[1.1]**

1.1 1.2 1.3 1.4 1.5

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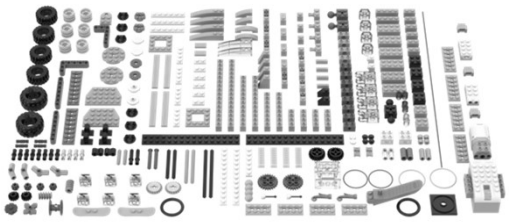
WeDo 2.0 CORE SET PIECES



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BUILDING EXERCISE 1 Christmas tree

After knowing all the pieces in the WeDo 2.0 set, you are now ready to build your first model in JingleBots Classroom course; WeDo 2.0 Christmas tree by Not Just Bricks (Diego Galvez) . Press the button below to view the building Instructions.

View Instructions

Model Image

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ALGORITHMS:

Of course, a robot won't be a robot without a program or in other words code and that's what would give your robot the forth robotic characteristic Intelligence, and that is what will be discussed now but we should know what is meant by an Algorithm. The word "algorithm" may not seem relevant to you, but the truth is that algorithms are all around us, governing everything from the technology they use to the worldly decisions they make every day. Algorithms are fascinating and, although some are quite complex, the concept itself is actually quite simple. An algorithm is a detailed step-by-step instruction set or formula for solving a problem or completing a task. Algorithms are not just related to Programming or Computer Science they are everywhere. A recipe for making food is an algorithm, the method you use to solve addition or long division problems is an algorithm, the process of folding a shirt. Even your morning routine could be considered an algorithm.

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WeDo Motor Blocks:

The Motor Blocks are the commands responsible for controlling the WeDo 2.0 Motor/s, to move a robot, 3-4 blocks are used The Motor Power Block to set the Power of the Motor, The Motor On For Block to set the time the motor would work in seconds, The Motor Direction Block, which choose the direction or rotation, either right or left and finally the Motor Off Block to stop the Motor.

Blocks

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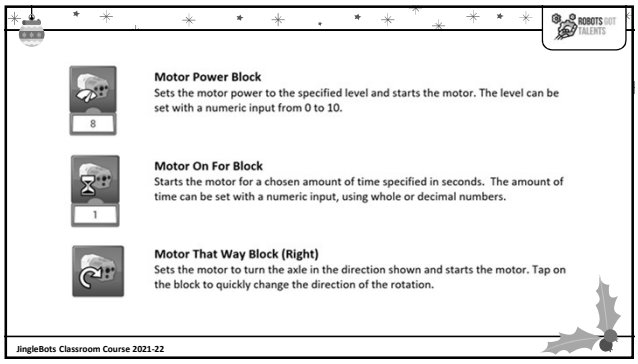
Motor Power Block
Sets the motor power to the specified level and starts the motor. The level can be set with a numeric input from 0 to 10.
8
Motor On For Block
Starts the motor for a chosen amount of time specified in seconds. The amount of time can be set with a numeric input, using whole or decimal numbers.
1
Motor That Way Block (Right)
Sets the motor to turn the axle in the direction shown and starts the motor. Tap on the block to quickly change the direction of the rotation.
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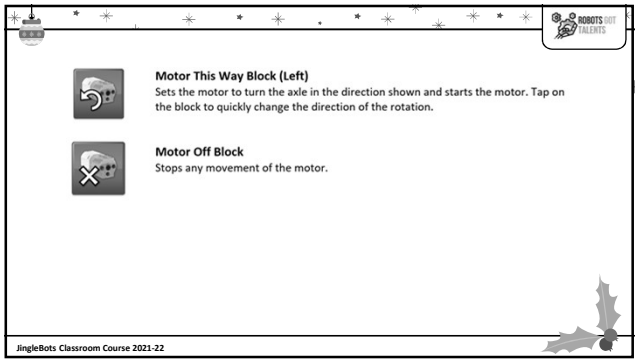
Motor This Way Block (Left)
Sets the motor to turn the axle in the direction shown and starts the motor. Tap on the block to quickly change the direction of the rotation.
Motor Off Block
Stops any movement of the motor.
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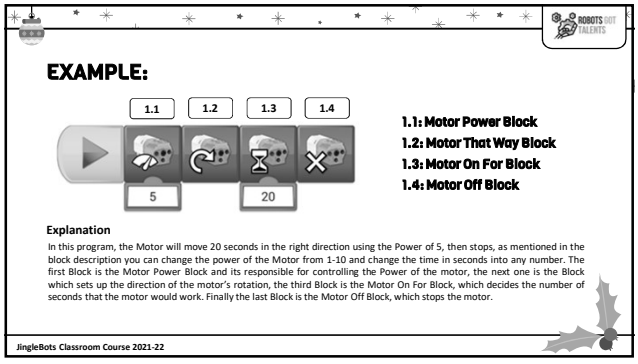
EXAMPLE:
1.1
1.2
1.3
1.4
5
20
1.1: Motor Power Block
1.2: Motor That Way Block
1.3: Motor On For Block
1.4: Motor Off Block
Explanation
In this program, the Motor will move 20 seconds in the right direction using the Power of 5, then stops, as mentioned in the block description you can change the power of the Motor from 1-10 and change the time in seconds into any number. The first Block is the Motor Power Block and its responsible for controlling the Power of the motor, the next one is the Block which sets up the direction of the motor's rotation, the third Block is the Motor On For Block, which decides the number of seconds that the motor would work. Finally the last Block is the Motor Off Block, which stops the motor.
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PROGRAMMING EXERCISE 1

Program your WeDo 2.0 Christmas tree to rotate (to the right) with a speed of 3 for 5 seconds then move in the opposite direction for another 5 seconds. Before creating the program in the WeDo 2.0 software try dividing this task into simple steps then convert these steps to blocks in the WeDo 2.0 software. Move to the next page to view the exercise solution.

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Block 1						
Block 2						
Block 3						
Block 4						You may not use all fields.

	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Block 1						
Block 2						
Block 3						
Block 4						
Block 5						
Block 6						
Block 7						
Block 8						
Block 9						

PROGRAMMING EXERCISE 1 SOLUTION

	Step 1	Step 2	Step 3
	Move Right, Speed 3, Duration 5s	Move Left, Speed 3, Duration 5s	Stop Motor
Block 1	Motor power block [3]	Motor this way block	Motor Stop Block
Block 2	Motor that way block	Motor on for block [5]	
Block 3	Motor on for block [5]		

TOPICS COVERED:

- WeDo Output Blocks
  Book page/s: 26-27
- Programming Exercise 3
- WeDo Flow Blocks
  Book page/s: 28
- Building Exercise 3 – Santa's Sled
- Programming Exercise 4
- Programming Exercise 5

WeDo Output Blocks:

The Output Blocks are the commands responsible for controlling the WeDo 2.0 Smart Hub Lights, and outputs in the software. Including Light Block, Play Sound, Display Background Block, Display Block, Display Calculations Block and Display Size Block.

Blocks

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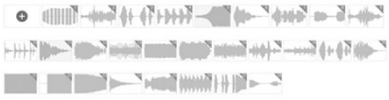
Light Block
Lights up the LED on the Smart Hub in a specific colour. The colour can be changed with a numeric input between 0 and 10.

Play Sound Block
This Block Plays a sound, The sound is chosen from a list available within the software. You can choose a sound using a numeric input from 0 to 28. Choose sound number 0 to record your own sound using the device's built-in mic



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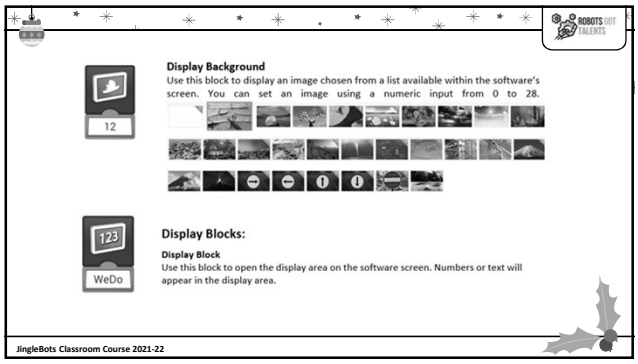
ROBOTS DOT TALENTS
12
Display Background
Use this block to display an image chosen from a list available within the software's screen. You can set an image using a numeric input from 0 to 28.
123
WeDo
Display Blocks:
Display Block
Use this block to open the display area on the software screen. Numbers or text will appear in the display area.
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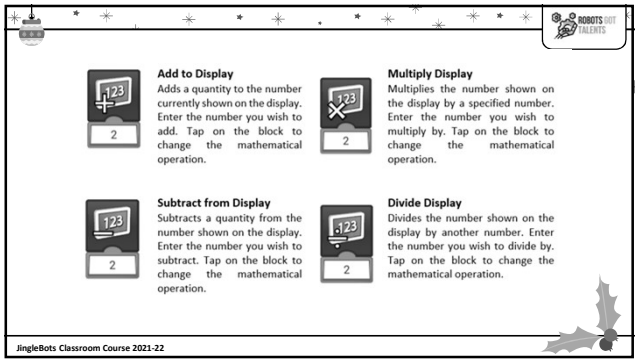
ROBOTS DOT TALENTS
Add to Display
Adds a quantity to the number currently shown on the display. Enter the number you wish to add. Tap on the block to change the mathematical operation.
Multiply Display
Multiplies the number shown on the display by a specified number. Enter the number you wish to multiply by. Tap on the block to change the mathematical operation.
Subtract from Display
Subtracts a quantity from the number shown on the display. Enter the number you wish to subtract. Tap on the block to change the mathematical operation.
Divide Display
Divides the number shown on the display by another number. Enter the number you wish to divide by. Tap on the block to change the mathematical operation.
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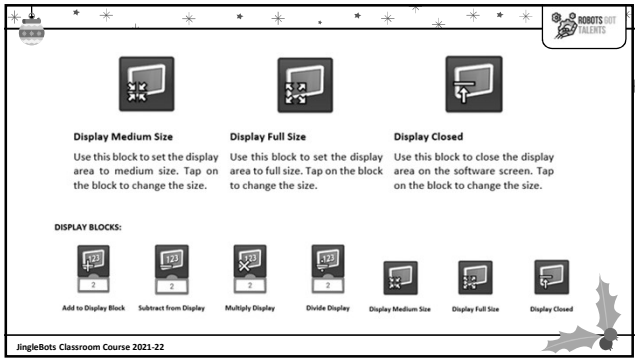
ROBOTS DOT TALENTS
Display Medium Size
Use this block to set the display area to medium size. Tap on the block to change the size.
Display Full Size
Use this block to set the display area to full size. Tap on the block to change the size.
Display Closed
Use this block to close the display area on the software screen. Tap on the block to change the size.
DISPLAY BLOCKS:
Add to Display Block
Subtract from Display
Multiply Display
Divide Display
Display Medium Size
Display Full Size
Display Closed
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EXAMPLE:

2.1: Light Block
2.2: Play Sound Block
2.3: Display Block

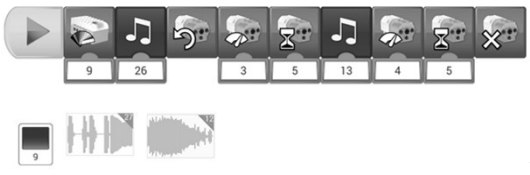
Explanation

In this program, The Smart Hub will light up Blue (Colour 3) after that the sound number 6 will work, then a text "WeDo 2.0" will be displayed in the Device's screen. The first Block is the Light Block, which lights up the Smart Hub built in LED, the second one is the Play Sound Block, which plays the sound on the Device, and finally the Third block is the Display Block that displays text on the program screen.

PROGRAMMING EXERCISE 2

In this exercise you should **turn on the Hub's LED to red**, **play sound effect (27)**, **rotate the tree to the right** with a **speed 3** for **5 seconds**, the next step is to **play sound effect (12)** then **move** in the **same direction** with a **speed of 4** for another **5 seconds**. You may use the table in the previous lesson to create your algorithm. For this exercise please use only motor and output blocks, and do not use more than 10 blocks.

PROGRAMMING EXERCISE 2 SOLUTION



WeDo Flow Blocks:

Flow Blocks are the Blocks responsible for giving your robot the sense of intelligence, by providing some types of logical expressions and Loop, they do increase the possibilities of creating more intelligent WeDo 2.0 creations and improve the programming experience. This group includes; Start, Start on key, send message, Start on message, Wait for, and Repeat blocks.

Blocks

Start Block

The Start Block is always placed at the beginning of the program, and When it is pressed the program starts.

Start On Key Press Block

The Start On Key Press Block should always be placed at the beginning of a program. Press it, or press the correct letter on the keyboard to start the program. All of the program with the same letter will start at the same time. To change the letter of activation, long press on the block to get access to the keyboard.

Send Message

Sends a message to the Programming Canvas. Every Start On Message Block with the same message will be activated. The message can include text and numbers.

Start On Message Block

Then Start On Message Block should always be placed at the beginning of a program. It will wait for the correct message and then starts the program or programs linked with the message.

Wait For

Use this block to tell the program to wait for something to happen. It can wait for a set amount of time or for input from a sensor, as will be covered in the Sensor Blocks Section. This block always requires input in order to work properly.

Repeat Block (Loop)

Use this block to repeat actions. Blocks placed inside the Repeat Block will be looped. The loop can be repeated forever, for a certain amount of time, or for an input to occur which can be a sensor input or a program input.

EXAMPLE:

Explanation

When Pressing the letter "r" the motor will move 5 seconds with the power of 10 to the right then the loop will work for 2 seconds, the loop includes the Sound Block with the sound "1" and the Display Background Block with the image "4" which both will be repeated for 2 seconds then the smart hub will light Blue colour "3".

BUILDING EXERCISE 2 - Santa's Sled

It is now time to build your second Christmas model in JingleBots Classroom course; WeDo 2.0 Santa's Sled by Not Just Bricks (Diego Galvez) . Press the button below to view the building Instructions.

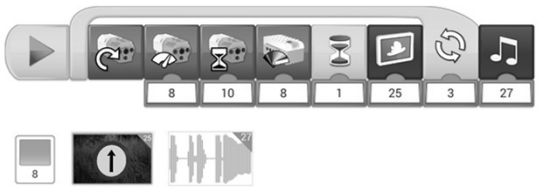
View Instructions

Model Image

PROGRAMMING EXERCISE 3

Program Santa's Sled to **repeat the following three times** [move **forward** with a **power** of **8** for **10 seconds** then turn on the **orange LED for 1 second** and **display image 25**] when that is done **play the sound effect 27**.

PROGRAMMING EXERCISE 3 SOLUTION

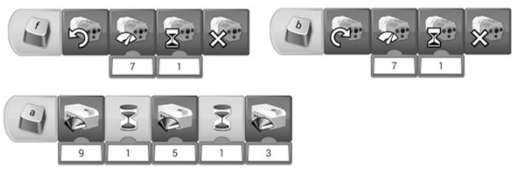


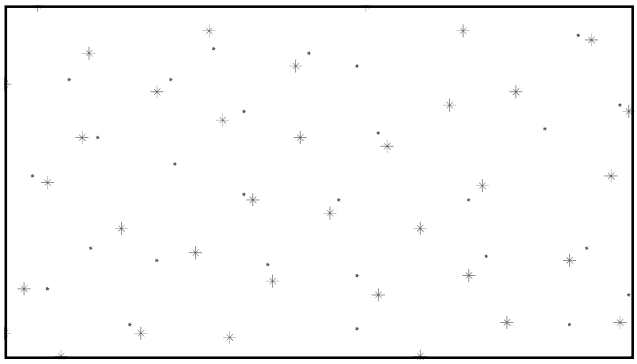
PROGRAMMING EXERCISE 4

In this exercise you need to create three main commands for Santa's Sled;

- When the letter a is pressed, turn on the red LED for 1 second, then change its color to light green for 1 second after that change it to blue for another 1 second.
- When the letter f is pressed move forward for 2 seconds with a power of 7
- When the letter b is pressed move backwards for 2 seconds with a power of 7

PROGRAMMING EXERCISE 4 SOLUTION





TYPES VS USES

Usually, people mix up between the uses and types of robots, although mostly the use of a robot is related to its type, for example, a pre-programmed robot could either be used in manufacturing as an industrial robot or do medical surgeries the space as a healthcare robot, so we cannot identify the use of the robot from it is type, but it is easy to guess the type of the robot from it is use to understand more here are the fields where robots are used the most:

ROBOTS USES

INDUSTRY:
Industrial robots are electronically controlled, both programmable and reprogrammable to carry out certain tasks with high precision and accuracy. Robots have been extensively used in highly advanced manufacturing facilities or high volume assembly lines for a long time. They are efficient and produce high yields or output.

AEROSPACE:
Aerospace robots or unmanned robotic spacecraft play a key role in outer space probe. Scientists can explore in outer space without putting themselves in great danger considering the risks involved if they go to outer space themselves.

HEALTHCARE:
A highly possible advancement in healthcare is using robots in robotic surgery. Due to technological advancement, this is possible even if the patient is located in remote areas. This possibility defies distance. With the proper tools and set-up in place, proper healthcare could be delivered to the patient even in remote areas without the corresponding risks involved.

MILITARY:
In the military and public safety sectors, robotic technology is being applied in many areas. These machines can be used for surveillance and support operations on the battlefield. Military drones flying over areas of war and conflict, in hostage situations, and for natural and manmade disasters are able to assess danger levels and provide soldiers and first responders with real-time information.

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TYPES OF ROBOTS

Human Controlled Robots
Human Controlled Robots are usually directly controlled by humans via a method of wired/wireless connection. These robots usually work in extreme geographical conditions, weather, and circumstances.

Augmenting Robots
Augmenting robots either enhance current human capabilities like the exoskeletons built by Hyundai to curry heavy objects or robots that replace the capabilities a human may have lost as Robotic arms and legs. Some examples of augmenting robots are robotic prosthetic limbs or exoskeletons used to lift hefty weights.

Autonomous Robots
Autonomous robots operate independently of human operators. These robots are usually designed to carry out tasks in open environments that do not require human supervision.

Pre-Programmed Robots
Pre-programmed robots operate in a controlled environment where they do simple, monotonous tasks. An example of a pre-programmed robot would be a mechanical arm on an automotive assembly line. The arm serves one function — to weld a door on, to insert a certain part into the engine, etc.

Humanoid Robots
Humanoid robots are robots that look like and/or mimic human behavior. These robots usually perform human-like activities (like running, jumping and carrying objects), and are sometimes designed to look like us, even having human faces and expressions.

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WeDo Input Blocks:

The Inputs Blocks are responsible for managing the inputs received from the programming device's built in Inputs as keyboard and microphone. These Blocks are usually linked to other Blocks, as the Wait For Block, Motor Power Block, Send a message Block, Repeat Block and the Display Blocks.

Blocks

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Sound Sensor Change
Inputs the Sound Sensor or the built in mic (from the device) mode "sound level change" to a block.

Number Input
Inputs a numeric value to a block. Which could be used to set the time for the Wait For Block or to set the Power of the Motor.

Text Input
Inputs a text value to a block. Which could be used to set the text for the Display Block or add the validation for the Start On Message Block.

Start On Message Block
Inputs the numeric value shown on the display area to a block.

Random Input
Inputs a random value to a block. The range of numbers is determined by the block to which it is attached.

WeDo Sensor Blocks:

The Sensor Blocks, are blocks responsible for managing the inputs received from the Distance Sensor or the Tilt Sensor, they are usually linked to the Flow Blocks, as the Wait For Block and the Repeat Block.

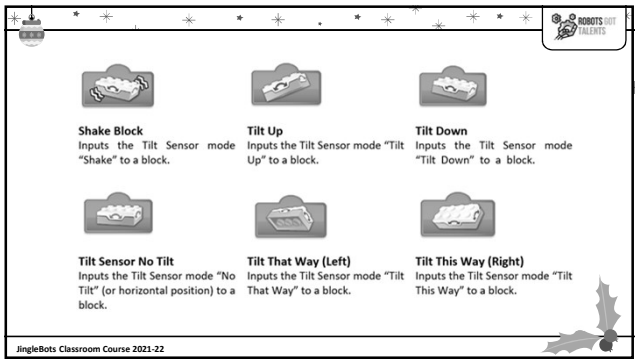
Blocks

Any Distance Change
Inputs the Motion Sensor mode "Any Distance Change" to a block.

Distance Sensor Input
Inputs the value detected by the Motion Sensor (from 0 to 10) to a block.

Distance Change Further
Inputs the Motion Sensor mode "increasing distance between the sensor and an object" to a block.

Distance Change Closer
Inputs the Motion Sensor mode "decreasing distance between the sensor and an object" to a block.


ROBOTS GOT TALENTS
Shake Block
Inputs the Tilt Sensor mode "Shake" to a block.
Tilt Up
Inputs the Tilt Sensor mode "Tilt Up" to a block.
Tilt Down
Inputs the Tilt Sensor mode "Tilt Down" to a block.
Tilt Sensor No Tilt
Inputs the Tilt Sensor mode "No Tilt" (or horizontal position) to a block.
Tilt That Way (Left)
Inputs the Tilt Sensor mode "Tilt That Way" to a block.
Tilt This Way (Right)
Inputs the Tilt Sensor mode "Tilt This Way" to a block.
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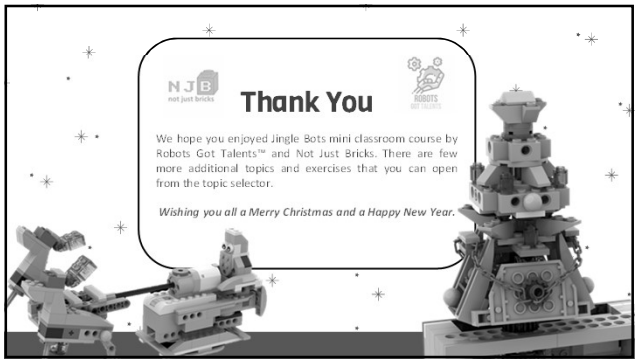
NJB
not just bricks
Thank You
ROBOTS GOT TALENTS
We hope you enjoyed Jingle Bots mini classroom course by Robots Got Talents™ and Not Just Bricks. There are few more additional topics and exercises that you can open from the topic selector.
Wishing you all a Merry Christmas and a Happy New Year.