2control NXT

User Guide

Introduction

As a young child I spent many happy hours playing with LEGO. Solving problems and building models - it provided endless possibilities for a developing mind.

As a teacher I initially found control somewhat daunting to teach, a feeling I know that many colleagues have shared.

In producing 2control NXT I tried to combine the fun and learning that I experienced playing with LEGO as a child, with all the techniques I learnt from teaching to produce a really exciting, simple and powerful program.

I hope you and your pupils enjoy using 2control NXT and the LEGO NXT hardware. Let us know what you build and what you discover…

Max Wainewright,
Designer & Developer - 2control NXT

Contents

Whilst this manual provides help in using 2control NXT, we recommend you also watch the videos provided on the CD!

Installation - Stand-alone machines

1. Put the CD in the drive

2. If nothing happens click 'Start - Run'

3. Type D:\Autorun.exe
   (If your CD Drive is drive E, type
   E:\Autorun.exe etc)

4. Click OK

5. Follow the instructions on screen to complete installation. This will install your software and add a link from the start menu to 2control NXT

Note:
2control NXT requires the following to be installed
on each local machine:
(1)   The 2control NXT software itself.
(2)   Microsoft .NET Framework 2.0 or above
(3)   LEGO MINDSTORMS NXT Driver (to enable the software to communicate with the LEGO hardware)
(4)   Adobe Flash Player 8 or above (to view the videos)

The .NET Framework install is included within the 2control NXT install so it does not appear as a separate option on the main CD menu.
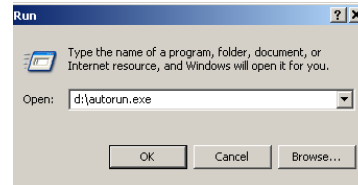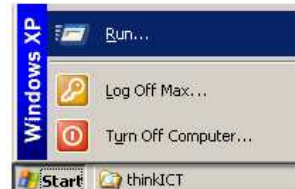
Installation - Networks

2control NXT is designed to work on ALL networks.

If you need help with a specific installation, please do not hesitate to contact us via our website, email support@2simple.com, or call (+44) 020 8203 1781. Please refer to www.2simple.com/support for up-to-date information on network installs for all 2Simple programs, as well as other useful technical information. If any of our instructions do not work, please do contact us as we want to provide accurate information and we rely on your feedback to help us get it right.

There are 2 possible methods to install the software across a network :

1. **MSI install** *(Recommended)* : Use the MSI included on the CD to allocate the package across the network. To use this method you will need a Windows 2000/2003 network or later and some technical knowledge. Further details of how to deploy MSI's are available on our website - go to www.2simple.com/support/ and click Networks. *Note that the LEGO NXT Driver, the Microsoft .NET Framework, and Adobe Flash Player & Reader will need to be deployed across the network separately (if you need further information, please refer to the relevant vendor's website.)*

2. **Local install** : Install the software on each machine individually.

Note: This software ***cannot*** be installed on a server only, with shortcuts created to the server from each local machine.

Links to the QCA Scheme of Work (ICT at KS1 & KS2)

QCA unit	Unit description	Module covered by
Unit 1F: **Understanding instructions and making things happen**	In this unit, children learn to give and follow instructions. They create sequences for others and predict outcomes. Children will learn that machines follow instructions and are controlled and switched on and off. They can apply their learning verbally and in written instructions and will gain understanding of how everyday appliances work.	Lighthouse Traffic Lights NXT Robot Sequence Logo My Model
Unit 2D: **Routes: controlling a floor turtle**	In this unit, children create, test, modify and store instructions using a floor turtle. They learn to control the turtle using single instructions, sequences and repeated sequences. This will develop understanding of programmed devices outside school as well as supporting creating and using maps in Geography, working with shape and space in Mathematics and using devices in Design and Technology.	NXTRobot Sequence Logo My Model
Unit 4E: **Modelling effects on screen**	In this unit, children enter instructions to control a screen turtle and compare screen and floor turtle operation. They learn to write procedures that "teach" a computer a new word and write short sequences to produce specific shapes on screen. They understand that screen steps are smaller than floor steps and learn to repeat procedures to create "crystal flowers" through 360 degree rotations. This learning can be applied when working with shape and space in Mathematics.	NXTRobot Sequence Logo My Model

Links to the QCA Scheme of Work (ICT at KS1 & KS2)

QCA unit	Unit description	Module covered by
Unit 5E: **Controlling devices**	In this unit, children control simple devices, e.g. buzzers, small motors and lights, using basic control boxes. They learn to control devices through a set of instructions and then to create a sequence of instructions to meet a desired objective. This learning can be applied when learning about the built environment (e.g. traffic lights, simple manufacturing processes).	Lighthouse Traffic Lights NXT Robot Sequence Logo My Model
Unit 5F: **Monitoring environmental conditions and changes**	In this unit, children learn about monitoring and measuring environmental changes using a device connected to a computer. This unit links with the ICT Key Stage 2 Programme of Study 2b (monitoring events, e.g. temperature change) and Science Key Stage 2 Programme of Study Sc1, Scientific Enquiry 2f (making systematic observations and measurements including the use of ICT for data logging). Learning and understanding can be applied when working on Unit 6c "Control and monitoring – What happens when…?"	Sensors Sequence My Model
Unit 6C: **Control and Monitoring - What happens when...?**	In this unit, children use input devices or switches to control a process. They learn about devices attached to control boxes e.g. pressure pads, light sensors, magnetic switches and on/off switches. They learn about and create programs which "teach" the computer to carry out a process as a response to change, e.g. switch on the light when it's dark. This includes learning the vocabulary of control and decision making, e.g. "if… then."	Sequence My Model

Getting started

Before you launch the program:

1) Switch on the NXT Brick by pressing on the orange button. If you get no display on the NXT brick screen this may mean you need to recharge the batteries.

2) Plug the USB cable into the USB port at the top right corner of the NXT brick, and the other end to a USB port on your computer.

3) Now launch the 2control NXT program by double-clicking the icon on your desktop or Start menu.
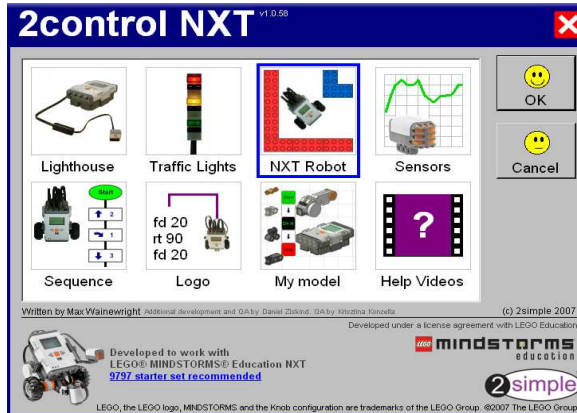
For instructions on how to assemble the NXT LEGO model itself, please refer to the relevant instructions accompanying the model.

Remember: You will still be able to use most parts of the program even if you do not have a real NXT connected to the computer at the time. Only some features, such as sensors, will not be available.

To computer

Getting started

Choose a module then click OK.

Printing, saving etc

New   Print   Open   Save   Minimise Exit

Every module screen in 2control NXT features the above icons. Additional icons and controls feature on the individual module screens.

Click on the blank white sheet to start a new module.

The open and save buttons on the toolbar allow pupils to store their work.

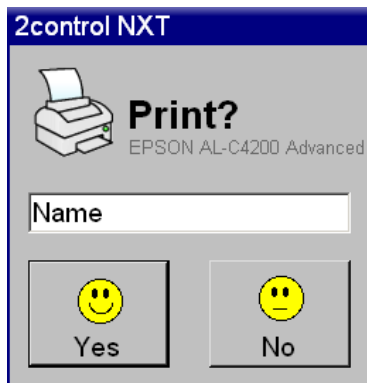Print - Print your screen - see next page for more info.

Exit - This will exit the entire program; if you want to get back to the launcher, press NEW.

Next to the Minimise button will either be an indicator of the NXT battery level, or an indicator that no connection can be found with the NXT brick. (see page 12 for more info.)

Printing

When you click print, you will see displayed in light grey the default printer for your computer. To change to print to a different printer, click on the default printer name and a new window will appear, allowing you to select a different printer.

You also have the option to enter your name which will appear on the printed page.

Re-establishing a connection

If you start the program and your NXT robot is not connected to the computer or not turned on, you will see the screen on the left appear, indicating that the program cannot connect to the real, physical NXT. This screen will also appear if you disconnect the NXT robot from the computer, or turn it off, while the program is running.

You will still be able to use most parts of the program while not connected to the real NXT; however some features, such as sensors, will not be available.
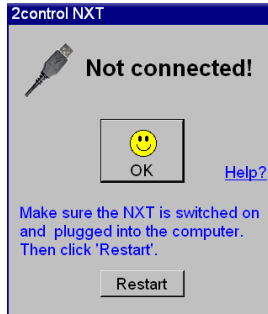
To re-establish a connection to the real NXT, click on the blue "Help?" button (If the "Not connected" window is not visible, click on the crossed-out NXT brick to get the window to re-appear on screen).

After clicking "Help?", you will see the window on the left. Once you have checked your NXT is turned on and plugged into the computer via USB, click "Restart." This should re-establish the connection to the NXT, and the "no connection" indicator should now be replaced by a battery level indicator.
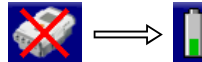
Lighthouse

Control lights plugged into the LEGO NXT brick, or an on-screen simulation of the brick.
Drag and drop commands into a simple flow chart to build up a program to flash a light.

Click to view help video.
Click X button to close,
and F1 to open up again.

Drag commands onto flow chart,
or simply click ON / OFF to get an
immediate effect.

Drag slider to increase or decrease
sequence speed.

Click to start sequence

Remember - unplug your
motor cables from ports B
and C before using this
module!
(The "On" button activates
ports A, B and C.)

Click to stop sequence

Lighthouse

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the connector at the end of the light block cable is plugged into Port A, B or C at the top of the NXT brick.

Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

Light block cable

To computer

A   B   C   USB

nXT

1   2   3   4

Traffic Lights

This builds on the Lighthouse by allowing 3 lights to be plugged into the NXT, to simulate a set of traffic lights. Choose when each light comes on and goes off. The on-screen simulation will work irrespective of whether a real NXT is connected or not.

Click to start   Click to stop

You can also illuminate your actual traffic lights by clicking on the on-screen traffic lights.

Add a light command to the sequence by dragging a traffic light symbol over to the circle. Click and drag on the black area of the traffic light symbol (the mouse icon will change when you are over a draggable area).

Click on the coloured circles to choose which lights to illuminate.

3s

12s

22s

Start   Stop

2simple   2controlNXT

Traffic Lights

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the connector of the red light is connected to Port A at the top of the NXT brick, the amber light is connected to Port B and the green light to Port C.
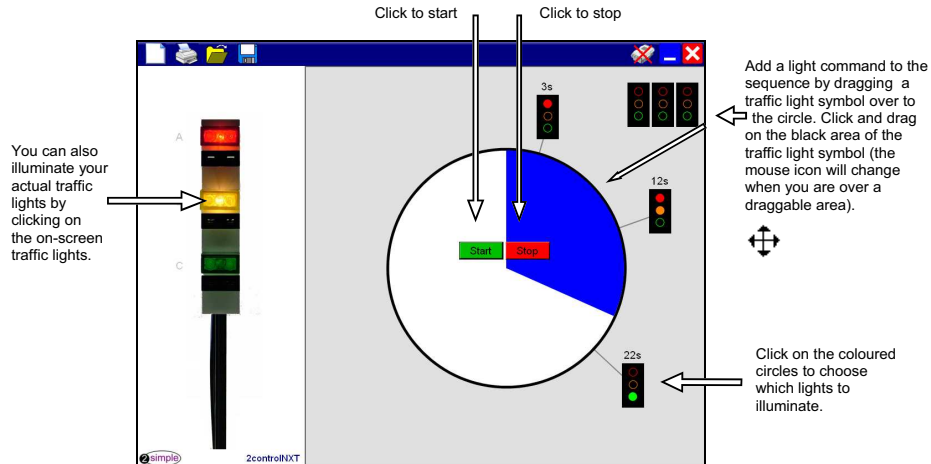
Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

Traffic light cables

To computer

A   B   C   USB

ПХТ

1   2   3   4
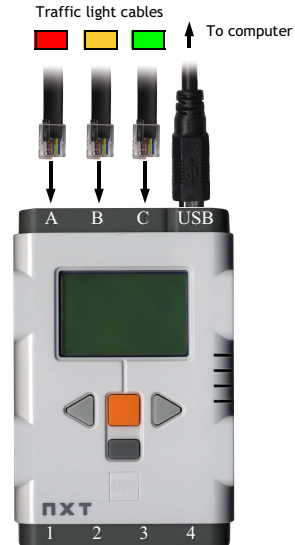
NXT Robot

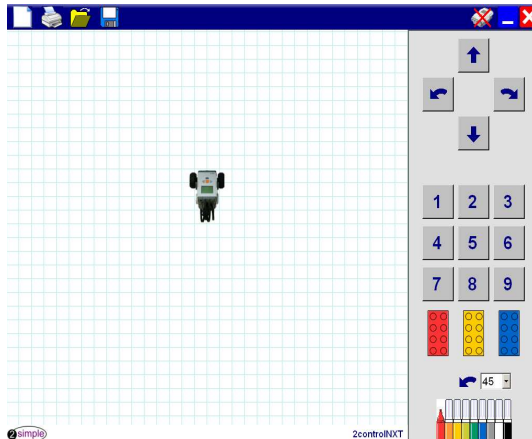**Control a standard NXT robot by giving simple forwards, backwards or turn commands, together with a numerical parameter. These commands will be replicated by an on-screen NXT vehicle.**

First, click an arrow to choose if you want your robot to go backwards, forwards, left or right.

Next click on a number to choose the number of units you want for this action.

You can drag the LEGO bricks onto the white part of the screen to act as barriers for the on-screen robot; if the on-screen robot hits a brick while it is moving, it will stop. You can recolour a LEGO brick by clicking on the brick and then clicking on one of the felt tips.

From this drop down, you can choose how many degrees PER UNIT your robot will turn left or right when commanded to do so.

You can paint with the felt tips or choose a colour for the line drawn by the on-screen NXT. If you replace all the felt tip lids, the on-screen robot will not draw lines when it moves.

NXT Robot & Logo - saving
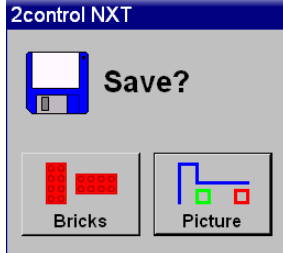
The pattern of bricks you create in the NXT Robot screen is saved in a 2cx file. The picture is saved as a PNG file (the picture is drawn by using felt tips freehand, lines drawn by the on-screen NXT, and imported backgrounds).

When you click save in the NXT Robot section, you will be given the choice of either saving the bricks or the picture (you will not be given this choice if no bricks have been added or no picture has been drawn).
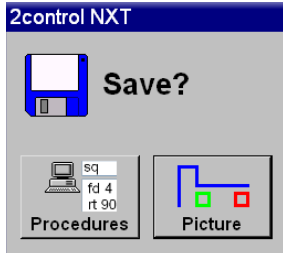
Similarly, in the Logo screen: The procedures you define are saved in a 2cx file. The picture drawn by the on-screen NXT in Logo is saved as a PNG file.

When you click save in the Logo section, you will be given the choice of either saving the procedure or the picture (you will not be given this choice if no procedures have been defined or no picture has been drawn).

(Note - all other screens in this program only save 2cx files - Lighthouse, Traffic Lights, Sensors, Sequence, My Model.)

NXT Robot

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the cable connector for the robot's left hand motor is connected to Port B on top of the NXT Brick, and the cable for the right motor is connected to Port C.
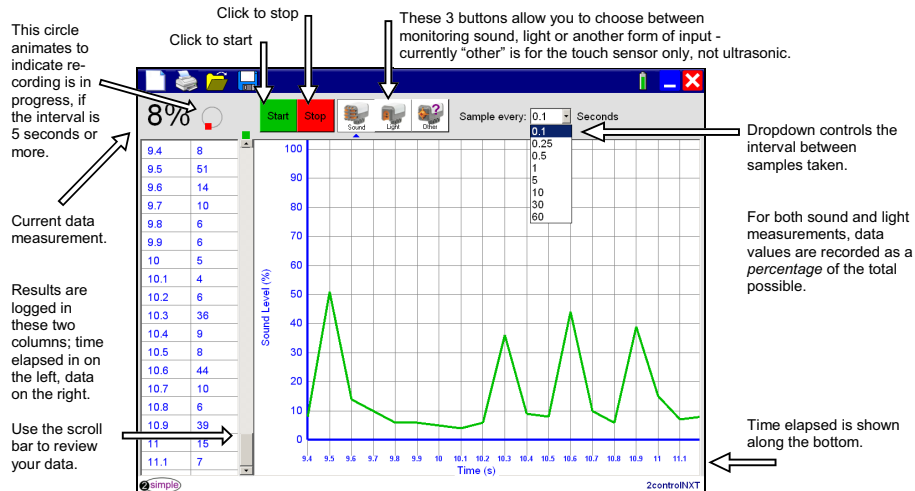
Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

Sensors

A basic introduction to using sensors, giving a reading of a sound/light/touch sensor over a period of time. This is displayed as a simple line graph.

This circle animates to indicate recording is in progress, if the interval is 5 seconds or more.

Click to stop

Click to start

These 3 buttons allow you to choose between monitoring sound, light or another form of input - currently "other" is for the touch sensor only, not ultrasonic.

Current data measurement.

Results are logged in these two columns; time elapsed in on the left, data on the right.

Use the scroll bar to review your data.

Dropdown controls the interval between samples taken.

For both sound and light measurements, data values are recorded as a *percentage* of the total possible.

Time elapsed is shown along the bottom.

9.4	8
9.5	51
9.6	14
9.7	10
9.8	6
9.9	6
10	5
10.1	4
10.2	6
10.3	36
10.4	9
10.5	8
10.6	44
10.7	10
10.8	6
10.9	39
11	15
11.1	7

Sample every: 0.1 Seconds

0.1
0.25
0.5
1
5
10
30
60

Start Stop

Sound Light Other

8%

2simple

2controlNXT

Sensors

To computer

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Sensors plug into Ports 1, 2, 3 and 4 on the <u>bottom</u> of the NXT Brick. Ensure that:
- Touch sensors are plugged into Port 1
- Sound sensors: Port 2
- Light sensors: Port 3

Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

A   B   C   USB

ПХТ

1   2   3   4

Sensor cables

Touch   Sound   Light

Sequence

Create a sequence of instructions to move an NXT vehicle around. Individual instructions are dragged on to a flow chart to create the program.

Click to start sequence.

Drag arrows and numbers onto the flow chart to create a sequence; ie forward 2 units, left 3 units, etc.

The microphone symbolises "wait for a sound"; the lower the number you use for this, the more sensitive the micro-phone is to detecting sound. (If no sound sensors are plugged in, or the NXT is not connected to the computer, this step will be skipped over).

The musical note symbolises the robot making a sound (no sound will be made if the NXT is not connected to the computer).

The drop-down controls how many times the sequence will run.

Click to stop sequence.

Here the drop-down controls how many degrees PER UNIT your robot will turn left or right when commanded to do so.

Sequence

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the cable connector for the robot's left hand motor is connected to Port B on top of the NXT Brick, and the cable for the right motor is connected to Port C.

Sensors plug into Ports 1, 2, 3 and 4 on the bottom of the NXT Brick. Ensure that:
- Sound sensors are plugged into Port 2.

Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

Motor cables

Left   Right

To computer

A   B   C   USB

NXT

1   2   3   4

Sensor cables

Sound

Logo

A simple implementation of the educational computer language Logo provides a text-based way to control the NXT vehicle. An on screen robot simulates the NXT vehicle.
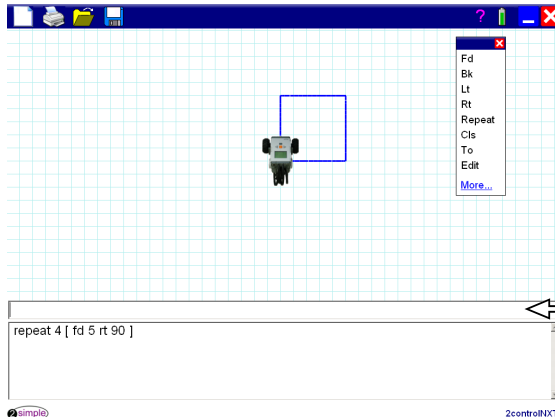
See following pages for a list of all commands.

Ctrl + "g" toggles the grid on and off. When you drag the on-screen robot, it will snap to the grid unless you hold down "shift" while dragging (this applies to the NXT and Sequence screens as well).

Type your Logo commands in this field here and then hit the return button on your computer keyboard to start the robot.

A history of previous commands is displayed beneath.

Logo

LOGO Commands:

Help

- **help** = show all possible commands.
- **help xxx** = show help for command xxx.

General

- **home** = move the On screen Robot to the centre of the screen.
- **cs / cls** = clears the main screen.
- **ct / ctx** = clears the bottom text screen.
- **hide** = hide the On Screen Robot.
- **show** = show the On Screen Robot.
- **beep n** = Play a tone of pitch n (1 – 50).
- **wait n** = wait for n milliseconds.

Movement

- **bk / back n** = move backwards a distance of n units.
- **fd / forward n** = move forwards a distance of n units.
- **lt / left n** = turn left n degrees.
- **rt / right n** = turn right n degrees.

Loops

- **rp / repeat** = repeat a set of instructions n times - eg repeat 4 [xxx] will do xxx 4 times.

Logo

Individual motors

- **on xxx yyy** = turn xxx motor(s) on for yyy milliseconds - eg on bc 100
- **rev xxx yyy** = turn xxx motor(s) on in reverse direction for yyy milliseconds - eg rev bc 100
  (Values for xxx : a / b / c / ab / bc / ac / abc. Values for yyy : 1 - 30000)
  (Note: these 2 commands will not affect the on-screen NXT robot)

Procedures

- **to xxx** = create your own procedure called xxx.
- **edit** = display a list of all currently defined procedures.
- **edit xxx** = edits your own procedure called xxx.
- **xxx =** instruct the NXT to perform the procedure named xxx that you have previously created.

Speed

- **fast** = moves the On Screen Robot very quickly - if no external robot is connected.
- **slow** = moves the On Screen Robot at normal speed.
- **setpower n** = set motor speed / light intensity to be n%.
  (0-100, but values 0-60 are only used when setting the light intensity ;
  motor speed will only work with values 60-100.)
  The power setting in Logo will affect the NXT and Sequence screens as well.

Colour & Drawing

- **pu / penup** = lift the pen up on the on screen Robot.
- **pd / pendown** = put the pendown on the on screen Robot so it can draw.
- **setpc n** = set pen colour to be colour value n. (0-8)
- **setbg n** = set the background of the screen to colour value n. (0-8)
  (0 = black, 1 = red, 2 = orange, 3 = yellow, 4 = green, 5 = blue, 6 = purple, 7 = grey, 8 = white)
- **setps n** = set line thickness of pen to be n pixels. (0-500)

Logo

Further notes:

You can issue multiple commands to the NXT by entering them on the "command line", with each command separated by a space. The NXT will then attempt to perform each command in the sequence you entered it. For example, "fd 3 rt 90" will move the NXT forward 3 units and then turn right 90 degrees.

Repeat can contain a number of commands; for example, "repeat 4 [fd 3 rt 90]" will form a square.

Any command which can be entered on the command line can also be entered in a procedure definition; for example you can define a procedure called "square" which contains the command in the above paragraph.

Some commands have an abbreviated form; eg "fd 3" or "forward 3" will have exactly the same effect.

If the on-screen robot reaches the edge of the screen, it will "wrap around" and appear on the opposite edge of the screen. This applies to the NXT Robot and Sequence screens as well. In Logo Fast mode, wrap-around is switched off to allow more flexibility when creating shapes; if you lose the on-screen NXT Robot off the edge of the screen, remember you can always call it "home"!

Logo

Examples of patterns made in Logo
(fast mode recommended).

Regular Polygons
rp 3 [fd 2 rt 120]
rp 4 [fd 2 rt 90]
rp 5 [fd 2 rt 72]
rp 6 [fd 2 rt 60]
rp 8 [fd 2 rt 45]
rp 9 [fd 2 rt 40]
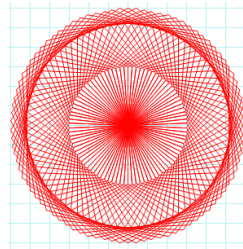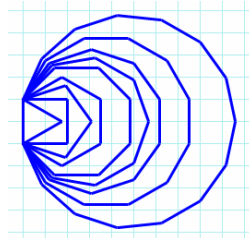rp 10 [fd 2 rt 36]
rp 12 [fd 2 rt 30]
rp 15 [fd 2 rt 24]

setps 1
rp 90 [rp 6 [fd 3 rt 60] rt 4]

Logo

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the cable connector for the robot's left hand motor is connected to Port B on top of the NXT Brick, and the cable for the right motor is connected to Port C.

Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.
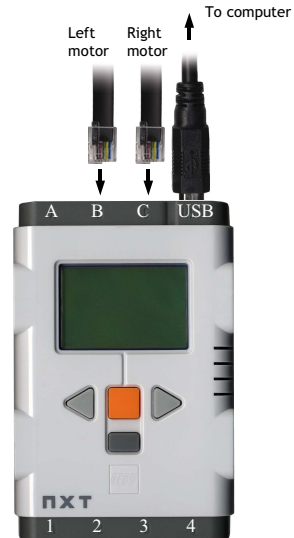
My model

A more open-ended screen, allowing users to turn off or on motors and create their own flow charts.

Drag symbols onto the grid to create your flow chart.

A, B and C relate to your motors (or lights); drag the relevant symbols on to the grid to start, stop or reverse them.

Use the arrows to link commands together.

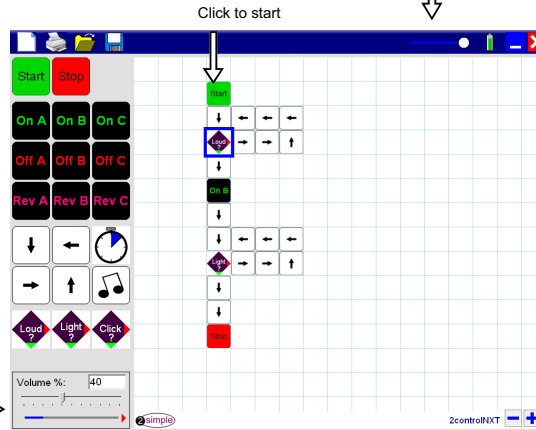The stopwatch symbol makes the robot wait.

The musical note symbol makes the robot make a noise.

The 'Loud?', 'Light?' and 'Click?' symbols are explained on the following pages.

A slider control will appear here when you click on some of the commands, allowing you to alter their parameters.
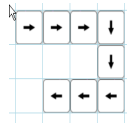(For ON/REV A/B/C, the range is 0-100%, but values 0-60 are only used when setting the light intensity; motor power will only work with values 60-100.)

Drag slider to increase or decrease sequence speed.

Click to start

My model

You can make loops and connections more easily with the following commands :

Hold down "Ctrl" and drag a symbol on the grid to copy it to adjacent cells.

Note: The arrows in the NXT Robot and Sequence screens play a different role to the arrows in My Model. In NXT and Sequence, the arrows indicate **direction of movement.** In My Model, the arrows indicate **flow of control**.

Right-click on an arrow and drag around the grid to copy the arrow to adjacent cells and intelligently change the arrow direction.

Also note that if you place commands directly beneath each other, you do not need arrows to link them. You can also do this by placing commands from left to right.

My model

The 3 sensor blocks allow you to create a model which responds to changes in the environment around the NXT. Each block represents a question which must be answered at the point in time when the block is reached (for example, "Is it light?") In each case, the green arrow represents an answer of **YES** and the red arrow indicates **NO**. If the answer is yes, control will pass to the block directly beneath the sensor block. If the answer is no, control will pass to the block directly to the right of the sensor block. In this way you can make your model respond differently according to the environment in the real world.
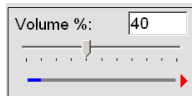
When you have placed a light or sound sensor block on the grid, you can customise how sensitive you want it to be using the panel which appears on the bottom left of your screen. Moving the slider to the left makes the sensor more sensitive; it will be quicker to answer YES.

At the bottom of the panel is a live indicator which shows the current light or sound being detected by the NXT, and a red or green arrow which indicates how the sensor would respond to that input based on the sensitivity setting you have chosen.

My model

Connecting your NXT brick

Before you launch the program:

Check the NXT brick is turned on (see page 8).

Ensure that the cable connector for the robot's left motor is connected to Port B on top of the NXT Brick, and the cable for the right motor is connected to Port C.

Sensors plug into Ports 1, 2, 3 and 4 on the <u>bottom</u> of the NXT Brick. Ensure that:
• Touch sensors are plugged into Port 1
• Sound sensors: Port 2
• Light sensors: Port 3

Ensure that the USB cable is plugged into the USB port at the top right corner of the NXT brick, and the other end is connected to a USB port on your computer.

Motor cables | Left | Right | To computer

A   B   C   USB

NXT

1   2   3   4

Sensor cables

Touch   Sound   Light

Teacher Options - Basic

To access the Teacher Options, hold Ctrl and Shift, then tap the letter 'O'.

This setting affects the NXT, Sequence, LOGO and My Model screens.

Teacher Options - Motor control

To access the Teacher Options, hold Ctrl and Shift, then tap the letter 'O'.

Alters the angle turn per unit for both **real and screen robots**. This does not affect the Logo screen.

Alters the number of degrees each wheel on your **real robot** needs to turn to rotate on the spot.
This affected by the length of the axis between your 2 wheels (ie it would be different for different LEGO models).

Alters the distance your **screen robot** will move per unit. This will affect the size of the grid cells, but will only become active once you restart the part of the program you are working in.

Alters the distance your **real robot** will move per unit.

Teacher Options

Basic · Motor control

Sequence, Robot and Logo Screens:

Turning:
Angle to turn per unit `45`
This sets how far the robot will turn. Eg 90 will make a the command Left 1 result in a quarter turn.

Wheel degrees per 360 `1520`
The number of degrees each wheel needs to turn to rotate your robot on the spot.

Moving forward and back:
Pixels per Forward Unit `24`
This controls how far your on screen robot will move if commanded to move forward.

Wheel degrees per Forward Unit `200`
This controls how far your real robot will move if commanded to move forward

Reset all values

2control NXT
Written by Max Wainewright (c) 2simple software 2007
QA: Daniel Ziskind

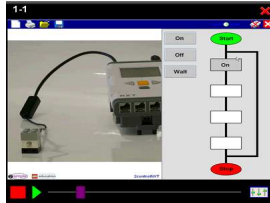Cancel   OK

Using the training videos

The CD supplied contains many tutorial videos.

In addition to showing you how to use the software, the videos are also designed to give you ideas on how to teach particular concepts and skills.

Once the videos have started playing you will see the program being used. To pause or rewind the video use the buttons at the bottom of the screen:

Stop/Pause   Current location

Play
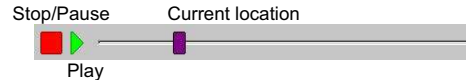
 Click the red exit button to return to 2control NXT

Why not use the videos:
To introduce the start of an activity in the ICT suite?   As part of an INSET session?

As a way to remind individual pupils how to do an activity?   To learn more!

Accessibility Statement

At 2Simple we try to design all our software in a way that makes it accessible to as many learners as possible.

We use:
- large buttons
- icons instead of text wherever possible
- animation to convey meaning
- video tutorials to show learners how to use the software, at their own pace.
- we provide options to tailor and personalise the software for individual learners.

Design Principles

Our software is designed on the following principles:

Simplicity of use
The software has evolved in the classroom to meet the needs of very young pupils. It is simple to learn and simple to use. There are no 'wrong buttons' to press.

Transfer of skills
Our software has a common look and feel. It is designed to take pupils from what is familiar towards standard Windows™ interfaces.

Developed in the classroom for the UK curriculum
The software has been developed to meet the needs of the UK curriculum. It has been tested & refined in the classroom & has evolved based on research & suggestions from teachers.

Videos of Ideas for activities
Our software comes with a large number of ideas for use and tutorials. These take the form of short videos which run on the computer and teach staff and pupils to use the software in an appropriate curriculum context.

Emphasis on creativity
Making the software simple allows pupils to focus on the content of their work. Whilst the software is powerful, it is the pupils who are creating, not the computer.

Reading age
Many pupils are held back by complex language in some software packages. Our software uses simple icons & appropriate text, ensuring reading age is not a barrier to ICT learning.

Independent use
The simplicity of the software, combined with the use of video makes the software ideal for independent use.

System Requirements

Operating System: **XP (SP2) / Vista**

Note: The 2control NXT software works on **Windows 2000** as well, however the LEGO NXT Driver can only be installed on XP (SP2) or Vista. You can therefore install the software **without** the LEGO NXT Driver on Win 2000 and use most of the on-screen simulations, however you will not be able to control a real NXT robot, use the Sensors screen, or use those features of the other screens which use sensor blocks.

Processor: Recommended 2 Ghz
Memory: Recommended 1GB RAM
Hard Drive: *(This excludes space required by third party installs below)*
      - Minimal install - 7MB
      - Videos - additional 103MB
Display: Minimum 800x600, 16 bit High Colour. (*Recommended* 1024 x 768)
CD Drive: Required for Installation
Printer: Optional
Soundcard & speakers: Required to view videos
Mouse, Keyboard: Required

Third party software required (included on CD ROM)
1. **Microsoft .NET Framework -** v2.0 or above
2. **LEGO MINDSTORMS™ NXT Driver -** v1.1 or above
3. **Adobe Flash player** - v8 or above - required to view the videos
4. **Adobe Reader** - required to view the user guide

For further details on any of the above third party software, including updates and installation instructions, please refer to the relevant vendor's website.

Copyright Information

Contacting 2Simple

You can contact us:

For general information: **info@2simple.com**

For support issues: www.2simple.com/support or email us at: **support@2simple.com**
Tel: (+44) 020 8203 1781
Fax: (+44) 020 8202 6370

You can write to us at:

2Simple Software
Enterprise House
2 The Crest
Hendon, London
NW4 2HN

Faulty Media

Should the CD-ROM develop a fault we will replace it free of charge.

2control NXT

Max Wainewright, 2007