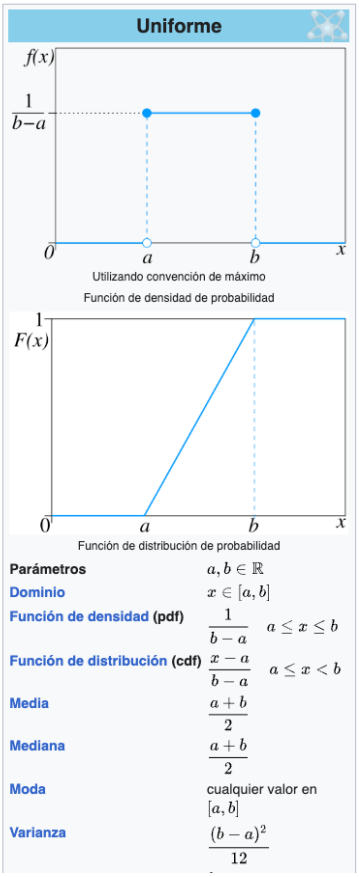
Practica 1:

```
       Value     Percentile TotalCount 1/(1-Percentile)

       0.127 0.000000000000         17           1.00
      10.175 0.100000000000      10012           1.11
      20.351 0.200000000000      20046           1.25
      30.335 0.300000000000      30053           1.43
      40.383 0.400000000000      40017           1.67
      50.367 0.500000000000      50034           2.00
      55.295 0.550000000000      55009           2.22
      60.223 0.600000000000      60015           2.50
      65.343 0.650000000000      65050           2.86
      70.271 0.700000000000      70003           3.33
      75.263 0.750000000000      75081           4.00
      77.759 0.775000000000      77554           4.44
      80.255 0.800000000000      80060           5.00
      82.751 0.825000000000      82567           5.71
      85.247 0.850000000000      85032           6.67
      87.679 0.875000000000      87506           8.00
      88.959 0.887500000000      88788           8.89
      90.239 0.900000000000      90012          10.00
     124.671 0.999978637695      99998       46811.43
     130.175 0.999981689453      99999       54613.33
     130.175 0.999984741211      99999       65536.00
     130.175 0.999986267090      99999       72817.78
     130.175 0.999987792969      99999       81920.00
     130.175 0.999989318848      99999       93622.86
     149.119 0.999990844727     100000      109226.67
     149.119 1.000000000000     100000
#[Mean    =       50.257, StdDeviation   =       28.872]
#[Max     =      149.119, Total count    =       100000]
#[Buckets =            2, SubBuckets     =         2048]

Process finished with exit code 0
```

Es la distribución uniforme.



Al hacer tantas realizaciones prácticamente converge con la teorica (Incluso no cogiendo todos los valores, que es lo que hacemos con histogram, pero hemos selecionado significantvaluedigits=3)

La varianza teorica es raíz de (b-a)^2 /12.

100^2/12 = 28.86 de desviación típica.

A nosotros nos ha salido 28.87.

Practica 2.

1 hilo.
MAX_EXPECTED_EXECUTIONS_PER_SECOND =50.

```
/Library/Java/JavaVirtualMachines/openjdk.jdk/Contents/Home/bin/java -javaag
------ Latencias (no acumuladas) ---------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000         23           1.00
       10.00 0.100000000000         23           1.11
       10.00 0.200000000000         23           1.25
       11.00 0.300000000000         45           1.43
       11.00 0.400000000000         45           1.67
       12.00 0.500000000000        100           2.00
       12.00 1.000000000000        100
#[Mean    =        11.32, StdDeviation   =         0.82]
#[Max     =        12.00, Total count    =          100]
#[Buckets =            1, SubBuckets     =          256]
-------- Latencias Acumuladas ------------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000         23           1.00
       10.00 0.100000000000         23           1.11
       10.00 0.200000000000         23           1.25
       11.00 0.300000000000         45           1.43
       11.00 0.400000000000         45           1.67
       12.00 0.500000000000        100           2.00
       12.00 1.000000000000        100
#[Mean    =        11.32, StdDeviation   =         0.82]
#[Max     =        12.00, Total count    =          100]
#[Buckets =            1, SubBuckets     =          256]

Process finished with exit code 0
```

Las latencias y las latencias acumuladas tienen el mismo histograma ya que la máxima latencia ha sido de 12 ms y como las ejecuciones son cada 20 ms, nunca hay delay.

Si subimos MAX_EXPECTED_EXECUTIONS_PER_SECOND a 500, entonces la latencias acumuladas si que explotarán, pero las latencias se mantendrán.

```
------ Latencias (no acumuladas) ---------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000         14           1.00
       10.00 0.100000000000         14           1.11
       11.00 0.200000000000         48           1.25
       11.00 0.300000000000         48           1.43
       11.00 0.400000000000         48           1.67
       12.00 0.500000000000         77           2.00
       12.00 0.550000000000         77           2.22
       12.00 0.600000000000         77           2.50
       12.00 0.650000000000         77           2.86
       12.00 0.700000000000         77           3.33
       12.00 0.750000000000         77           4.00
       13.00 0.775000000000        100           4.44
       13.00 1.000000000000        100
#[Mean    =        11.61, StdDeviation   =         0.99]
#[Max     =        13.00, Total count    =          100]
#[Buckets =            1, SubBuckets     =          256]
        Latencias Acumuladas
```

Las latencias se mantienen.

```
-------- Latencias Acumuladas ------------
       Value     Percentile TotalCount 1/(1-Percentile)

       13.00 0.000000000000          1           1.00
       95.00 0.100000000000         10           1.11
      189.00 0.200000000000         20           1.25
      295.00 0.300000000000         30           1.43
      397.00 0.400000000000         40           1.67
      493.00 0.500000000000         50           2.00
      543.00 0.550000000000         55           2.22
      587.00 0.600000000000         60           2.50
```

Las latencias acumuladas explotan.

2 hilos.

MAX_EXPECTED_EXECUTIONS_PER_SECOND = 50,

```
------ Latencias (no acumuladas) ---------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000          10           1.00
       11.00 0.100000000000          23           1.11
       12.00 0.200000000000          55           1.25
       13.00 0.300000000000          85           1.43
       13.00 0.400000000000          85           1.67
       22.00 0.500000000000         112           2.00
       22.00 0.550000000000         112           2.22
```

```
      143.00 0.994531250000        199         182.86
      319.00 0.995312500000        200         213.33
      319.00 1.000000000000        200
#[Mean    =        22.83, StdDeviation   =        26.05]
#[Max     =       319.00, Total count    =          200]
#[Buckets =            2, SubBuckets     =          256]
```

La media ya es mayor de 22.83 > 20, por lo tanto, las latencias acumuladas subirán.

```
-------- Latencias Acumuladas ------------
       Value     Percentile TotalCount 1/(1-Percentile)

       13.00 0.000000000000           1           1.00
       47.00 0.100000000000          21           1.11
       73.00 0.200000000000          40           1.25
       95.00 0.300000000000          60           1.43
      110.00 0.400000000000          82           1.67
      148.00 0.500000000000         100           2.00
```

```
      501.00 0.994531250000        199         182.86
      507.00 0.995312500000        200         213.33
      507.00 1.000000000000        200
#[Mean    =       203.44, StdDeviation   =       140.05]
#[Max     =       507.00, Total count    =          200]
#[Buckets =            2, SubBuckets     =          256]
```

Media de latencias acumuladas de 283.

Si pusiésemos MAX_EXPECTED_EXECUTIONS_PER_SECOND = 30.

Entonces la media bajaría y ya no habría delay por formarse colas.

```
------ Latencias (no acumuladas) ---------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000         35           1.00
       10.00 0.100000000000         35           1.11
       11.00 0.200000000000         56           1.25
       12.00 0.300000000000        100           1.43
       12.00 0.400000000000        100           1.67
       12.00 0.500000000000        100           2.00
       21.00 0.550000000000        120           2.22
```

```
       25.00 0.950000000000        200          20.00
       25.00 1.000000000000        200
#[Mean    =        16.88, StdDeviation   =         5.90]
#[Max     =        25.00, Total count    =          200]
#[Buckets =            1, SubBuckets     =          256]
```

```
-------- Latencias Acumuladas ------------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000         35           1.00
       10.00 0.100000000000         35           1.11
       11.00 0.200000000000         56           1.25
       12.00 0.300000000000        100           1.43
       12.00 0.400000000000        100           1.67
       24.00 0.943750000000        189          17.78
       25.00 0.950000000000        200          20.00
       25.00 1.000000000000        200
#[Mean    =        16.88, StdDeviation   =         5.90]
#[Max     =        25.00, Total count    =          200]
#[Buckets =            1, SubBuckets     =          256]
```

Pasamos directamente a 4 hilos.

MAX_EXPECTED_EXECUTIONS_PER_SECOND = 50.

```
------ Latencias (no acumuladas) ---------
       Value     Percentile TotalCount 1/(1-Percentile)

       10.00 0.000000000000          36           1.00
       11.00 0.100000000000          84           1.11
       11.00 0.200000000000          84           1.25
       12.00 0.300000000000         180           1.43
       12.00 0.400000000000         180           1.67
       13.00 0.500000000000         262           2.00
```

```
       519.00 0.994531250000         398         182.86
       523.00 0.995312500000         400         213.33
       523.00 1.000000000000         400
 #[Mean    =        37.10, StdDeviation   =        68.16]
 #[Max     =       523.00, Total count    =          400]
 #[Buckets =            3, SubBuckets     =          256]
```

Respecto a 2 hilos ha subido la media considerablemente. Asi como el valor del P90, la varianza acumulada por lo tanto habrá subido en proporción muchísimo mas

```
-------- Latencias Acumuladas ------------
       Value     Percentile TotalCount 1/(1-Percentile)

       12.00 0.000000000000           1           1.00
      273.00 0.100000000000          40           1.11
      511.00 0.200000000000          80           1.25
      599.00 0.300000000000         122           1.43
      747.00 0.400000000000         161           1.67
     1375.00 0.500000000000         200           2.00
     1487.00 0.550000000000         220           2.22
     1559.00 0.600000000000         240           2.50
     1647.00 0.650000000000         260           2.86
     2223.00 0.700000000000         282           3.33
     2335.00 0.750000000000         301           4.00
     2399.00 0.775000000000         310           4.44
```

```
     3087.00 0.993750000000        398         160.00
     3087.00 0.994531250000        398         182.86
     3103.00 0.995312500000        400         213.33
     3103.00 1.000000000000        400
#[Mean    =      1370.20, StdDeviation   =       944.90]
#[Max     =      3103.00, Total count    =          400]
#[Buckets =           5, SubBuckets     =          256]
```

Media = 1380.20.

Como vemos las latencias medias subieron menos del doble, pero las latencias acumuladas casi se han triplicado respecto a dos hilos.

Tendríamos que poner MAX_EXPECTED_EXECUTIONS_PER_SECOND mucho menor a 50 para que las latencias acumuladas se mantuviesen bajas.