MA 323 (2020) Monte Carlo Simulation: LAB 12
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Problem I:

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[The first 25 values of the Van der Corput sequence are:
     N  Van der Corput(N)
0    0            0.00000
1    1            0.50000
2    2            0.25000
3    3            0.75000
4    4            0.12500
5    5            0.62500
6    6            0.37500
7    7            0.87500
8    8            0.06250
9    9            0.56250
10  10            0.31250
11  11            0.81250
12  12            0.18750
13  13            0.68750
14  14            0.43750
15  15            0.93750
16  16            0.03125
17  17            0.53125
18  18            0.28125
19  19            0.78125
20  20            0.15625
21  21            0.65625
22  22            0.40625
23  23            0.90625
24  24            0.09375
```

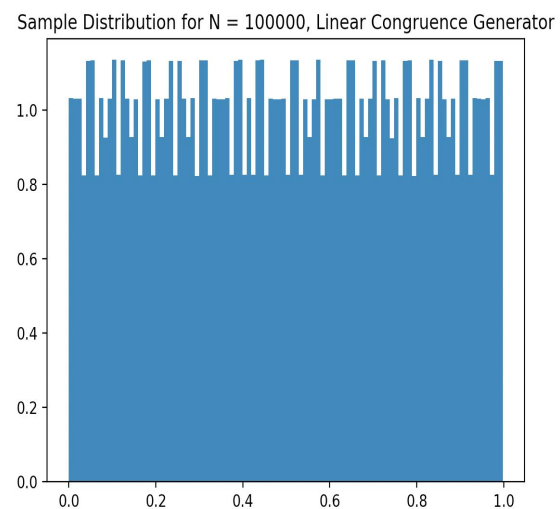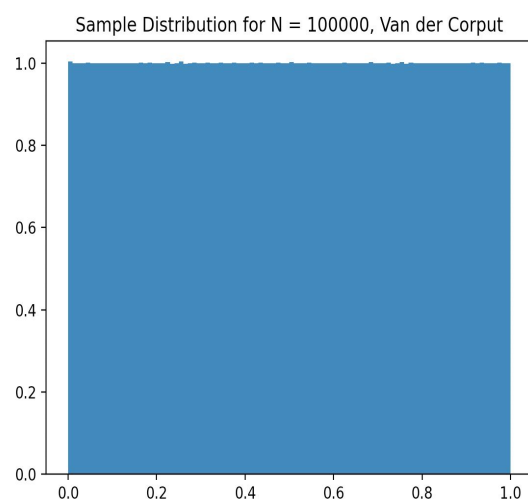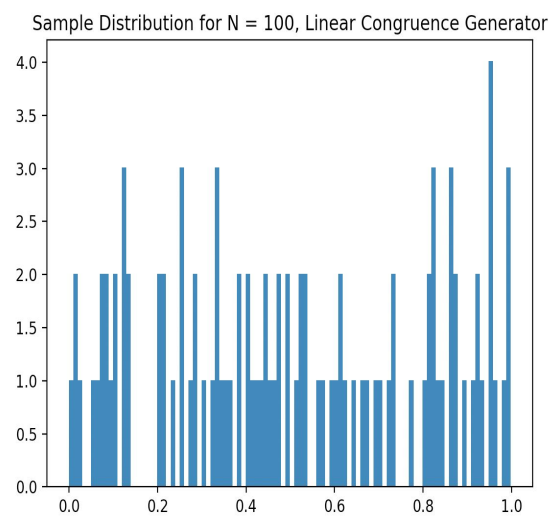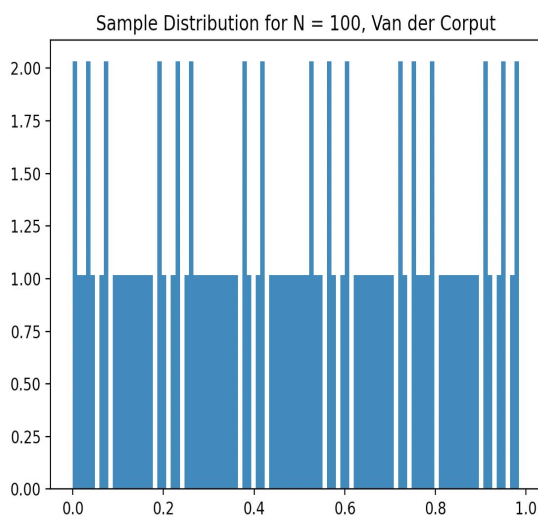1000 Values of Van der Corput Sequence using radical inverse function, plotted as (x_i, x_{i+1}):
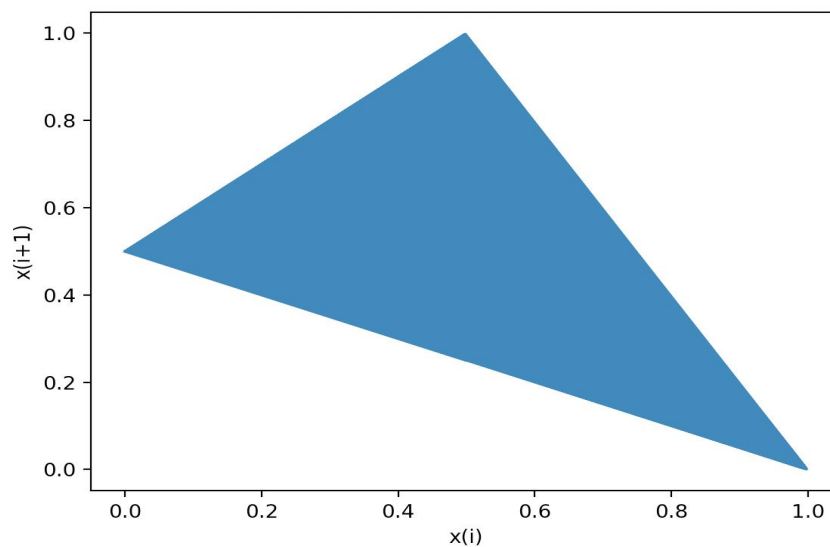
Observations:

1. The above graph shows that, x(i) and x(i+1) are wee distributed in the interval [0, 1]. They acquire a **triangular shape** which is suggestive of a **sufficient variation** in consecutive values.

Comparison between the sampled distributions of 100 and 1,00,000 values generated by Van der Corput and Linear Congruence Generator.
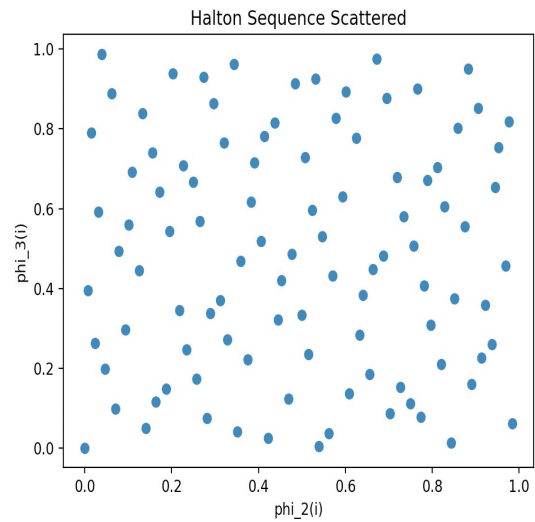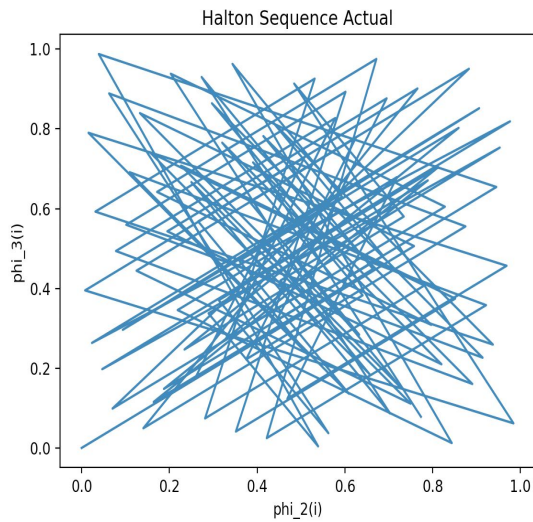
Linear Congruence Generator Used:
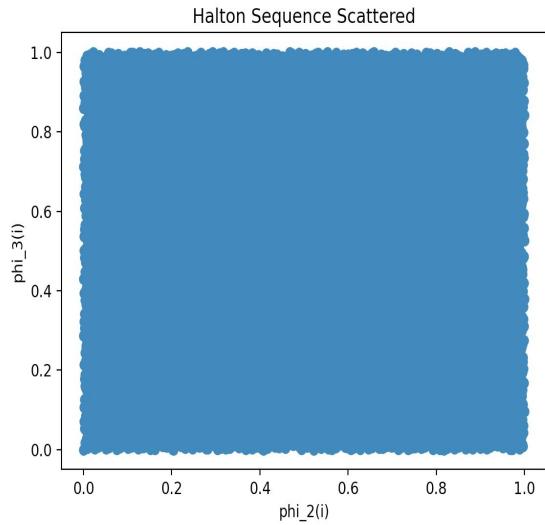
1. $a = 51749$
2. $b = 1352$
3. $m = 244944$
4. $x_0 = 3$

Problem II:
For N = 100

Halton Sequence Actual (left) and *Halton Sequence Scattered* (right)

For N = 1,00,000

Halton Sequence Actual (left) and *Halton Sequence Scattered* (right)
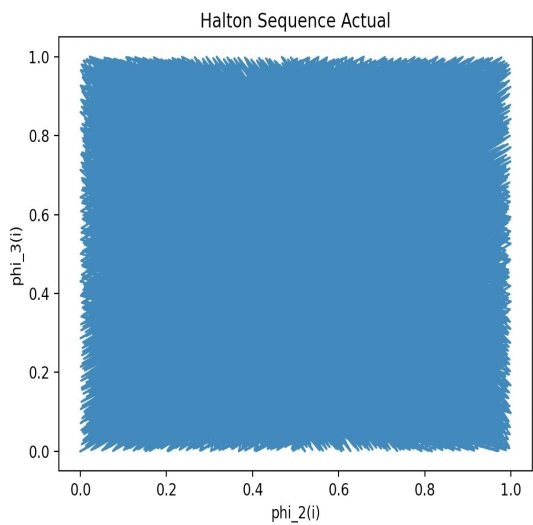
Observations:

1. Since here $b1 = 2$, and $b2 = 3$ are relatively prime or coprime, the hypercube (or square for $d = 2$ dimensions) gets completely filled with no exceptions for sufficiently large N.