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.

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

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

$$start = 2015 - 11 - 18T12 : 17 : 00Z \land end = 2015 - 11 - 18T14 : 17 : 00Z$$
$$unit = second$$
$$startN = isoToUnix(start) = 1447849020$$
$$endN = isoToUnix(end) = 1447856220$$
$$interval = endN - StartN = 7200$$
$$unitN = toSeconds(unit) = 60$$
$$nO? = 10$$
$$rate! = rateOf(nO?, start, end, unit) = 0.001389 \Rightarrow 10 \div (7200 \div 60)$$
$$rate!! = rateOf(nO?, start, end, hour) = 5 \Rightarrow 10 \div (7200 \div 3600)$$