0.1 Rate Of

The Operation $rateOf$ calculates the number of times something occured within an interval of time given a unit of time.

$$rateOf(nOccurances, start, end, unit)$$

Where the output translates to: the rate of occurance per unit within interval

- $nOccurances$ is the number of times something happened and should be an Integer (called $nO?$ bellow)

- $start$ is an ISO 8601 timestamp which serves as the first timestamp within the interval

- end is an ISO 8601 timestamp which servers as the last timestamp within the interval

- $unit$ is a String Enum representing the unit of time

This can be seen in the definition of $rateOf$ bellow.

$$
\begin{array}{|l}
\underline{\ RateOf[\mathbb{N}, TIMESTAMP, TIMESTAMP, TIMEUNIT]\ } \\
nO? : \mathbb{N} \\
rate! : \mathbb{Z} \\
start?, end? : TIMESTAMP \\
unit? : TIMEUNIT \\
rateOf\_ : \mathbb{N} \times TIMESTAMP \times TIMESTAMP \times TIMEUNIT \rightarrow \mathbb{Z} \\
\hline
rate! = rateOf(nO?, start?, end?, unit?) \bullet \\
\quad let \quad interval == isoToUnix(end) - isoToUnix(start) \\
\qquad\quad unitS == toSeconds(unit?) \\
\quad = nO? \div (interval \div units)
\end{array}
$$

The only other functionality required by $rateOf$ is supplied via basic arithmetic

$start = 2015 - 11 - 18T12 : 17 : 00Z$

$end = 2015 - 11 - 18T14 : 17 : 00Z$

$unit = second$

$nO? = 10$

$\quad startN = isoToUnix(start) = 1447849020$

$\quad endN = isoToUnix(end) = 1447856220$

$\quad interval = endN - StartN = 7200$

$\quad unitN = toSeconds(unit) = 60$

$0.001389 = rateOf(nO?, start, end, unit) \Rightarrow 10 \div (7200 \div 60)$

$5 = rateOf(nO?, start, end, hour) \Rightarrow 10 \div (7200 \div 3600)$