Submission Deadline: November 07, 2024, 12:30 hrs

For the background material, refer to Glasserman (Sections 5.1 & 5.2) / Seydel-4e (Section 2.5)

1. Generate the first 25 values of the van der Corput sequence $x_1, x_2, \ldots, x_{25}$ using the radical inverse function $x_i := \phi_2(i)$ and list them in your report. Next, generate the first 1000 values of this sequence and plot the overlapping pairs (x_i, x_{i+1}) as a two dimensional plot. What do you observe?

2. Generate first 100 and 100000 values of the van der Corput sequence and plot the histogram (for sampled distributions) for both the cases. Compare these plots with the sampled distributions of 100 and 100000 values generated by an LCG, by plotting the sampled distributions in two graphs side by side for both the cases. Specify the LCG that you have used.

3. Generate the Halton sequence $x_i = (\phi_2(i), \phi_3(i))$ (as points in $\mathbb{R}^2$) and plot the first 100 and 100000 values. What are your observations? What are your observations if, instead of the bases 2 and 3, you use larger values (say, something close to 100) as the bases?

Recall that the radical inverse function is defined by $\phi_b(i) := \sum_{k=0}^{j} d_k b^{-k-1}$, *where* $i = \sum_{k=0}^{j} d_k b^k$.

Put all your observations in the report.