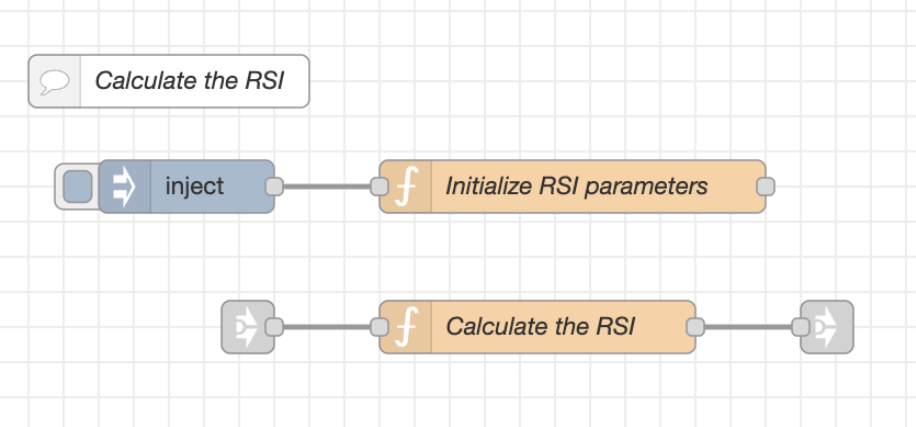
The Relative Strength Index (RSI)

The flow named RSI contains an implementation of the Relative Strength Index (RSI) in MachineTrader.

You can download this flow from the MachineTrader community repository on GitHub:

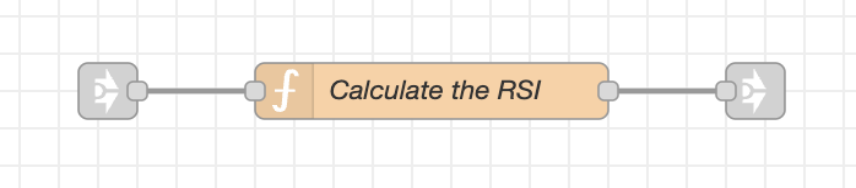
https://github.com/predictivetechnologysystems/MachineTrader-Community

The RSI flow has two sub flows. The first one initializes the RSI parameters. The second one calculates the RSI values for live, streaming prices.



The function called *Initialize RSI parameters* initializes the RSI parameters. To execute this function, press the inject node on the left.

The function *Initialize RSI parameters* creates flow variables needed calculating the RSI.
For example, it creates a flow variable with the ticker symbol for which it will be calculating the RSI.
It creates the look back interval, which is the number of data points that will be used for the RSI calculation. The look back interval is often chosen to be equal to 14 time periods.
It initializes the counter of the number of times the RSI has been calculated, to determine if it's in the warm-up period or if it's past the warmup period.
It initializes two flow variables called gainm and lossm for the average gain and loss.
It creates a data queue with the most recent stock returns (called dataq), as an array of length equal to the look back interval.
It also creates a flow variable called endq, that points to the position of the end of the queue.
The end of the queue contains the oldest return.



The function called *Calculate the RSI* calculates the RSI values for live, streaming prices. The streaming prices are delivered by the link-in node (small square with arrow), and the streaming RSI values are output by the link-out node.

The following website provides a good explanation of the RSI calculation:

https://school.stockcharts.com/doku.php?id=technical_indicators:relative_strength_index_rsi

The RSI depends on the trailing average gain (gainm) and the trailing average loss (lossm).

The average gains and losses are calculated from the gains and losses over a look-back interval (lookb),
which is often chosen to be 14 time periods (days, minutes, etc.)

The current gains and losses are always expressed as non-negative values:

gain(t) = max(r(t), 0)
loss(t) = max(-r(t), 0)

Where r(t) is the current return at time t.

In the initial warmup interval (say the first 250 time periods), the averages
are calculated as the averages of the gains and losses over the look-back interval:

gainm(t) = Sum(gain(t) ... gain(t-lookb+1)) / lookb
lossm(t) = Sum(loss(t) ... loss(t-lookb+1)) / lookb

After the initial warmup interval, the average gains and losses are calculated
recursively, similar to the exponential moving average (EMA):

gainm(t) = ((lookb-1) * gainm(t-1) + gain(t)) / lookb
lossm(t) = ((lookb-1) * lossm(t-1) + loss(t)) / lookb

The advantage of the recursive calculation is that it doesn't require maintaining an array of recent gains and losses.
Only the the most recent gains and losses are needed to update the averages.

The RSI is then calculated from the average gains and losses as:

$$RSI = \frac{100 * gainm(t)}{gainm(t) + lossm(t)}$$

The RSI value is between 0 and 100 - it is said to oscillate between these extremes.
If the gain is equal to zero, then RSI = 0.
If the loss is equal to zero, then RSI = 100.
If the gains and losses are equal, then RSI = 50.
If the gains are greater than the losses, then RSI > 50.
If the gains are less than the losses, then RSI < 50.

Some traders interpret the condition RSI > 80 as indicating that the prices are overbought (too high).
Some traders interpret the condition RSI < 20 as indicating that the prices are oversold (too low).

The above rule is just an example, and the thresholds equal to 80 and 20 are somewhat arbitrary.
We don't endorse this rule, and it's up to each trader to make their own choice of rules and parameters.