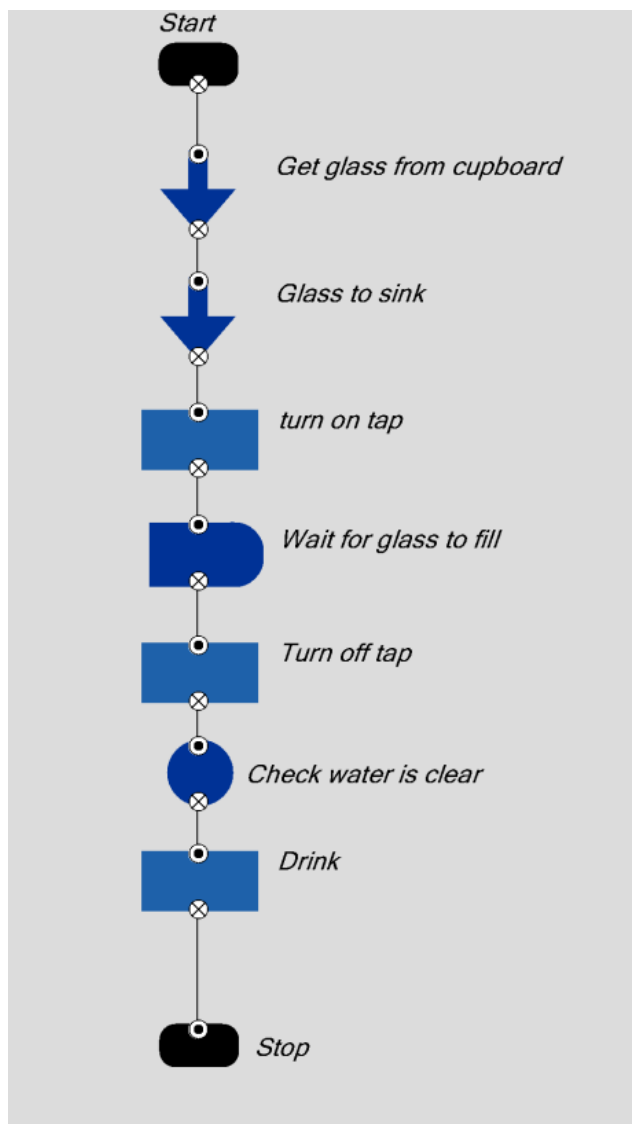


Chapter 1 - Process mapping.

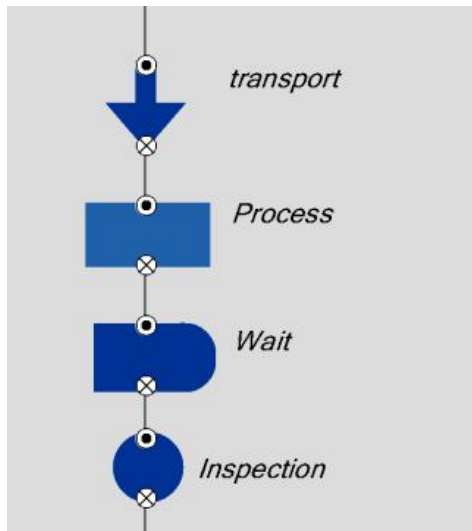
In this chapter we will look at the technique of manufacturing process mapping and how Aliquis can be used to generate a map. We will also look at how the map can be animated to assist in discussions around the process.

Why are process maps important?

We all adopt processes to achieve results in any remotely sophisticated tasks. Here's a top level process map for drinking a glass of water....



This is obviously a trivial and low cost example – but it shows some basic elements. Firstly the different symbols that are used...



Unfortunately there does not appear to be any world wide standardisation of these graphics. In addition, you may see process maps with data related blocks (used more in business systems) . In this library the set is limited but effective.

By mapping your manufacturing processes in this way you achieve two things :

Firstly, you can discuss the process with other people using a graphical method. So you might say – what about washing up? Or I don't look at the water – I just drink! This enables groups of people to come to a *common* understanding of the processes they operate.

Secondly, everything, apart from this type of block,



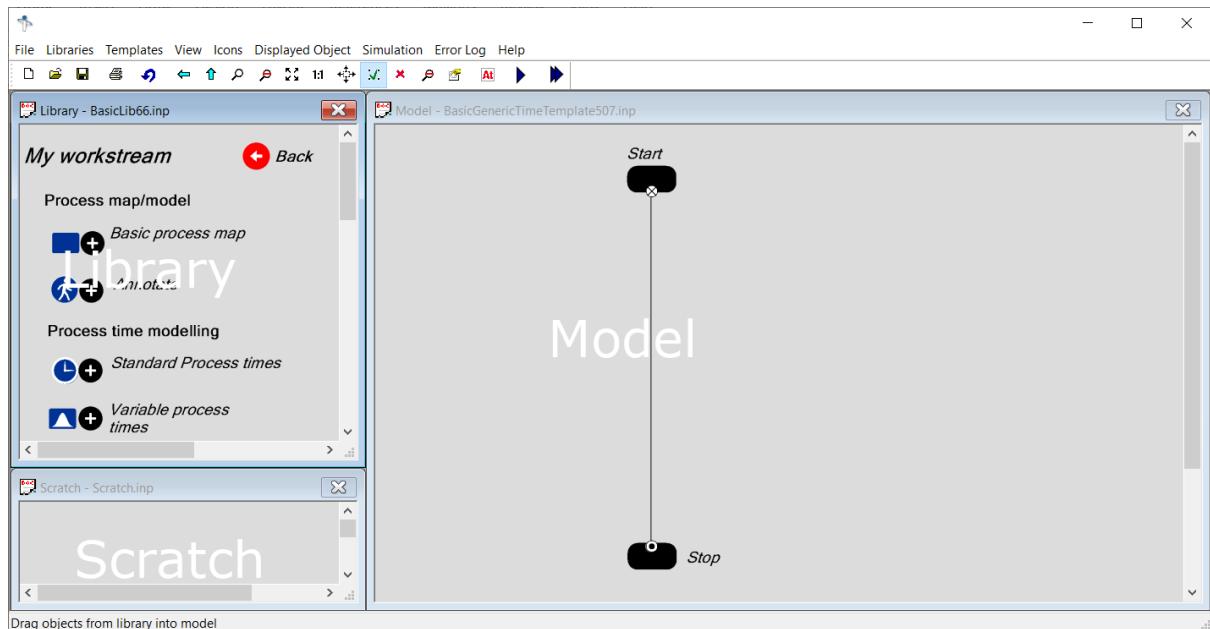
represents waste. Waste process elements do not add value. They do add cost.

Waste cannot be eliminated completely in manufacturing processes, but it can be reduced.

By mapping the process, using the correct symbols, you can immediately get a better idea on how waste can be reduced and value maximised.

Building process maps with Aliquis

Aliquis out of the box :



Like most Windows programs, Aliquis is driven by menus and a toolbar which can be found at the top of the application window. In addition, there are three areas of importance:

Library

The default installation of Aliquis gives you the basic library - a number of *sub-libraries* containing more *sub-libraries* and *blocks*.

Model

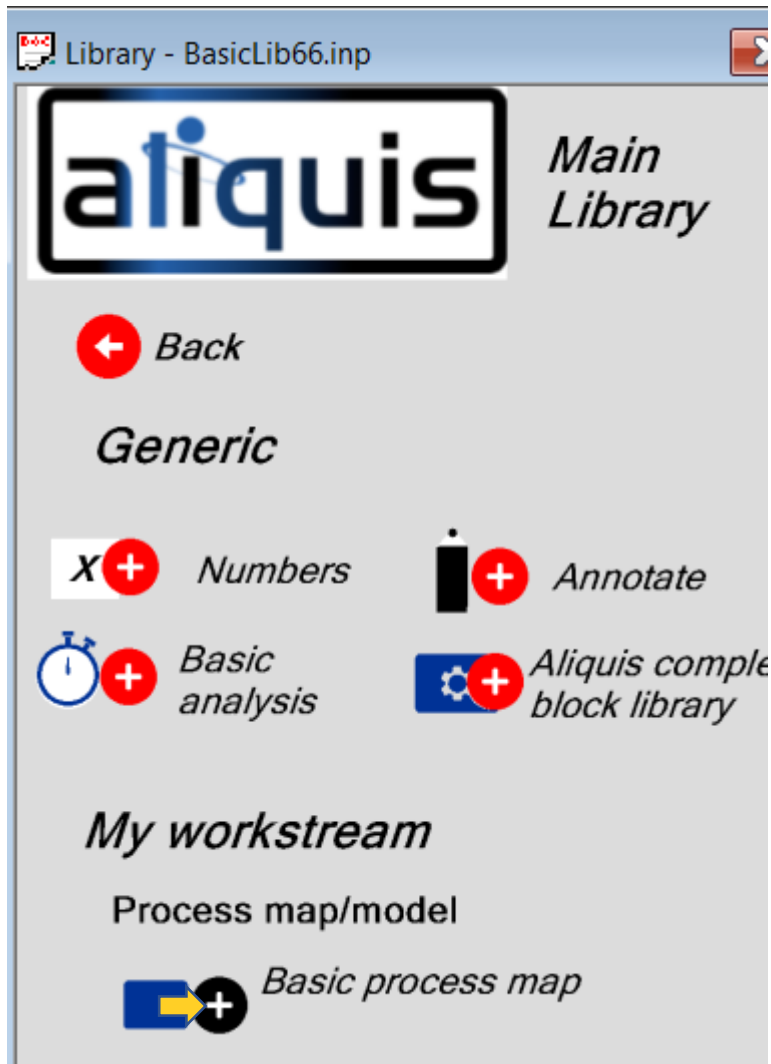
This is your Aliquis model. The default installation contains the basic template which already contains a start and stop block

Scratch

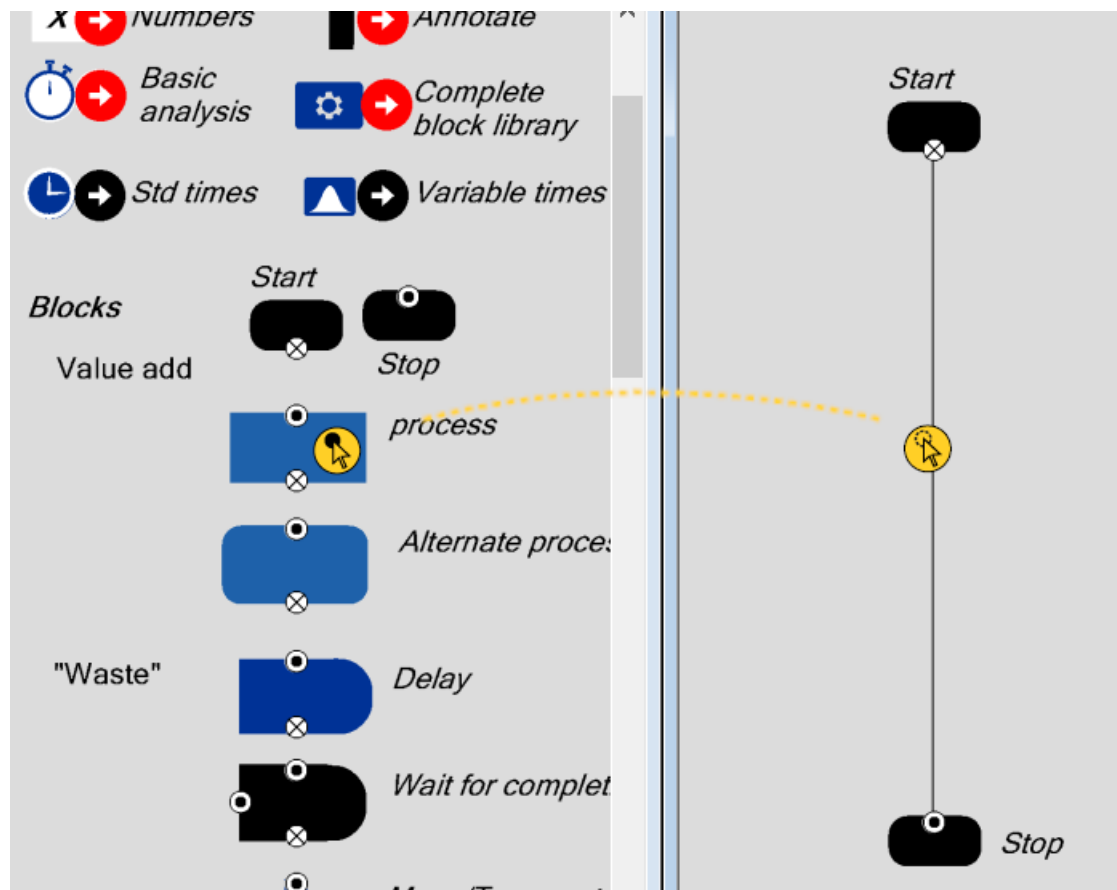
This is used to copy blocks and other elements

Steps to create a basic process map :

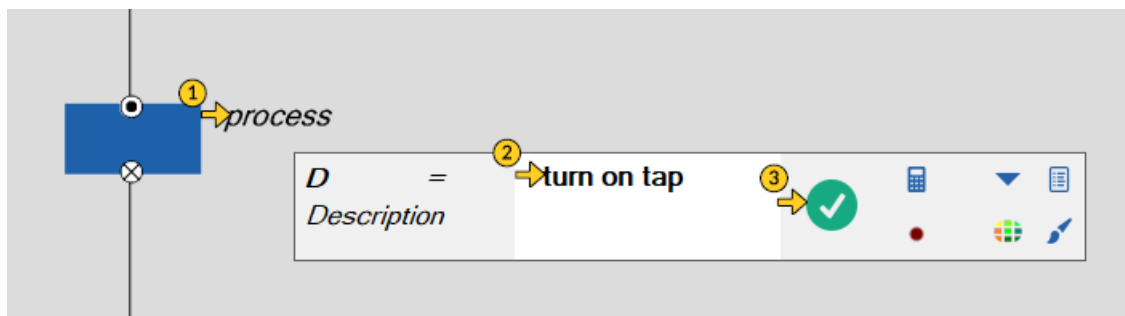
1. Go into the library and click on the basic process map sub library



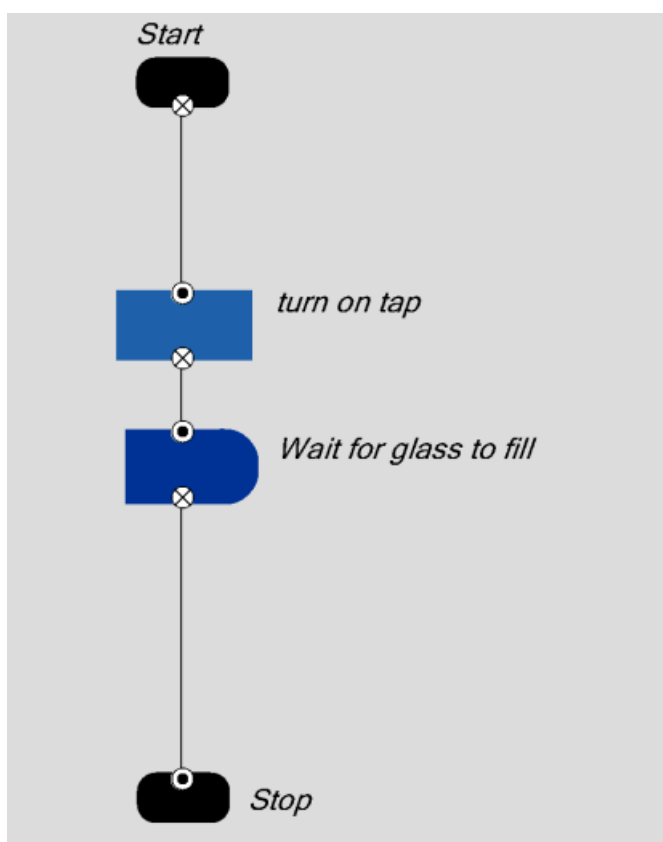
2. Drag the block you want into the line:



3. Edit the description to reflect the action.



4. Repeat for the next block

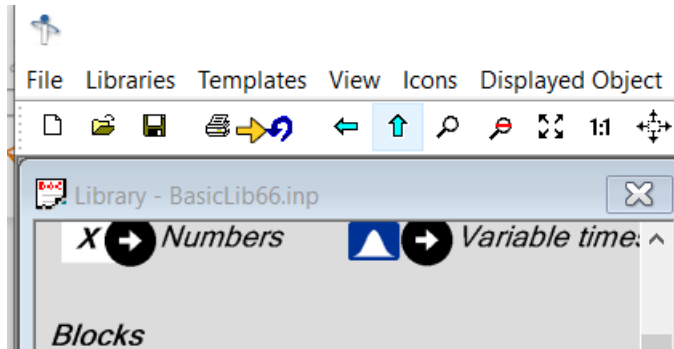


Exercise 1

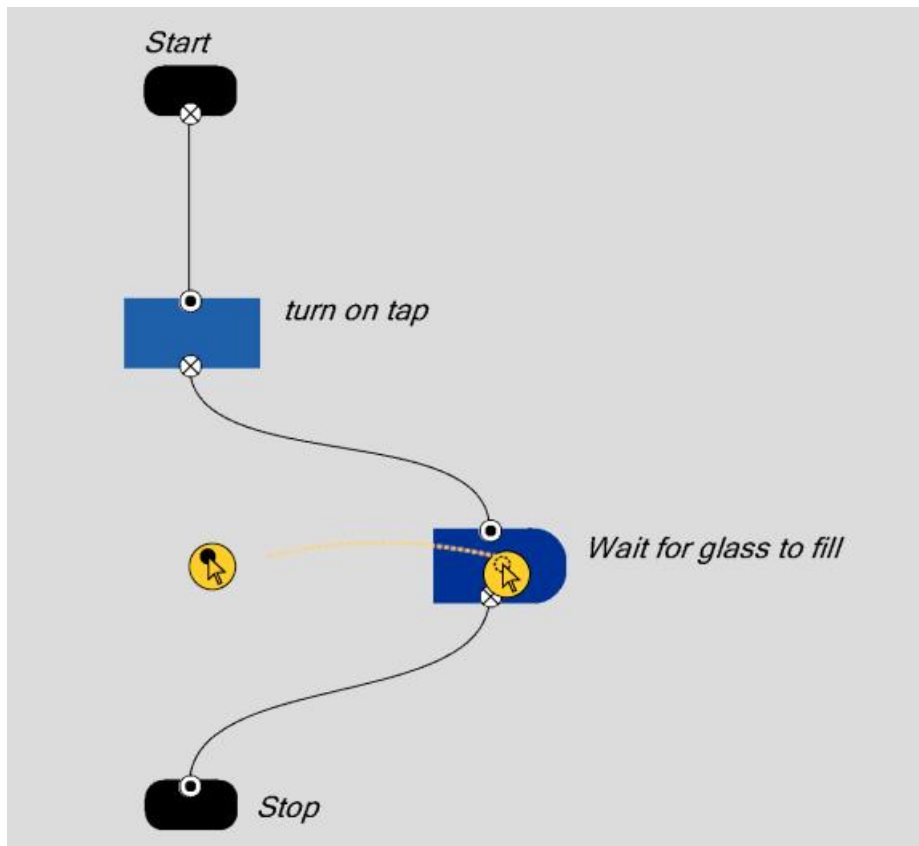
Use Aliquis to map your process for making your favourite cold drink. Where is the waste in the process?

Tips and hints for exercise 1 :

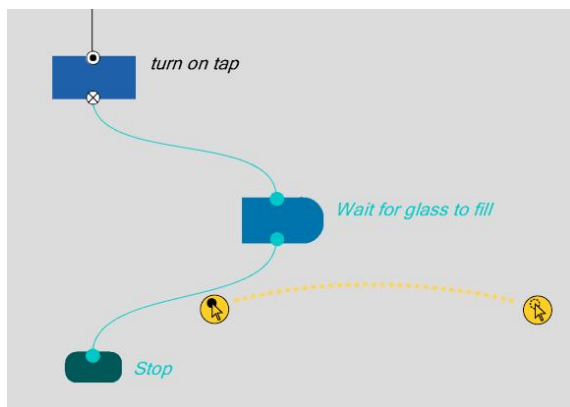
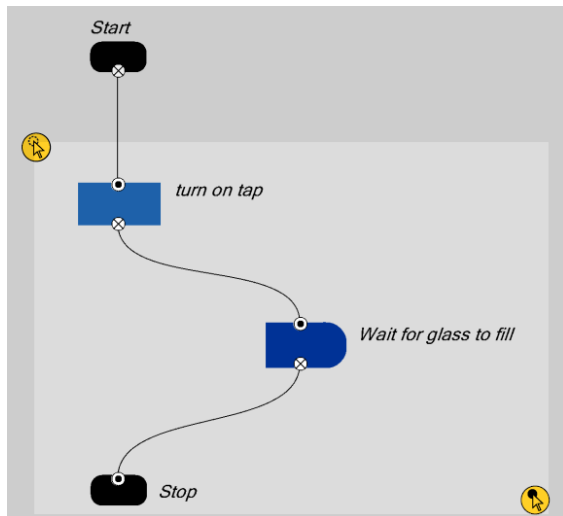
Tip1: If you make a mistake you have an undo:



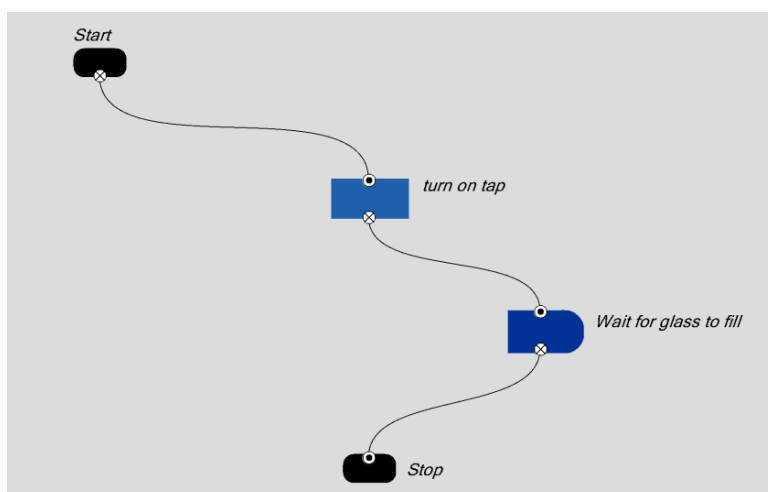
Tip2: You can Drag blocks around to make space.



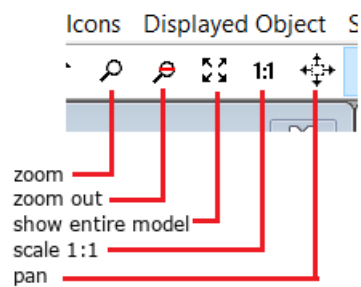
Tip3: You can select a number of items and drag them around :



Result :



Tip4: To scroll around use the scroll bars or the zoom buttons



What about waits?

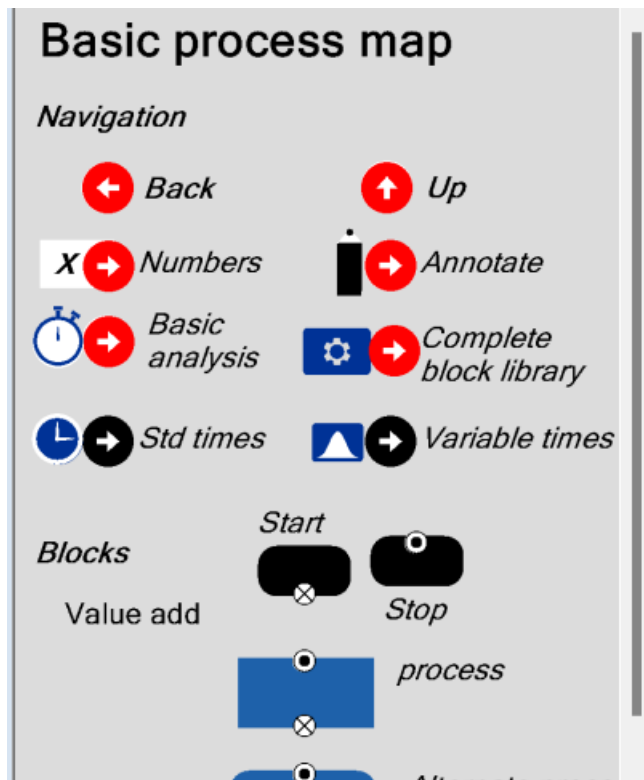
We often find ourselves in a situation where the process forces us to wait. For example tea needs to be brewed to get the best flavour, paint needs to dry and customers need time to make decisions.

The library allows us to add a wait with this block :

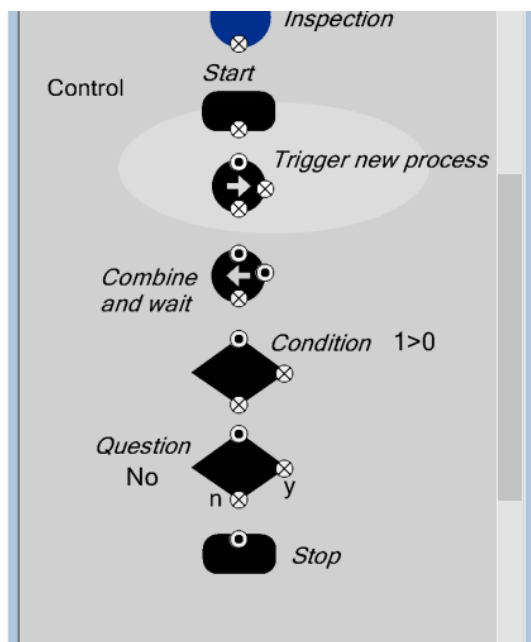


However, this kind of wait does not allow other things to happen while the wait is going on. In this situation we can adopt the following procedure using the “Trigger new process block”.

From the basic process map sub library scroll down:

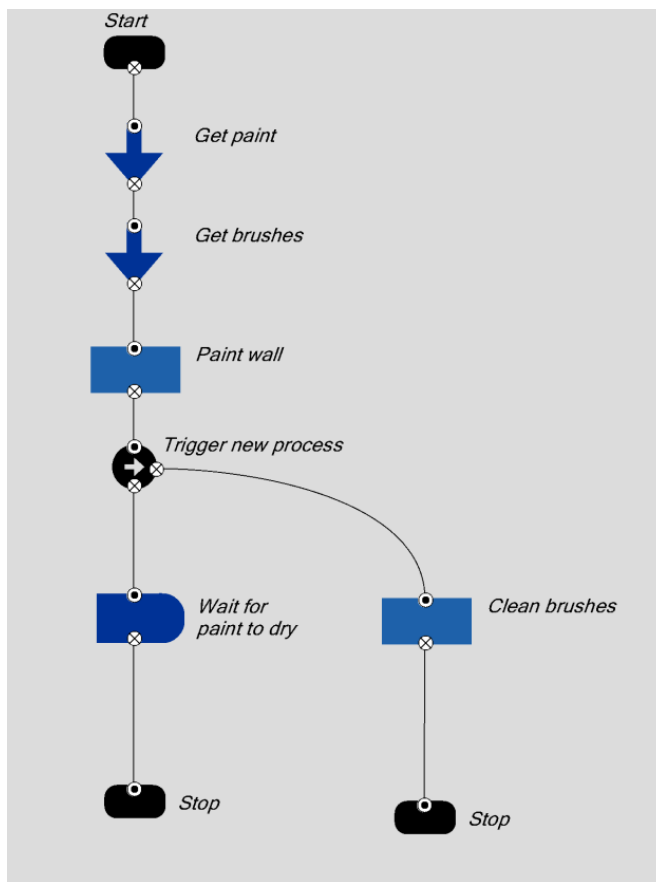


To here:



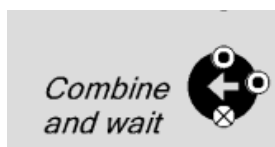
It is now possible to have two things going on simultaneously. Let's assume a painter paints a wall and then, when he is finished, he cleans his brushes while the paint is drying...

We can make an Aliquis model like this:

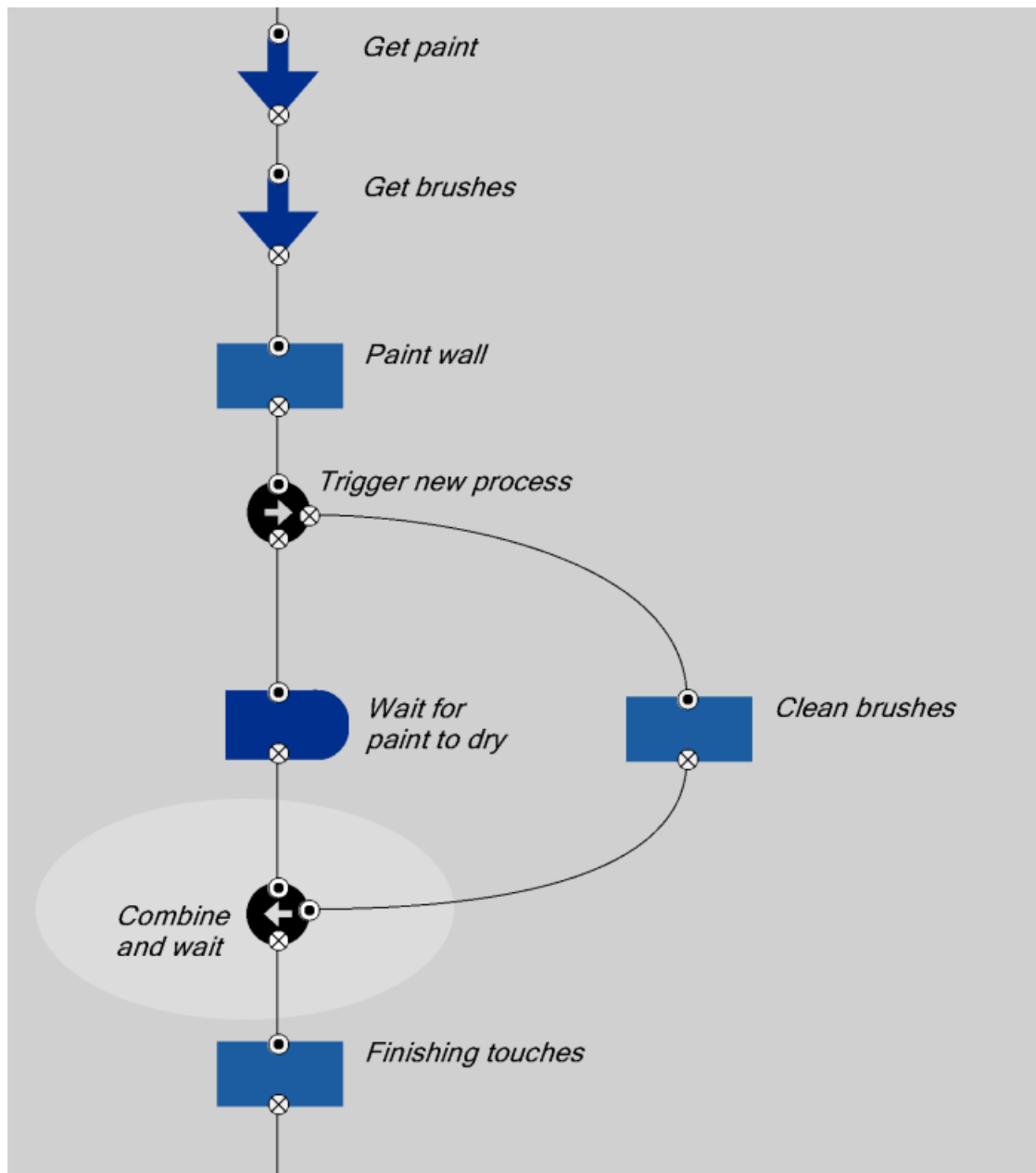


Let's now assume that the painter wants to carry on with the main job after the wait, for example there might be a process item to add finishing touches.

This can be dealt with in two ways. Firstly, we can use the combine and wait block

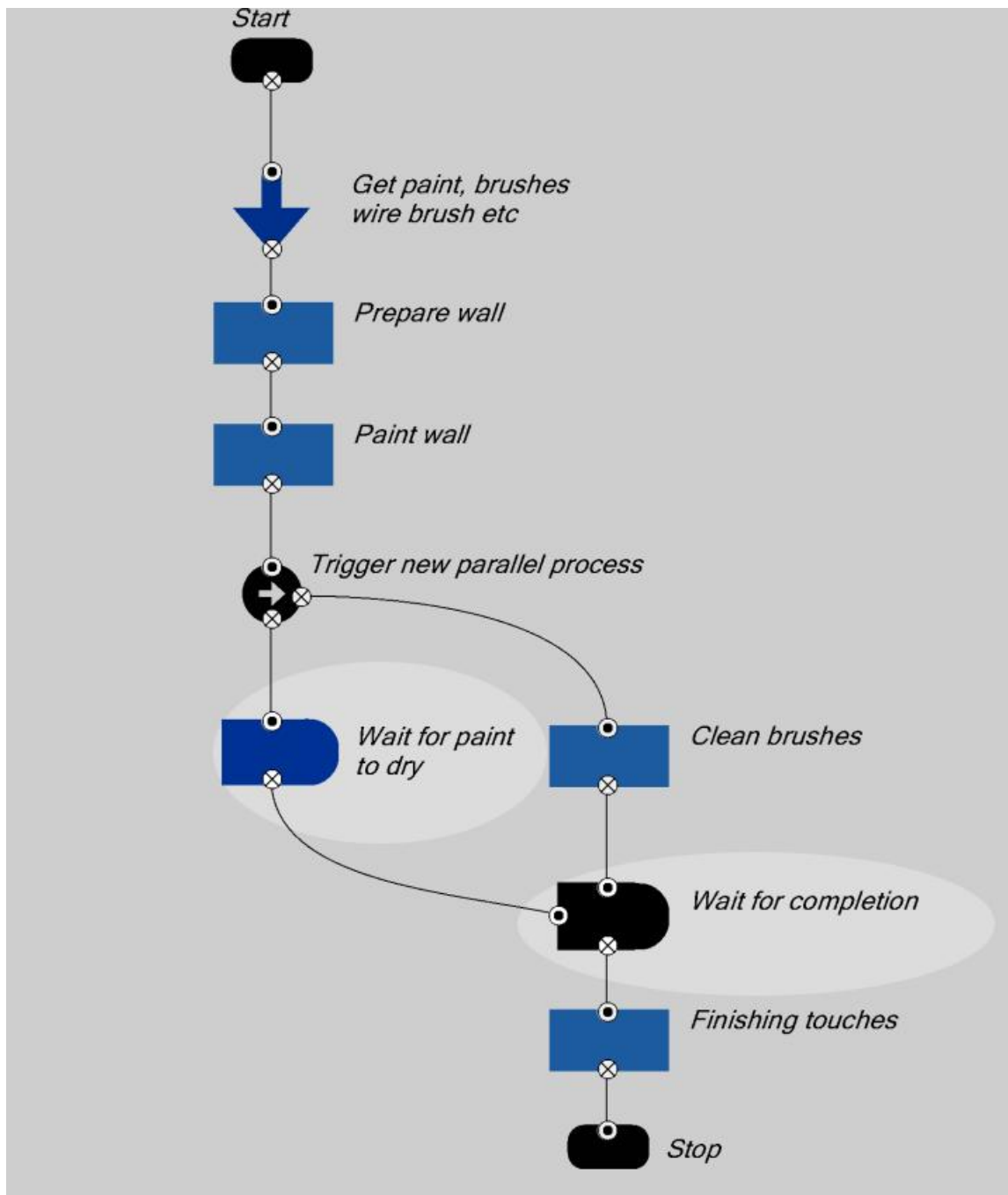


Like this :



Here's an alternative method of communicating the same intent

The wait on the left is a delay caused by the properties of the paint. The black wait on the right is what the decorator has to do!



Exercise 2

I would describe a process for making a cup of tea as follows :

1. Fill kettle, switch on
2. boil water.
3. While the kettle is on get cup and teabag. Put tea bag into cup.
4. When kettle has boiled, pour water into cup.

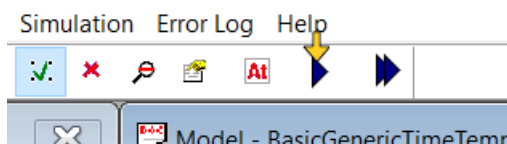
5. Wait a while for tea to brew.
6. While waiting to brew get some milk from the fridge.
7. When tea has brewed remove teabag – put in bin.
8. Add some milk.
9. Drink..

Your process might be a little different – either way use Aliquis to produce a process map of the process for making a cup of tea.

Bringing your process map to life with the solver

Aliquis is not just a graphics tool - it is a simulation package. We are now going to show some of the features of the solver.

The solver can be started here :



You will then see this solve control panel on your screen :

Solve controls

Preliminaries

- Save Model? Its always a good idea to save the model and possibly delete any old results. These buttons only appear if the model has changed
- Delete old results?

Step

- Program Stops the solver at every program step.
- Time Stops the program whenever time is advanced

Animate

Slow Fast

Speed scale

1.00

Go Animates the process. You can adjust the speed scale

Fast

Repeats: 1

1

Go Runs the process very fast - you can adjust the number of repeats.

Revert You can revert to the start state at any time.

Time indicator

0

Progress bar

Quit

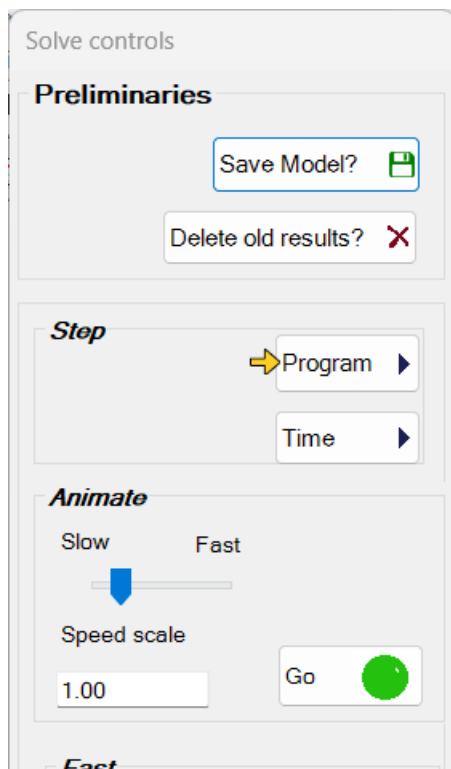
Reset 1. Completely reset the solve - delete all tokens and reset the start time.

Revert 2. Revert to where you were when you started the solve

Keep as is 3. Leave everything as it is

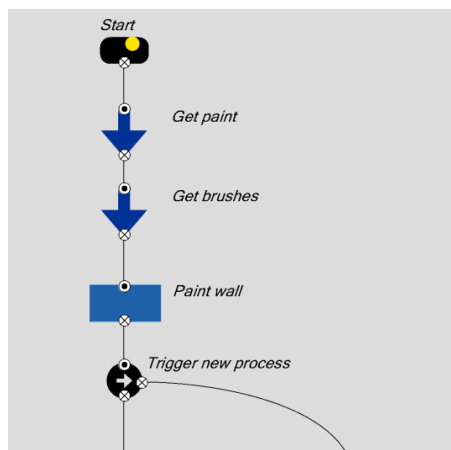
When you want to stop solving there are three options:

To visualize a process map all you need is to step through the solve one step at a time :



Tip 6: Hold the button down on the program button to rapidly go through the steps

When you first press the program step button you will see an *item* arrive at the first step of the model:



This will go through process as you step.

Exercise 3

Try stepping through your tea process map. Do this with a friend or colleague. Does the solver help to focus a discussion about the accuracy of the process or how improvements could be made?

Navigating through the libraries

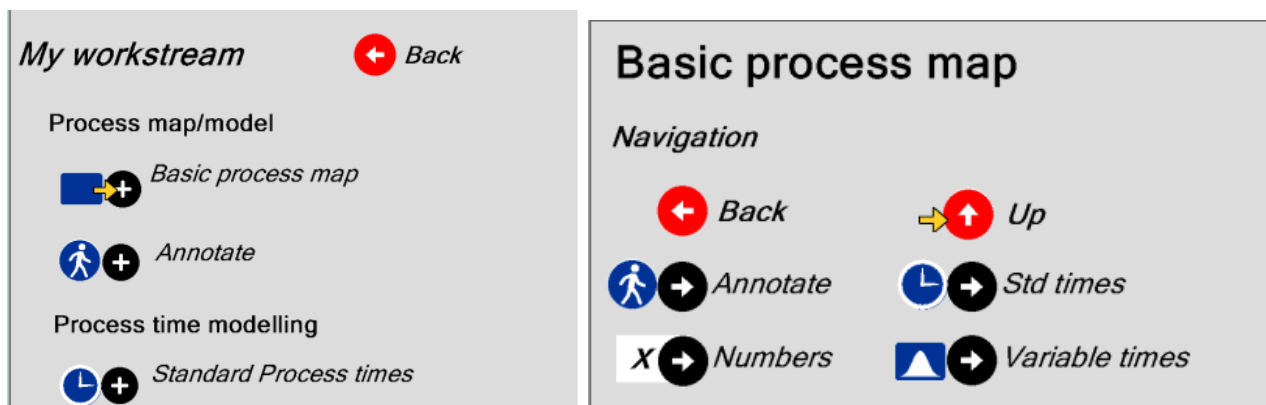
The “out of the box” Aliquis library is tailored to help you design manufacturing systems. The library structure has been structured accordingly. It assumes you will first want to establish your process maps, then perhaps annotate them or focus on job times, uncertainty and variation, waste analysis and scoring.

It then assumes you will want to design your balanced and highly utilized factory elements to produce the right quantities and quality - using these processes.

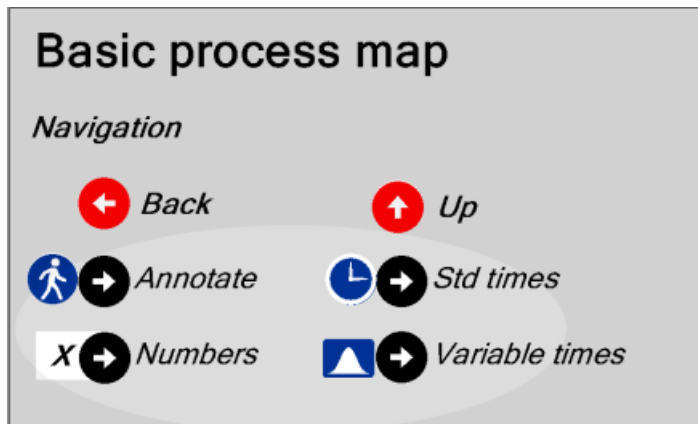
It must be stressed that it is possible to setup Aliquis for completely different applications or workstreams. It does not have to be about planning or improving manufacturing facilities. – you will learn to set up *your* libraries accordingly in due course.

That said, at this point it is worth explain how the standard manufacturing library navigation works.

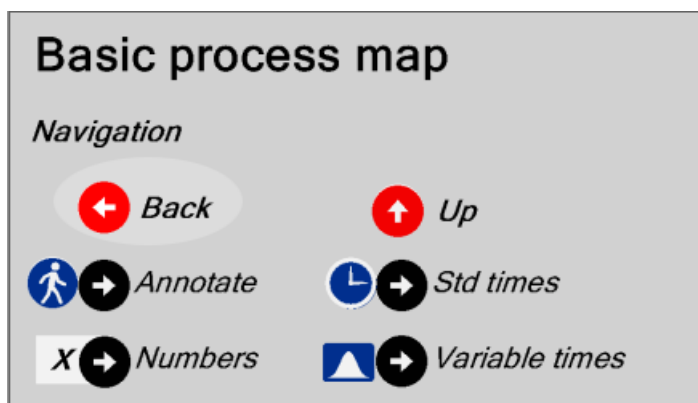
The library is basically a hierarchical structure and it is always possible to navigate up and down through the structure:



However, it is also possible to setup buttons in a library to take a shortcut directly to another place of interest :



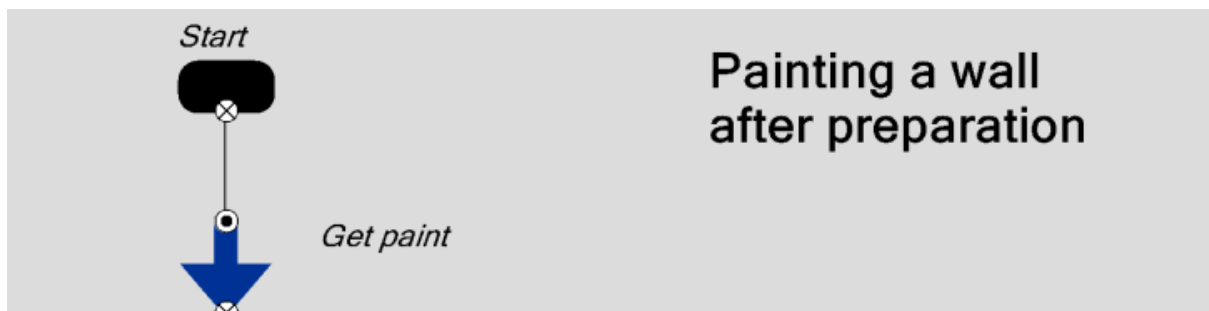
Or you can just go back to your last position:



Enhancing the graphics and descriptions.

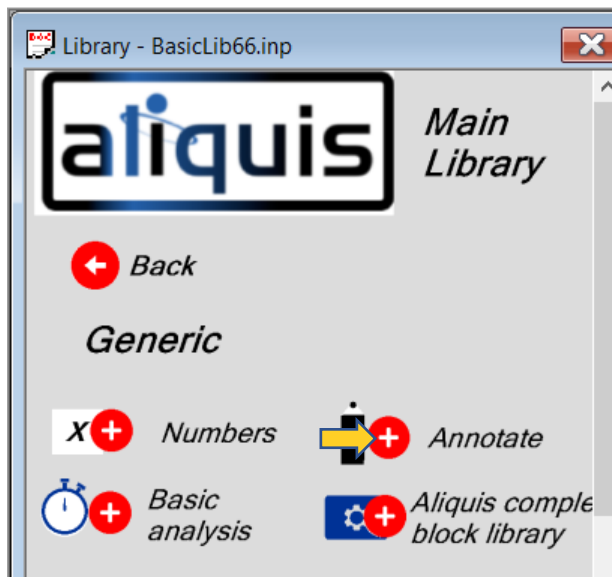
The Aliquis graphics system is reasonably powerful. It is dealt with more fully in chapter xxxx however here are a few tips for getting the map to look more like what you want..

With this documentation you should have a number of Aliquis models to look at while engaging with the subject. This directory will be referred to as the “model directory” in this documentation. Open the model *Chapter1Sample1* from here :



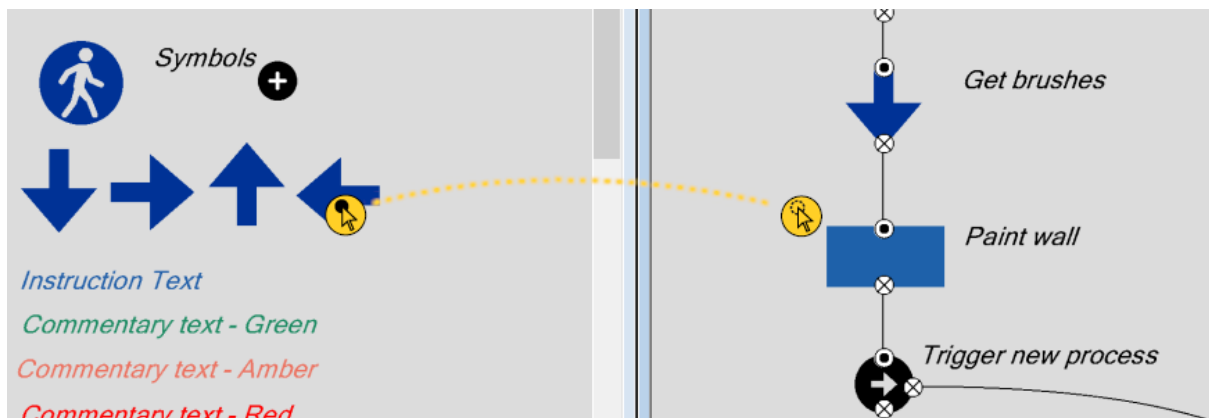
You can add symbols and text to the model very easily as follows :

Go to the annotate sub library

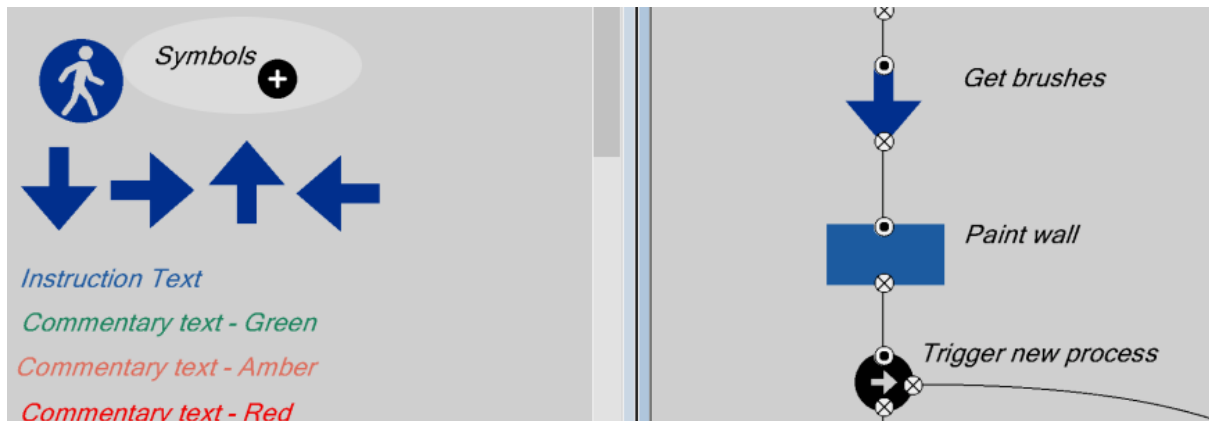


Drag the symbol you want into the model. If you want it to go into a block drop it on the block. Otherwise it will form background graphics for the model.

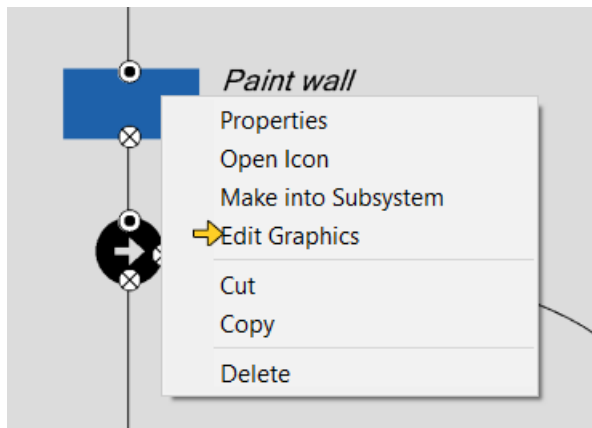
(hint block will flash if it is hit!)



There are more Aliquis symbols here:

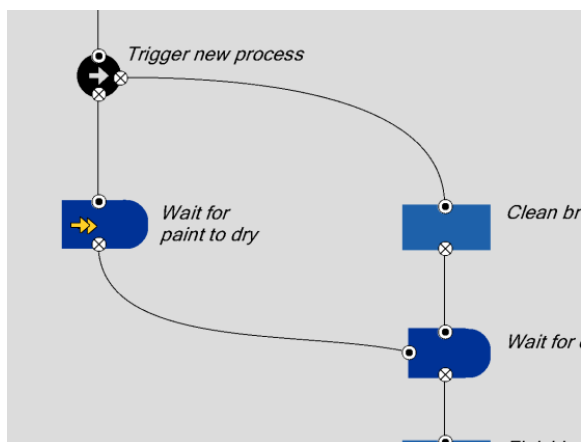


You can also change the colour of a block on the right button menu.

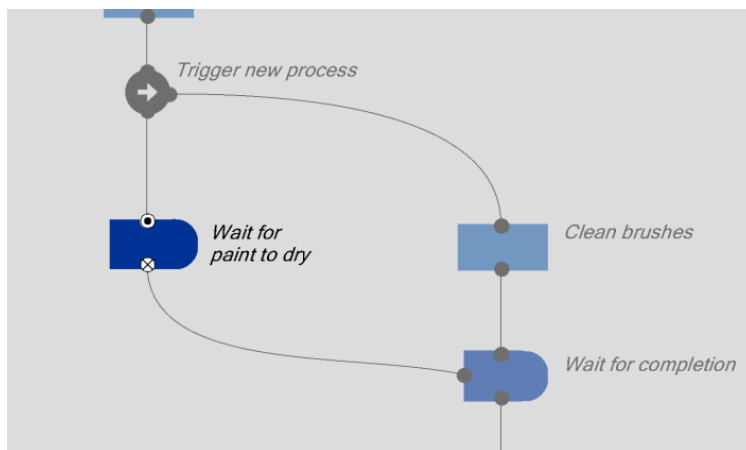


It is worth knowing that if you double click a block – you go *into* it. Changes can only be made to that block. This feature can be used to change port positions :

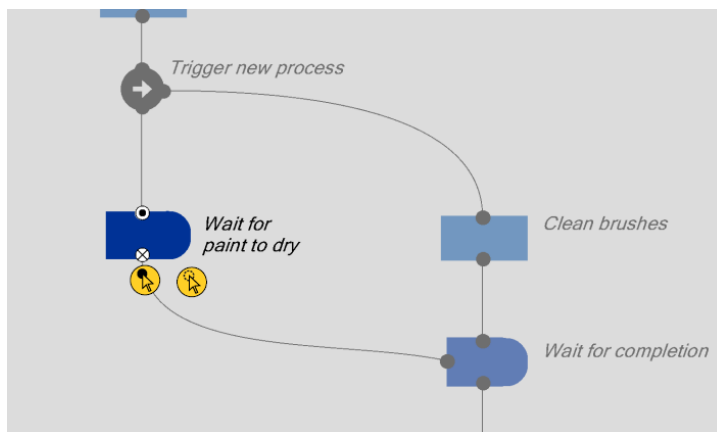
Double click a block :



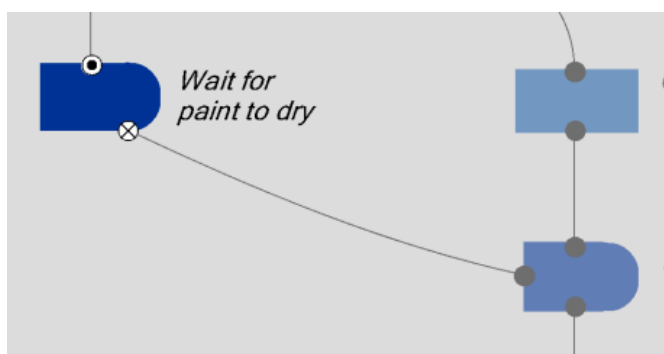
Result – the rest of the model is greyed . You are now in this block.



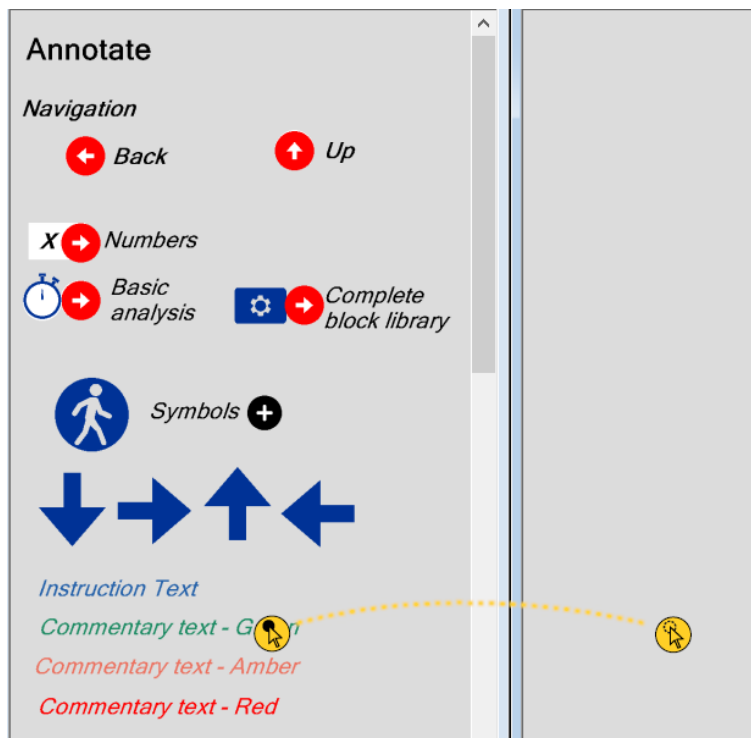
You can now do things like drag the ports around :



Result :



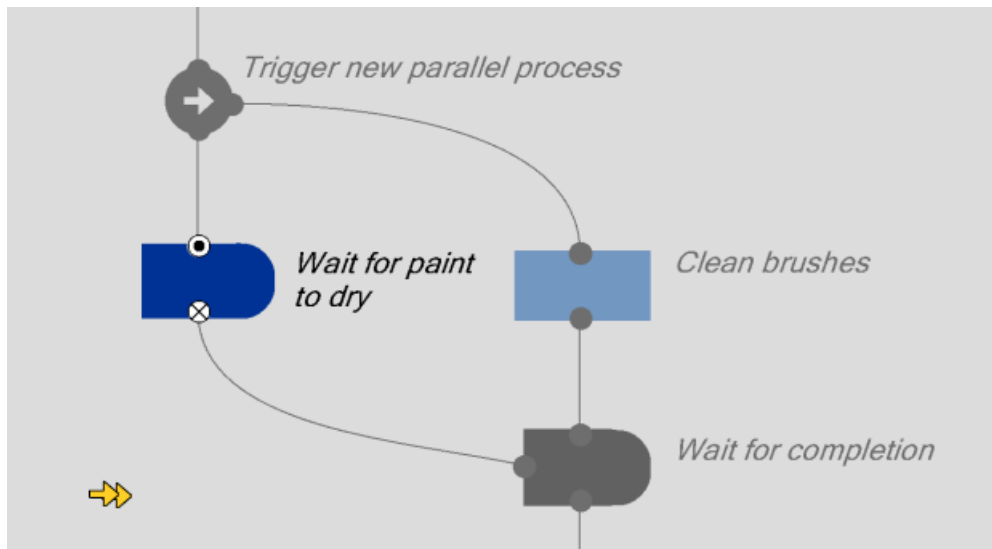
Or Add text and other graphics to the model :



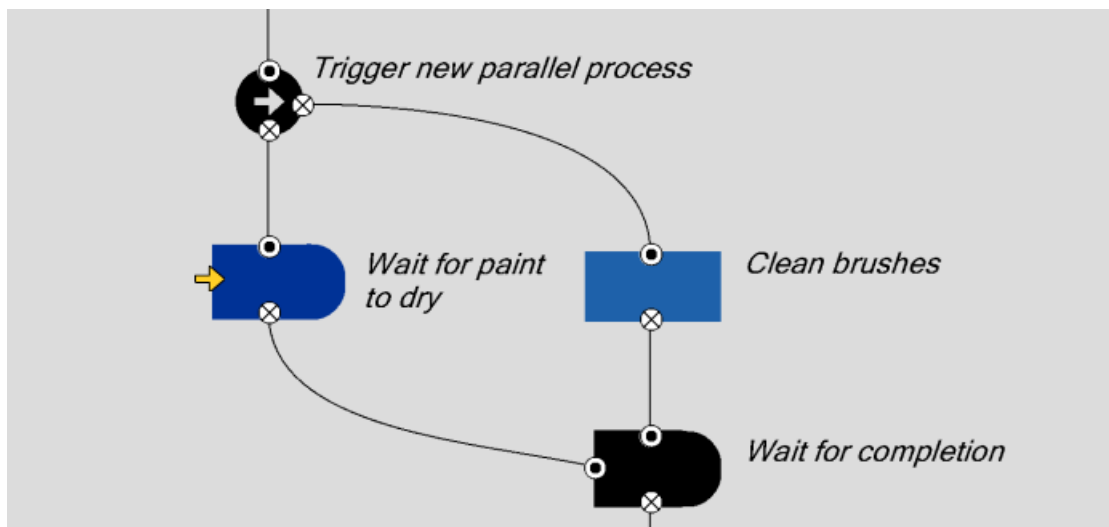
Or add an image :

The quickest way to add an image in windows is to use *windows logo key + shift + S* to snap an image from your screen then *rh menu-> paste* to put it into your model. If you are drawing in the block – the image will go into the block. If you are drawing in the main model, it will go there.

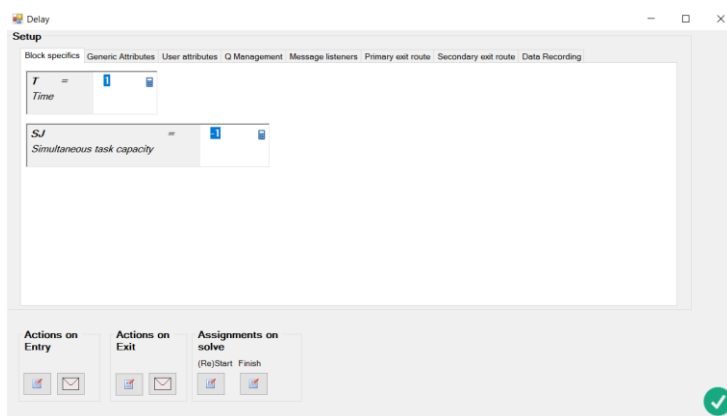
Double Click in space to revert to the whole model.



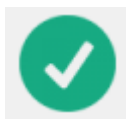
What happens if you single click a block :



This brings up the block editor –



You will use this later when you want to change the behaviour of a block in a simulation. At this stage, if you accidentally do this, just hit the green button:



Review

In this chapter we have looked at why process maps useful to capture and improve processes. We have shown how Aliquis can be used to make them and we have started to look at the Aliquis solve functionality and the ability to edit graphics.

Key Engineering concepts :

- Process maps

Key Aliquis concepts:

- Library
- Library navigation
- Blocks
- Block editing
- Solver

In chapter 2 we will look at how we can enter times for process elements and start to analyse these times...

Additional Exercise :

As a group make a process model for making an egg sandwich. What are the resources required at each stage (tools and consumables). We will look at resource management in chapter XXX. For Reference you can look

Questions

1. Summarise why you think process maps help engineering companies to reduce costs?
2. Why do some people say inspection processes are waste.
3. Why is some waste generally unavoidable.

Answers :

1. Process maps are visual and can be easily discussed by a whole team – step by step. This means that the team becomes aligned in its understanding of how things are done avoiding the cost of confusion and miscommunication. In addition, if the correct symbols are used a good process map will immediately give a team several targets where waste can be reduced. Waste and costs are intrinsically connected to each other.
2. Most companies want 100 percent of their output to be of sufficient quality to keep their customers satisfied. (Zero defects) . This can be achieved with robust inspection processes - mainly at the shipping end of the factory. However robust inspection processes cost time and money while not actually adding any value to the good parts which will be shipped. (An alternative approach is to design quality into the whole process from start to finish via statistical quality control, machine monitoring etc.)

3. Geography – customers do not all exist on a pin head. There is going to be some transportation both within and outside of a factory. Quality requirements – it is extremely difficult to totally dispense with inspection processes even if they are focussed on monitoring a process rather than individual parts. You cannot stop beer needing some time to brew (wait).