# Using iTrain 5.0 Tutorial Series Contents

With the assistance of Iain Morrison, I have been working on a new "Using iTrain Tutorial Series". They are published on YouTube. Below are the links and content.

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**Tutorial 01: Installing iTrain**
https://youtu.be/5jjA2mwRS1U
**Timecodes:**
00:30 - What do I need?
01:37 - Downloading
02:05 - Check if Java is installed
03:08 - Download and Install Java
05:09 - Download and Install iTrain
06:48 - Opening iTrain
08:06 - iTrain license overview
09:10 - Applying for a trail license

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**Tutorial 02: iTrain Overview**
https://youtu.be/HkQIi3E6ra0
**Timecodes:**
00:24 - Introduction
00:59 – Fundamental windows at startup
01:44 – Top toolbar
03:28 – File - dropdown menus
04:04 – Editor - dropdown menus
04:12 – Settings
04:26 – Preferences
04:45 – Interfaces
05:01 - Boosters
05:15 – Feedbacks
05:52 – Accessories
06:17 – Track Routes
07:02 – Actions
07:32 – Locomotives, Wagons and Trains
08:17 – Train Types
08:80 – Train Routes
09:44 – Blocks
10:10 – Stations
11:14 - Switchboard
11:38 – Control – dropdown menu
11:48 – View – dropdown menu
11:59 – Diagnosis
12:42 – Keyboard
13:05 – Feedback Monitor
13:32 – Speed measurements

14:01 – Decoder Programming
14:25 – Layout views plus extra switchboards

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## Tutorial 03: Connecting a Command Station

https://youtu.be/mnJL5e2z5DA

**Timecodes:**
00:46 - Saving a layout
02:08 - Interface Editor
04:06 - General Tab
04:17 - Connection Tab
06:18 - Specific Tab
06:29 - Image Tab
06:42 - Saving your Command Station
07:25 – Connect to your layout

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## Tutorial 04: Running Locos Manually

https://youtu.be/Y-UnPm6fqqg

**Timecodes:**
00:31 – Fundamental Basics
02:54 - Quick Speed Profile
07:52 – Creating a new locomotive
09:36 – Image Tab
10:02 – Speed Tab – Step1 and Step 126 – Linear
10:56 – Options Tab
11:10 – Saving your new Locomotive
11:42 – The difference between Locomotives & Trains
13:34 – Making the train move manually – video insert
14:35 – Creating a new Locomotive – Revision
15:53 – Speed Tab – copy from existing locomotive
16:49 – Saving the new Locomotive
17:10 – Running the new Locomotives – video insert
18:48 – Saving the layout

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## Tutorial 05: Switchboard - Manual Turnout Control

https://youtu.be/Rp7fBxkFShM

**Timecodes:**
00:30 – Start iTrain and open project
01:11 – Creating a new switchboard whilst retaining Locomotives & Trains
02:38 – Editing the Switchboard
03:26 – Diagram of Test Track for Tutorials
04:25 – Enlarging the grid space

05:09 – Drawing the mainline track
06:08 – Drawing the sidings
06:42 – Drawing the left-hand turnouts
07:32 – Drawing the right-hand turnouts
08:12 – Drawing the curves
08:52 – Drawing the buffers
09:39 – Naming and addressing the turnouts
12:50 – Applying / Saving the Switchboard
14:17 – Testing the turnout addressing and function on the layout – video insert
15:04 – Testing by moving trains over turnouts – video insert

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**Tutorial 06: Switchboard - Laying Track, and Track Layers**
https://youtu.be/ZkI_zQTVEXo

**Timecodes:**
00:03 – Overview
01:05 – Using the Keyboard to lay track in the switchboard
02:24 – Creating the sidings using keystrokes only
04:32 – Entering buffers using Shift + B
05:25 – Rotating elements using Shift + R
05:48 – Inserting Feedbacks using the F key
06:01 – Inserting Blocks using the B key
06:11 – Inserting Direction Arrows using the P key
06:23 – Using the Copy and Paste method
06:59 – Moving elements using Shift + Ctrl + Cursor Keys
07:17 – CAUTION when copying items
09:00 – Copying onto a new Tab
09:35 - Understanding Layers
10:17 – Creating a layer
10:46 – Editing elements on or below a layer
12:05 – CAUTION - Inadvertently creating layers
13:23 – Non-switchable elements above switchable elements
13:57 – CAUTION – you cannot have two switchable elements on top of each other
14:19 – IMPORTANT - leave at least two squares either side when creating Block elements.
14:35 – IMPORTANT – leave at least one square adjacent to ends of tracks.
15:06 – IMPORTANT – Direction Arrows pointing in the direction of the Block element dots.
16:18 – Undo Command – Ctrl + Z

## Tutorial 07: Track Routes

https://youtu.be/K6ZOtIIk3uI

**Timecodes:**

00:00 – Introduction
01:17 – Adding text elements using Shift + E
04:05 – Adding a section of track in the switchboard using keystrokes
05:03 – Apply changes and save
05:19 – Creating Track Routes
06:10 – Placing Track Route elements away from the track.
06:43 – Entering the details of the Track Routes – naming and sequences
10:01 – Setting the delay in the Switch Order Tab
12:12 - Setting a Global delay in the Options Tab
13:44 - Set Always tick-box
14:21 – Reset Initial State tick-box
15:13 – Entering Track Route Details – Revision
18:00 – Apply changes and save
18:21 – Checking the operation of the saved Track Routes
18:50 – Lock symbols at turnouts
19:19 – IMPORTANT – deselect Track Route when finished.
20:08 – Automatic Track Route Control – Overview
22:14 - Homework suggestion

## Tutorial 08: Blocks, Feedbacks and Groups

https://youtu.be/nhKXUSAgei0

**Timecodes:**

00:13 – Introduction
00:52 – Blocks – graphic depicting real-world railway blocks
01:22 – Blocks in iTrain
01:43 – The three aspects of Blocks
02:49 – Block Properties Editor
03:22 – Block Terms Graphic – Physical Block, Block Element, Block Control Object
03:31 – Block Rules 1&2 - Graphic
04:02 – Block Rules 1 & 2 – Examples & Explanation
05:50 – Block Rules – Cross tracks
07:24 – Block Rules – Sidings and long track sections
08:06 – Block Rule 3 - Graphic – Block requirements
08:40 – Block Rule 3 – Examples & Explanation
10:37 - Preferred Direction of Travel definition – Previous to Next
11:40 – Block Element dots explanation
12:12 – Block Rule 5 – Graphic – Length of Blocks
12:26 – Block Rule 5 – Examples & Explanation
13:27 – Block Rule 6 – Graphic – Grouping
13:40 – Block Rule 6 – Using the Assign Group button or G Key
15:21 – Placing the required elements to create a Block

## Tutorial 09: Defining Feedbacks

https://youtu.be/ymrhTb56qOA

**Timecodes:**

00:00 – Introduction & Recap
00:59 – Running the Diagnosis – Ctrl D
01:45 – Correcting errors – inputting length of turnouts
03:34 – Opening the Switchboard, checking for black track elements and correcting errors
05:57 – Defining Feedbacks – Feedback Properties
08:38 – Defining Feedbacks by using the Template function for multiple Feedbacks
10:24 – Assigning control objects to Feedback elements – drag and drop
11:06 - Revision of defining Feedbacks
11:45 – Using Board Item to define a Feedback

## Tutorial 10: Defining Blocks

https://youtu.be/8ndTcstd0Kw

**Timecodes:**

00:00 – Introduction and Recap
01:00 – Opening Switchboard and selecting Block properties
01:44 - Naming and Describing the Block
01:56 – Selecting the type of Block
02:13 – Defining the length of the Block and the use of Autofill
02:46 – Options Tab
03:33 – Feedbacks Tab
04:24 – Feedbacks Tab with two feedback sensors
05:55 – IMPORTANT – Order of feedbacks – Previous to Next
06:19 – Feedbacks using light sensors or reed switches
07:15 – Direction Previous Tab – Use Positions checkbox
08:14 – Direction Previous Tab – Entering a STOP position – positive or negative distances
09:44 – Direction Previous Tab – Block
10:15 – Direction Next Tab
11:50 – IMPORTANT – Critical check box - avoiding deadlocks
14:12 - Results of defining a Block
14:56 - Defining Blocks by using the Template function for multiple Blocks
15:42 - Assigning control objects to Block elements – drag and drop
16:00 – Using the Autofill function
16:51 – Revision of entering the STOP position and Block properties
17:45 – Revision of defining Blocks
19:45 – Using the Board Item Tab
21:04 – Using the Text Direction drop-down menu in the Board Item Tab
21:45 – IMPORTANT – Using the Connect button
22:16 – Saving the Layout and running the Diagnosis – Ctrl D

## Tutorial 11: Instant Route Basics

https://youtu.be/ZwuzZX6RaHs

**Timecodes:**

00:45 - "Wide" layout and how to select it
00:54 - Recall of "Track Routes" and their limitations
03:37 - Putting/Removing trains in blocks in the Switchboard
05:09 - Synching physical orientation of the train in the switchboard
08:40 - Creation of an "Instant Route" and Route vs Shunt selection
10:25 - Information in the switchboard about the route and the train
12:20 - How iTrain knows where the train is?
12:29 - Example of movement simulation with iTrain offline, not connected, by double clicking in the feedbacks. (simulation mode)
13:37 - Shunt example
14:19 - Erasing a route error message

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## Tutorial 12:
## Multiple Instant Routes
## Auto Reverse using Instant Route
## Splitting and reattaching a Loco

https://youtu.be/INdIf2rB44o

**Timecodes:**

00:00 – Introduction and Recap
01:13 – Placing a Train on the Switchboard and checking the orientation of the Train
03:06 - Shift + Click on Direction Arrow to change the iTrain orientation to match reality
03:16 – Checking the orientation – Select forward – note the direction of the arrow and compare
04:09 – Creating an Instant Route with simple drag & drop
04:40 – Creating a simultaneous Instant Routes with drag & drop
06:11 – Creating more simultaneous Instant Routes including moving into an occupied siding
11:10 – Auto Reversing
12:02 – Splitting a Train - Left-click and Hold (note: the "Split Train" option will not appear until the train has previously been routed somewhere. So it is not available when the train is first placed onto the layout)
14:09 – Reattaching a Locomotive to Wagons by shunting
14:41 – “Allow shunt in occupied Block” setting change in Block Properties
15:20 - Reattaching a Locomotive to Wagons by shunting – Left-Click and Hold to join

## Tutorial 13: Semi-Automatic and Manual Instant Routes

https://youtu.be/a63agS5XwY4

Block Position

**Timecodes:**

00:00 – Introduction
00:50 – Checking Train Properties
01:39 – Instant Route Recap – Drag & Drop – Route or Shunt
02:22 – New feature iTrain 5.0.5 and above – Pop-Up option to run the route in 3 ways
03:02 – Explanation of difference in route options – Automatic, Semi-Automatic, Manual
04:08 – Semi-Automatic Mode – Example
05:47 – Positional information in the Block
07:18 – Starting a Semi-Automatic route – Apply throttle or you get an error
07:49 – Resetting the Route
08:18 – Applying throttle in offline mode and simulating the movement of the train
08:37 – QUESTION? – Why is iTrain reporting 3cm when the train first enters the block?
09:21 – Monitoring the position of the train in the control Block.
12:14 – QUESTION? Why is iTrain only releasing after the train has moved 65cm into the Block and not 58,5cm
12:51 – A closer look at Block Properties and interpretation of positions
14:21 – IMPORTANT - Iain Morrison's iTrain Forum post explaining Block Position
17:29 – Reporting Position dependent on the direction of Direction Arrow
18:07 – QUESTION? Reversing a Train into a Block – what position will iTrain report?

## Tutorial 14: Answers to the questions from video 13

https://youtu.be/ed9W-Uoxw44

**Timecodes:**

00:00 – Introduction
00:10 – ANSWER - Why is iTrain reporting 3cm when the train first enters the block?
01:47 – ANSWER - Why is iTrain only releasing after the train has moved 65cm into the Block and not 58.5cm
03:05 – IMPORTANT – Explanation and Table regarding Margins
04:38 – ANSWER - Reversing a Train into a Block – what position will iTrain report?
05:38 – IMPORTANT – Occupancy sensors triggered by current conducting/pickup wheels

## Tutorial 15: Deadlocks and Critical Blocks

https://youtu.be/Qg0xjJl14Y0

**Timecodes:**

00:00 – Introduction of the new layout
01:38 – Setting up three Instant Routes
02:14 – Starting the Instant Routes and moving the trains along the routes.
02:59 – Example and Explanation of a classic Deadlock
03:34 – How to prevent a Deadlock and identify a Critical Block
04:42 - How to make a Critical Block in Direction Next
06:28 – Definition of a Critical Block
07:17 – Checking the operation with Critical Block selected – Deadlock avoided
09:03 – More complex example of a Deadlock – Critical Block in Direction Previous
16:18 - Checking the operation with Critical Block selected – Deadlock avoided

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## Tutorial 16: Preparing a Locomotive for iTrain (part 1)

https://youtu.be/80K2VIXVO1I

**Timecodes:**

02:30 - Five step summary
05:15 - Creating a CV Table
09:13 - Setting CV3 Acceleration, CV4 Deceleration
10:50 - Measuring and setting CV5 Max Speed
13:30 - Measuring and setting CV2 Min Speed
14:38 - Creating a Speed Profile
20:00 - Inertia Simulation - Acceleration - Deceleration - Step Delay - Step Size - Feedback Offset

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## Tutorial 17: Preparing a Locomotive for iTrain (part 2) - Reaction Delay

https://youtu.be/uBldmYVxkK4

**Timecodes:**

00:00 – Introduction and review of previous Tutorial
00:27 – Definition of Reaction Delay
01:22 – Illustrations of the effect of Reaction Delay with CV4 = 0 and default settings
02:57 - Adjusting the Reaction Delay – CV4=0 – Late = Increase : Early = Decrease
03:48 – IMPORTANT - Explanation of CV4 values – Deceleration Inertia Simulation
04:40 - Illustrations of the effect of Reaction Delay with CV4 = 1 and default settings
05:33 – The effects of changing the iTrain Inertia Simulation
06:03 – Determining and Setting Reaction Delay : CV4=0 Forward Direction
10:36 - Determining and Setting Reaction Delay : CV4=0 Reverse Direction
12:24 - The effect of high CV4 values and setting the Reaction Delay
15:44 – Performing measurements at both ends of a Shuttle Route.

## Tutorial 18: Preparing a Locomotive for iTrain (part 3) - Reaction Delay Shuttle Train Route

https://youtu.be/Y1H-bYn2e28

**Timecodes:**

00:00 – Introduction and review of the previous Tutorial
00:54 – Explanation of track diagram and Blocks used for this tutorial
02:21 – Creating the Shuttle Train Route in the Route Editor – Item and Block Tabs
03:31 – Interim Block using the Strict checkbox to ensure route adherence
05:04 - Explanation of Wait – Chance, Min, and Max
05:46 - Entering the return section of the Shuttle Train Route
06:52 – Setting the number of times the Shuttle Route will Repeat in the Options Tab
07:27 – Review of the Shuttle Train Route and Wait times.
08:13 – IMPORTANT – Last Step in Route and Wait time
08:56 – Saving the Shuttle Train Route
09:08 – Determining where the train should stop in the Shuttle Train Route
10:41 – Assigning the Train that is to be tested for Reaction Delay – Train Properties – Routes Tab
11:39 – Selecting the Shuttle Train Route in the Train Control window – Route Dropdown menu
11:55 – Starting the Shuttle Train Route in the Overview window
12:07 – Testing the Shuttle Train Route in Offline Mode

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## Tutorial 19: Speed Measurement Methods

https://youtu.be/b4BuBIRamXk

**Timecodes:**

00:00 – Introduction
00:20 – Opening the Speed Measurement Feature – View Menu dropdown
00:42 – Explanation of the Device Method
01:30 – Explanation of the Two Feedback Method
03:28 - Explanation of the Center Feedback with Side Feedbacks Method

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## Tutorial 20: Preparing a Locomotive for iTrain (part 4) - Additional Details

https://youtu.be/CQFh7NPSRI4

**Timecodes:**

00:00 – Introduction and review of previous Tutorials
00:48 – Detailed explanation of Step 2: Setting CV3 & CV4
03:39 - Detailed explanation of Step 3: Creating Speed Profile
04:25 – Explanation 128 Step Decoder vs 126 Speed Steps
07:23 – Detailed explanation of Step 4: Inertia Simulation – Speed Steps
13:29 – Graphical representation of iTrain to Decoder Signal Path
18:35 - Detailed explanation of Step 4: Feedback Offsets with a note for 3-rail users

## Tutorial 21: Train Route Basics using Blocks - Part 1

https://youtu.be/p0_EG3hw6v4

**Timecodes:**

00:00 – Introduction
01:14 - Track Routes - Overview
02:29 – Instant Routes – Overview
03:36 – Train Routes – Overview
05:01 – Automatic Routes – Overview
05:43 – Explanation of Test Track
08:06 – Opening the Train Route Editor
08:50 - Creating a New Train Route – anti-clockwise loop – CHECK Direction
16:37 - IMPORTANT – Last step (or at least one step) in Train Route must have a 100% chance of waiting
18:20 – Repeating Train Routes – a value of zero will keep repeating until you manually stop
19:32 – Applying the Train Route to a Train
21:13 – Positioning of the Train on the layout and check orientation
23:34 – Different ways of starting a Train Route
23:57 – Inserting a route element on the Switchboard and Grouping
25:25 – Using the route element – difference between Stop and Finish
27:10 – Starting the Train Route to test it in offline mode

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## Tutorial 22: Train Route Basics using Blocks - Part 2

https://youtu.be/67Vkxa76Td4

**Timecodes:**

00:00 - Introduction
00:18 – Adding a stop and extra blocks in the Train Route
02:00 – Using the Selection Dropdown Menu (In Order and At Random)
03:58 – Setting waiting times in a Train Route
04:51 – Setting the Repeat Option in the Options Tab
05:22 – Spotting the deliberate mistake – testing the behaviour of the Train Route in Offline Mode
10:00 – Opening the Train Route Editor to look for the problem - IMPORTANT lesson on Direction Next / Pervious – making and applying the changes
15:16 – Testing the corrected Train Route in Offline Mode

## Tutorial 23: Train Routes using Markers and Shunting

https://youtu.be/97pzxN4JqGY

**Timecodes:**

00:00 – Introduction and explanation of what is to be covered
01:18 – Opening the Train Route Editor and inserting new steps at the beginning and end
02:35 – Setting the Direction for the two new steps – IMPORTANT – make sure it is correct.
02:54 – Setting the Wait time – IMPORTANT – last step must be 100%
03:43 – Using Markers to create a loop – IMPORTANT – for a loop to work the end step must be the same as the starting step.
04:32 – Creating a Marker
05:14 – Setting the number of times for the Train Route to repeat
05:50 – Testing the Train Route with Markers – looking for and correcting mistakes
06:11 - "Route not possible from this position" Don't forget to select the Train Route for the particular train.
06:40 – Not stopping in the first block of the loop – You must insert a wait time
07:30 – Testing the Train Route after correcting the errors
07:59 – TIP : To skip the wait – left click and hold on Block and cancel waiting
09:21 – Checking the Train Route for longer trains – remember to assign the Train Route to the new train
13:00 – Train stuck in last Block and unable to move into siding. Turnouts not released.
13:46 – TIP : Clear locked turnouts by long left click on Block and select "Release track route"
13:55 – Making sure your train is able to fit into the Block
16:36 – Error – "Train cannot continue"
17:09 – Checking the Type of Train Route and explanation of Default – Shunt – Mixed
18:23 – Using Mixed Type and selecting which Blocks to allow shunting
19:21 – Explanation of "Enter occupied Block" tickbox – number of feedback sensors required
23:10 – Testing the Train Route as a Mixed Type

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## Tutorial 24: Train Route Markers (part 2)

https://youtu.be/P-UmVtVXpuA

**Timecodes:**

00:00 – Introduction
01:32 - Opening Train Route – Recap and new additions
02:28 – Removing the chance of Waiting to save time and setting loop frequency
03:40 – Making sure that the Shunt Option is checked – Setting Mixed or Shunt Type
04:25 – Adding two platforms to the Train Route – Check the direction – Select At Random
05:20 – Checking the Steps to ensure that the rules are obeyed
06:19 - Deliberate Mistake Warning
06:34 – Testing in Offline Mode – Checking the Properties of the Electric Locomotive
08:03 – Note about Train and Block modification for this Tutorial – Train able to operate in both directions without the need to shunt
09:02 – Making sure Train Route is selected and begin testing the untested sections

09:43 – First test going to SP3– ERROR – Train cannot continue
10:32 – Second Test going to SP2 – TRICK to disable Block – Alt + Click on Block Icon – Block turns grey
11:16 – Second Test going to SP2 – ERROR – Train cannot continue
11:46 – Third Test going to SP1 – Success
12:47 – Investigating the problem and finding solutions
17:42 – Testing with a Train that requires to Shunt – ERROR – Train cannot continue
19:38 – Investigating the problem – Trying to Shunt within Markers - and discussing the possible solutions
22:08 – Introduction to Actions and Relays – A modular approach – smarter, dynamic and intelligent

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**Tutorial 25: Train Routes (part 3)**
https://youtu.be/Aren3ZmdrPw

**Timecodes:**
00:00 - Introduction
00:17 - Action Tabs - General Explanation
02:17 - Entry Actions
04:09 - Delay
04:38 - NB: Always have at least a small delay for the first step
05:09 - Type - doubles click on cell to select
05:22 - Train Function
06:50 - Aspect
08:08 - Relay
08:19 - Lights
08:32 - Sound and Decoupling
08:40 - Managing Actions
09:23 - Waiting & Departure Actions
10:05 - NB: If you have multiple blocks - all actions apply to each block
10:25 - Setting Entry Actions - Practical example - Headlights & Sound Horn
It is very important to understand the next two sections of this tutorial
14:29 - How Train Route Functions are Mapped - Graphic & Explanation
17:34 - How Train Route Functions are Mapped in iTrain
Mapping to f Keys is very important

## Tutorial 26: Train Routes (part 4)

https://youtu.be/89YJi_L-tx4

**Timecodes:**

00:00 - Introduction
00:45 - The Position Field - Default / Start / End
02:39 - The Station Option
04:10 - The Options Tab - Reservation Count and Reserved Start
07:14 - The Options Tab - Direction Change
07:57 - The Options Tab - Set turnouts always
08:30 - The Options Tab - Use type Permissions
09:46 - The Options Tab - Continuous Route
10:35 - Summary of Train Routes - Rules and Recommendations with Graphic

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## Tutorial 27: Introduction to Automatic Routing & Stations (Part 1)

https://youtu.be/TpB4hROif2E

**Timecodes:**

00:00 - Introduction
01:08 - Automatic Routing - General Explanation
01:55 - Definition of Stations
02:45 - Automatic Route - path selection criteria
06:12 - Stopping / Starting / Finishing an Automatic Route
07:35 - Running Automatic Routes without setting up Stations
08:13 - The benefits of Automatic Routing
10:22 - Defining the requirements for Automatic Routing
12:10 - Defining Station Types - explanation with Graphic
14:28 - Important things about Automatic Routes - explanation and Graphic
18:11 - Train Types - refresher
19:50 - Changes to the Test Layout used in the Tutorial

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## Tutorial 28: Introduction to Automatic Routing & Stations (Part 2)

https://youtu.be/T23GdhjpKrw

**Timecodes:**

00:00 - Introduction
01:28 - Explanation of the importance on the interaction of the various parameters : NB!!
02:18 - Automatic Routing without a Route - NO Route selected in Train Control window
04:02 - Overview of Parameters that iTrain uses to run Automatic Routes
06:03 - Recap of fundamental lessons to ensure better understanding of Automatic Routing
14:00 - Explanation of content of upcoming Tutorials.

## Tutorial 29: Automatic Routing - Creating a Station

https://youtu.be/JTItV8AMh18

00:00 - Introduction
00:52 - Definition of a Station
01:43 - Defining a Station and choosing locations of Stations
05:37 - Drawing a Station in the Switchboard
09:01 - Creating the Station Object
10:11 - Deleting a Station Object
11:20 - Adding and Removing Blocks manually in Station Properties

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## Tutorial 30: Automatic Routing - Station Types

https://youtu.be/9RDMql8Flbk

**Timecodes:**
00:00 - Introduction
00:57 - Station Properties - Type Field - Recap and examples for each type
Shadow Station / Passenger / Cargo / Shed / Other
06:27 - Influence of Types in Automatic Routing - only to select certain types of blocks when creating a new Station

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## Tutorial 31: Automatic Routing - Station Selection (Part 1)

https://youtu.be/PY-xzyuIa3g

**Timecodes:**
00:00 - Introduction
00:20 - Station Selection - Overview with Graphic
01:24 - The Basics of Automatic Routes - Explanation
02:22 - In Order - explanation with example - Wait times set
07:51 - Testing the Automatic Routing with out a Route
10:38 - Making blocks occupied and noting the effect
11:37 - Changing the order of the Blocks in the Station and noting the effect
12:32 - Removing the Wait from a Block and noting the effect
14:48 - Changing the Direction of the Blocks and noting the effect
18:53 - Changing Blocks in the Permissions Tabs in the Locomotive Properties and noting the effect
21:14 - Changing Blocks in the Permissions Tabs in the Trains Properties and noting the effect
22:19 - Changing Blocks in the Permissions Tabs in the Train Type Properties and noting the effect
23:39 - Demonstrating with another Train to reinforce the lesson
25:53 - Overview of Block selection
27:38 - Demonstration of when Selection Criteria is ignored - Wait removed in Station Editor - Train Type
30:38 - Reducing the percentage chance of Wait to below 100% and noting the effect

## Tutorial 32: Automatic Routing - More on Permissions

https://youtu.be/DTOalSxx7zs

**Timecodes:**

00:00 - Introduction and recap of Station Selection (Part 1)
02:50 - Permissions Tabs - No Access / Only Access to - explanation and practical demonstration
07:14 - Making Permissions Direction sensitive - Both / Next / Previous with examples
11:21 - Hierarchy of Permissions in the Permissions Tab
12:31 - Permissions Hierarchy - Graphic Illustration - The Family Tree
15:06 - Editing the Permissions of a Wagon to Deny Permission and noting the effect
16:09 - Practical example of effect of Deny Permission for a Wagon
18:14 - Editing the Permissions of a Locomotive to Deny Permission and noting the effect
18:53 - NB !! - Set up Permissions are transferred when changing the makeup of Trains
19:31 - Editing the Permissions of a Train to Deny Permission and noting the effect
20:58 - Practical example of effect of Deny Permission for a Train
23:00 - Editing the Permissions of a Block in a Station (removing the Wait) to Deny Permission and noting the effect
24:50 - Summary of the Tutorial

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## Tutorial 33: Automatic Routing - Selections - At Random

https://youtu.be/UZWfAr7fQ3Y

**Timecodes:**

00:00 - Introduction and Recap
01:04 - Explanation of Demonstration Set-Up
01:46 - At Random - Explanation
02:30 - Demonstration of At Random with Automatic Routing without a Train Route
04:31 - Using Train Route with At Random selection method
04:55 - Creating a new Train Route using At Random
08:33 - First block must be the same block as the final block ONLY in repeating loops
09:23 - Assigning the Train Route to a Train
10:06 - Testing the Train Route - discovering a problem and fixing the mistake
11:44 - Testing the Train Route - success
12:48 - Adding an extra At Random to the Train Route - testing – success

## Tutorial 34: Automatic Routing - Selections - Optimal Length (Part 1)

https://youtu.be/V5-vs495tSk

**Timecodes:**

00:00 Introduction
00:48 Definition of Optimal Length
02:00 The Purpose of Optimal Length
02:26 Examples of use
02:55 Calculating Usable Length = Block Length - Margin
03:16 Margin values for 00 gauge, 1:76 scale
04:43 Definition of Margin
05:58 Margin values for N gauge, 1:148 scale
07:10 Test Layout Setup
08:31 Station Properties Setup and Block Order
08:56 Test of Train Length vs Usable Block Length
10:39 Example 1 - Shortest Train (DB_IC) into Shortest Block
12:40 Example 2 - DB_CAR into Middle Block
14:00 Example 3 - DB_POL into Longest Block
15:38 Example 4 - Train too long for all blocks
17:17 Train Length Test Check Box
19:07 End Summary
20:44 End

---

## Tutorial 35: Automatic Routing - Selections - Optimal Length (Part 2)

https://youtu.be/EXV2bBE9FrE

**Timecodes:**

00:00 Start
01:00 Introduction
02:50 Stopping Position Example
07:35 Secret of Consistent Operation
08:10 Example 1: Block Arrangement Diagram
09:14 Margin Definition
10:18 Usable Block Length
10:52 Train Length vs Usable Block Test
12:10 Block Stop Positions
15:07 Train Enters Block – Too Long!
16: 40 Too Long Resolved
17:45 Example 2: Reverse Direction
18:50 Example 3: Rule of Thumb (Next)
21:00 Example 4: Rule of Thumb (Previous)
22:11 Using a Platform
25:25 Deselecting Align Along Platform
26:00 Example 5: Full Length Platform
26:30 Defining a Full Length Platform
28:40 Example 6: Offset Platform

29:49 Defining an Offset Platform
33:00 Summary
36:20 End

---

**Tutorial 36: Automatic Routing - Selections - Optimal Direction**
https://youtu.be/uJtkYPHp56A

**Timecodes:**
00:00 Start
00:17 Introduction
00:30 Optimal Direction Definition
01:37 Test Layout Set Up
02:56 Blocks Aligned to Direction of Travel
04:58 Block Against the Direction of Travel
05:56 Bidirectional Block
06:08 Preferred Direction Block
07:08 Uni-directional Block
07:37 Order Selection Explanation
09:03 Summary
10:02 End

---

**Tutorial 37: Automatic Routing - Shortest Path (part 1)**
https://youtu.be/eM4QEPjeTS8

---

**Tutorial 38: Automatic Routing - Shortest Path (part 2)**
https://youtu.be/9n1Mf4QPDzk

---

**Tutorial 39: Automatic Routing - First Allowed Block Selection**
https://youtu.be/7IdCP9tyedQ

**Timecodes:**
00:00 Start
00:18 Introduction
01:45 First Allowed Definition
03:11 Example Introduction
06:42 Example Scenario
08:42 Example Using Automatic Routing
09:04 Station Properties
10:46 Block Selection Order
13:16 Example In Action Using Auto Routing
17:32 Example Using a Train Route
18:27 Example In Action Using a Train Route
19:58 Difference compared to In Order
26:32 Using Block C only for cargo
29:45 Intro to next Tutorial
30:22 End

## Tutorial 40: Stations - Blocks Tab

https://youtu.be/aphqdJdeuoA

**Timecodes:**

00:00 Start
00:17 Introduction
01:20 Blocks Tab Overview
02:28 Type Column
03:07 Name / Description Column
03:22 Direction Column
04:30 Track Column & Track No. Field
07:00 Wait Column & Wait Allowed Field
07:28 Length Column & Check Length Field
11:04 Column Shuttle
11:37 Pass Column
11:57 Tick Combinations & Block Truth Table
19:15 Shuttle Level & Pass Level
20:28 Summary
20:38 How to download the Truth Table
21:00 Intro to next Tutorial
21:50 End

---

## Tutorial 41: Station - Train Types Tab

https://youtu.be/nozhlaxsSbE

In this tutorial we look at the Station Train Types tab, and see how to include or exclude particular train types from using a Station.

**Timecodes:**

00:00 Start
00:18 Train Types Overview
01:58 All Train Types
03:40 Percentage Chance of Wait
03:58 Wait Duration
05:05 Direction Change
07:00 Adding Specific Train Types
10:58 Removing All Train Types
11:25 Summary
11:30 Intro to next Tutorial
12:08 End

## Tutorial 42: Station – Percentage Chance of Wait

https://youtu.be/kbUlPLAlQV8

It is about the effect that % chance of a wait has on the selection of the destination block during Automatic Routing without a route.

**Timecodes:**

00:00 Start
00:20 Introduction
02:00 Test Layout Configuration
02:47 Wait % Chance Setting
03:45 Block Selection Method Criteria
04:45 Example 1 – Wait Chance = 100%
06:27 Quick Explanation of Example 1
07:05 Full Explanation of Example 1
14:20 Example 1 – Wait Chance = 50%
17:32 Example 1 In Action
19:05 Info Box Explanation
19:45 Example 2 – Wait Chance = 100%
20:55 Example 2 – Wait Chance = 50%
23:50 Example 2 In Action
25:55 Info Box Explanation
29:50 Summary
30:22 Next Tutorial Introduction
30:53 End

---

## Tutorial 43: Stations – Thresholds

https://youtu.be/nBDWXKafeYE

In this tutorial we look at the last of tabs in the Station, the Options tab, and show how the Threshold parameter can be used to regulate the number of trains that are allowed to run on the main layout.

**Timecodes:**

00:00 Start
00:20 Introduction to the Options tab
00:40 Threshold Definition
01:15 Inactive Blocks
02:10 Examples of different yards
03:36 Test Layout Setup
05:20 How to add more Throttles
07:07 Demonstration without Threshold
12:00 Threshold Demonstration Setting 1
17:00 Threshold Demonstration Setting 3
19:00 Intro to next Tutorial
19:45 End

## Tutorial 44: Automatic Routing – Exercise 1 (Definition)

https://youtu.be/aPGWGDurSkU

In this tutorial, we set an Exercise to practise some of the things we have learnt about Automatic Routing without a route, and the use of Stations.

---

## Tutorial 45: Automatic Routing – Exercise 1 (part 1)

https://youtu.be/Q_hW2IlEXuQ

In this tutorial, we complete part 1 of Exercise 1, and show some hints and tips for debugging problems.

**Timecodes:**
00:00 Start
00:20 Introduction
04:43 The Intercity Train
06:14 Station START methods
07:30 Station FINISH methods
12:36 Station PASS methods
13:45 Block state methods
15:00 Intercity Orientation Error
17:45 Intercity first loop
19:25 Cancelling a Wait
22:15 Intercity second loop
22:35 Simulating Block Occupancy
24:00 Making a Station Entry for Intercity
26:18 Intercity third loop with random waits
29:50 Summary
32:25 End

---

## Tutorial 46: Automatic Routing – Exercise 1 (part 2)

https://youtu.be/M4iqu7NDkqk

Shuttle train with change of direction.

**Timecodes:**
00:00 Start
00:30 Shuttle Train Scenario
01:38 Block Directions
03:05 Setting bi-directional blocks
04:00 Station 1 Settings
04:36 Train Types Tab
06:14 Direction Change Check Box
08:20 All Train Types Entry
09:30 Station Blocks Tab

11:44 Setting Block B2 to BOTH
15:33 Station 2 Settings – set B4 to BOTH
16:23 Add the Shuttle Entry to Station 2
17:28 Prevent Shuttle using B1
22:08 First Test Run
22:45 Finding the reason for no direction change
38:45 Summary of changes
42:39 End

---

**Tutorial 47: Automatic Routing – Exercise 1 (part 3)**
https://youtu.be/zYPOpqOahkU

Running both trains simultaneously.

**Timecodes:**
00:00 Start
00:20 Introduction
00:40 Overview of settings
07.10 Starting and Stopping all trains in a Station
10:00 How to set the starting train – Priority Setting
11:05 Operation of both trains running simultaneously
17:40 Caution if Cancelling a wait
18:15 Change of direction reverts to direction Next
19:40 Summary of simultaneous operation
22:30 Your solutions to the Exercise
23:45 How to handle deadlocks – Critical Blocks
30:40 Operation using the Station Threshold
34:20 Operation using a Train Route
42:20 Summary wrap up
42:50 Using Actions – subject of the next tutorial
44:06 End

---

**Tutorial 48: ACTIONS - Overview**
https://youtu.be/ktk1z2RBVik

In this tutorial we provide and overview of Actions; describing what an Action is, and what an Event is. There is also an overview of the Actions Editor, describing the Condition Tab, OR and AND Groups, and the Execution tab.

**Timecodes:**
00:00 Start
00:11 Introduction
02:00 Run-around Video Clip
03:10 Test Layout
03:50 What are Actions?
04:39 Events
05:40 Event Analogy – Push Button Switch

08:15 Action Editor Overview
09:10 Condition Tab
11:10 OR Group
11:32 AND Group
12:27 Execution Tab
14:15 Applying an Action
15:40 IF-THEN not IF-THE-ELSE
17:20 Summary
18:35 End

---

**Tutorial 49: Actions - Light ON/OFF Action Example**
https://youtu.be/tYF4lmaVaP4

In this tutorial we create our first, simple Action to turn on a light, and then learn why we also need to create an action to turn off the light.

**Timecodes:**
00:00 Start
00:11 Introduction
01:40 Animation of Example
06:56 Feedback Delay Settings
07:45 …Animation continued…
10:00 Adding a Light to the Layout
11:35 Creating the Light ON Action Condition
14:00 Creating the Light ON Action Execution
15:40 Testing the Light ON Action
17: 00 Need for a Light OFF Action
18:00 Creating the Light OFF Action using Copy
19:20 Testing the Light OFF Action
19:45 Animation of Light ON and Light OFF
20:20 Is an OFF Action always needed?
21:00 Making an Action Active and Inactive
22:52 End

---

**Tutorial 50: Action Buttons**
https://youtu.be/iPaneiB-9l4

In this tutorial we look at the use and creation of Actions buttons.

**Timecodes:**
00:00 Start
00:18 Introduction
02:00 Ways of Using an Action Button
03:00 Creating an Action Button in the Switchboard
05:00 ALT-Click to make Active/Inactive
07:00 Number of Active Executions
08:15 Pausing and Restarting an Action with SHIFT-Click

09:37 Starting the Execution manually – ignoring Condition
10:54 Action Button Summary
11:44 Next Tutorial
12:20 End

---

## Tutorial 51: Actions - Sound Action using Block Conditions

https://youtu.be/jgSlLoqlyBI

In this tutorial, we continue the mini-series on Actions, this time creating an Action that plays a sound file when a particular train enters a block. The advantage of using a Block condition instead of a Feedback condition is that it allows us to select a particular train or train type.

**Timecodes:**
00:00 Start
00:18 Introduction
01:00 Creating the Sound Object
02:30 Creating the Condition using Blocks
05:00 Creating the Execution
05:40 Testing the Action
07:25 End

---

## Tutorial 52: Actions - The OR Operator

https://youtu.be/dSGRotjw-ec

In this tutorial we look at the logical OR operator which is used to group multiple sub-conditions together and perform a logical OR operation on the group. A logical OR operation means that only one input to the OR group needs to be true for the output of the OR group to be true.

**Timecodes:**
00:00 Start
00:20 Introduction
01:50 Logical Operators
03:15 Single OR Animation
04:15 Difference between an Event and a State
07:25 Multiple Input OR Group Animation
11:40 Creating an OR Action
18:55 Testing the OR Action
21:00 Creating a Virtual Relay
23:00 OR Operator Summary
24:01 End

## Tutorial 53: Actions - The AND Operator (Pt 1)

https://youtu.be/__ZYkVnEzw8

**Timecodes:**

00:00 Start
00:20 Introduction
01:00 OR/AND/MIXED diagram reminder
02:00 OR Explanation review
03:00 AND operation explanation
07:00 Dual-Mode and Trigger-Only elements
08:45 Table of Condition Elements
10:00 Rule #1
13:15 Rule #2
15:40 Wrap Up
16:25 How to download the table
16:50 End

---

## Tutorial 54: Actions - AND Construction

https://youtu.be/09biPwXh9qw

Intro to Static and Dynamic elements; Scenario Exercises.
In this tutorial we construct an AND-based Action with two Dual-Mode Condition Elements and using Rule 1. We explain the operation of the AND condition using animation; we introduce static and dynamic elements; and provide eight different scenarios and AND-based conditions to practice on.

**Timecodes:**

00:00 Start
00:30 Introduction
00:50 Rule 1 Review
02:10 Rule 2 Reminder
03:00 Explaining the Diagram of an Action
08:00 Creating the Action in the Editor
12:35 Testing the Action
14:14 Animation of the Action
21:00 Animation of the Action in Reverse Order
24:30 Introduction to Static and Dynamic Conditions
29:00 Scenario Exercise
29:35 Scenario 1
30:40 Scenario 2
30:50 Scenario 3
30:58 Scenario 4
31:05 Scenario 5
31:19 Scenario 6
31:24 Scenario 7

31:28 Scenario 8
31:32 Scenario Summary
32:53 END

---

## Tutorial 55: ACTIONS (part 3) - Static & Dynamic Element Scenario Exercises

https://youtu.be/YTzV5GjGisQ

This tutorial includes:

- Static & Dynamic Condition Elements
- Scenario Exercises answers and descriptions
- Condition Elements Table
- Reference States
- OFF States

**Timecodes:**

00:00 Start
00:30 Introduction
01:15 Static and Dynamic Condition Elements
01:45 Table of Conditions
02:00 Testable States (Reference States)
02:45 Static Elements
03:50 Dynamic Elements
05:05 Trigger-Only Elements
05:45 Static and Dynamic Summary
06:25 How to view this tutorial
07:00 Scenarios Answers 1,2,4,5,7
08:00 Scenario #1
08:15 Reference States
12:43 Scenario #2
14:36 Scenario #3
16:35 Scenario #4 with OFF states
22:28 Scenario #5
24:40 Scenario #6
26:12 Scenario #7 with OFF states
30:00 Scenario #8 with OFF states
32:30 Recap Summary
35:06 End

## Tutorial 56: ACTIONS - TIME

https://youtu.be/EBUgx7M97yQ

In this tutorial we look at the TIME condition element and see examples of using TIME as a state and as a trigger. We also look at setting the iTrain system clock.

**Timecodes:**
00:00 Start
00:12 Condition Table – Time Overview
01:40 Testable state of Time
02:30 Setting Time
03:15 The 60 second Active period
03:35 Time based on iTrain clock
04:05 Time Factor – iTrain Clock Speed
05:55 Diagram of TIME active state
08:00 Action demonstrating TIME active state
09:00 Stopping and Editing the Clock window
12:00 Using TIME as a trigger – Route Scheduler Example
17:00 Testing the Route Scheduler Example
19:00 Summary
20:19 End

---

## Tutorial 57: ACTIONS - VALUE (8BIT)

https://youtu.be/WDcPzAlMyfE

In this tutorial we look the the Value (8 bit) feedback used as an Action Condition; look at the hardware set up needed to support the physical device; describe the obstacles the prevent the Value (8 bit) being more commonly used; and see how it can be used as a virtual device.

**Timecodes:**
00:00 Start and Introduction
00:27 Value 8 bit rarely used, so…
01:07 Beginning of tutorial
01:30 Normal feedbacks
02:05 Value (8 bit) – 256 states
02:40 Value (8 bit) – purpose
03:00 Value (8 bit) – sensor examples
03:50 8 bit numbers – description (binary)
04:00 Why it is called Value (8 bit)
05:00 Standard vs Value 8 bit condition
05:35 Boolean Operators (Equal, Greater, Less, Not)
07:38 Range of values Condition example
08:30 Three obstacles to using the Value 8 bit
08:45 i - Needs the OC32 Accessory Decoder
09:50 ii - OC32 uses up an Interface allocation

11:42 iii – Lack of Applications and Sensors
12:38 Hardware set up diagrams
16:05 Aspect also uses 8 bit data
17:06 Summary of the three obstacles
17:15 Value 8 bit – Virtual Device example
19:10 Value – changing manually
20:10 Range of values example
21:15 Wrap up Summary
23:04 End

---

**Tutorial 58: Actions – Aspects - Introduction**
https://youtu.be/cyzGsIYdVoM

We are continuing to look at the Condition Elements used in Actions. In this tutorial we look at the Aspect. It is a device that is able to switch between 32 different states (increasing to 256 states in the future release of iTrain 5.1). Primarily, it is used to display information on our layouts, but can also be used as a general accessory. The ability to switch between multiple states makes it a flexible and creative tool, especially when used in Actions.

In this introduction to Aspects, we definite what it is, how it fits into the category of Accessories, and how it might be used.

**Timecodes:**
00:00 Start
00:27 Introduction – value 8-bit vs aspect data flow
02:30 Aspect hardware requirements
05:10 Accessories Overview
06:50 Aspect is a General Accessory
07:50 Aspect is a dual-mode, static device, used as a trigger or a state in an Action
08:20 Aspect Definition
08:30 Aspect 32 States (256 states in iTrain 5.1)
09:00 Used for displaying information
09:30 Examples of use
09:50 Physical Object
10:30 Switchboard Element
11:10 Control Object
11:50 Aspect Switchboard Element only displays state
12:20 Physical Element displays information
13:20 Theatre Route Indicator examples
14:25 Train Departure Board example
15:10 32 states map to 32 display patterns
16:00 Aspect Summary
18:56 End

## Tutorial 59: Actions – Virtual Aspects

https://youtu.be/eOUPzxFbjjI

In this tutorial we create and define a virtual Aspect in preparation for use in an Action.

**Timecodes:**
00:00 Intro
00:26 Physical Aspect vs Virtual Aspect
03:00 Train Route Action example vs Stand Alone Action example
04:50 Describing the Action example
05:17 Creating a new Aspect graphical element on the Switchboard
05:50 Defining the Control Object in the Aspect Properties
07:12 Aspect Initial State
08:35 Defining a Virtual Aspect
09:35 Enabling the displayed States in State Mapping
09:50 Renaming the States
12:15 Manually selecting the displayed state
14:00 Summary
15:10 End

---

## Tutorial 60: Actions – Using a Virtual Aspect (part 1)

https://youtu.be/PGUmGSsipvI

In this tutorial, we create an Action, using a virtual Aspect, that detects the entry of a train into a block and then increments the state of the Aspect.

This is the first of two actions which will run simultaneously and together will form a kind of counter. The second action is described in video #61.

Note: This tutorial covers Action operation in iTrain 5.0.x. Future versions of iTrain may have different features available and so methods of use may vary.

**Timecodes:**
00:00 Start
00:10 Introduction – Creating an Action using a virtual Aspect
01:35 Description of the Action Example
02:15 Breaking the task into two Actions
- Detect the entry of a train into a block and increment the Aspect state
- Detect when Aspect is state 3 then start a train on a route
03:25 Creating the Condition to detect the entry of a train into a block
08:00 Creating the Execution to increment the Aspect's state
14:40 Action summary
15:00 Testing the Action in simulation
16:50 Summary and description of next tutorial
17:33 End

## Tutorial 61: Aspects – Using a Virtual Aspect (part 2)

https://youtu.be/9fD3nq-Fb0Y

- The Actual Train variable
- Test track footage

In this tutorial we create a second Action which detects when the train has entered a block for the third time, and then triggers the execution of commands which start a different train on a route. The two Actions combined use a virtual Aspect and operate as a kind of counter.

A new Subtitles method has been added to this video, and now supports Dutch, French, German, Italian, and Spanish translations.

Turn on Subtitles by clicking on the Subtitle button and select the language using the Settings button.

For those that get to the end of the tutorial, there is bonus footage showing the Actions performing on a real test layout.

It's an N gauge layout, using Peco track.

The trains are controlled by a BiDiB Bidirectional Bus Station controller, and the MTB MP5 point motors are controlled by a DR5000 connected to a DR4018.

On my main 00 layout everything will be BiDiB controlled.
Ignore the reversing loop that you can see. That's for some future experiments.

This test layout is mounted on an old lightweight flat door, and everything is mounted on the top side of it, which makes it very easy to pack away and move to different areas of the house. And being N scale I was able to fit everything conveniently within the size of the door.

**Timecodes:**
00:00 Start
00:16 Action 60 summary
01:10 Action 61 purpose
01:55 Action button benefits
02:45 Creating Action 60 Action button
04:20 Add a delay to the Execution command
05:00 Add delays when multiple Execution commands are used
06:40 Testing the Action button
06:55 Purpose of the figure shown in the Action button
07:15 Start of creating Action 61
08:00 Action 61 Condition creation
09:00 Action 61 Execution creation
09:24 Using the Train Route command on its own

11:15 Using the Actual Train variable
14:30 Reconfiguring the Train Route command using Actual Train
16:00 Train Route selection
17:20 Preventing “Route not possible…” error
18:30 Refer to tutorial #23 for information on shunting within a train route
19:00 Action 61 Action button
19:30 Testing the Actions using the Action button
21:30 Action problem
22:40 Action problem solution – reset Aspect to 0
24:30 Testing the modified Action
25:15 Testing in Simulation
29:20 Bonus footage of my real, physical test track
31:52 End

---

Don't forget to subscribe to the YouTube channel, it's completely free, and also press the bell icon so that you receive a notification when a new video has been posted.

I hope you find them useful.
Bob