

PART A:

Figure 1: A color graph is output.

Figure 2: The blue histogram covering this line  $\Rightarrow y=x, 0 \leq x \leq 1$  and this is histogram of list U(Standard Uniform Distribution values). Blue histogram is PDF of U, Standard Uniform Distribution in  $[0, 1]$ .

The orange histogram covering this line  $\Rightarrow y=2x, 0 \leq x \leq 1$  and this is histogram of list Xa. CDF is  $F(x) = x^2$  and PDF is  $f(x) = 2x$

Figure 3: The blue line of cumulative sum(cumsum) histogram of list U(hU). The blue line is cumulative distribution function (CDF) of Standard Uniform Distribution.

The orange line is the same.

Figure 4-5: In this figure blue thing is mean of list Xa. When experiment count increased, its value is converges to 0.666

Formula of expectance:

$$\int_{-\infty}^{+\infty} xf(x)dx = \int_{-\infty}^{+\infty} x * 2x dx = \int_0^1 2x^2 dx = \left(\frac{2}{3}\right) * 1 = 0.666$$

In this figure orange thing is variance of list Xa. When experiment count increased, its value is converges to 0.0555.

Formula of variance:

$$\int_{-\infty}^{+\infty} (x - E(x))^2 f(x) dx = \int_{-\infty}^{+\infty} (x - 0.666)^2 f(x) dx$$

$$\int_{-\infty}^{+\infty} (x^2 - 2 * 0.666 * x + 0.66^2) 2x dx =$$

$$\int_0^1 (2x^3 - 2 * 0.666 * 2x^2 + 0.66^2 * 2x) dx \approx 0.0555$$

(FIGURE 4 INCLUDES BOTH FIGURE 4 AND FIGURE 5. THE BLUE ONE MEAN, THE ORANGE ONE VARIANCE.)

PART B:

Figure 6: Just like Figure2, Histogram2, this is histogram of PDF  $f(x) = 2x$ .

Figure 7: Just like Figure3, Line2, this is CDF of  $f(x) = 2x$ , so  $F(x) = x^2$

Figure 8-9: Just like figure 4-5.

FIGURE 1:

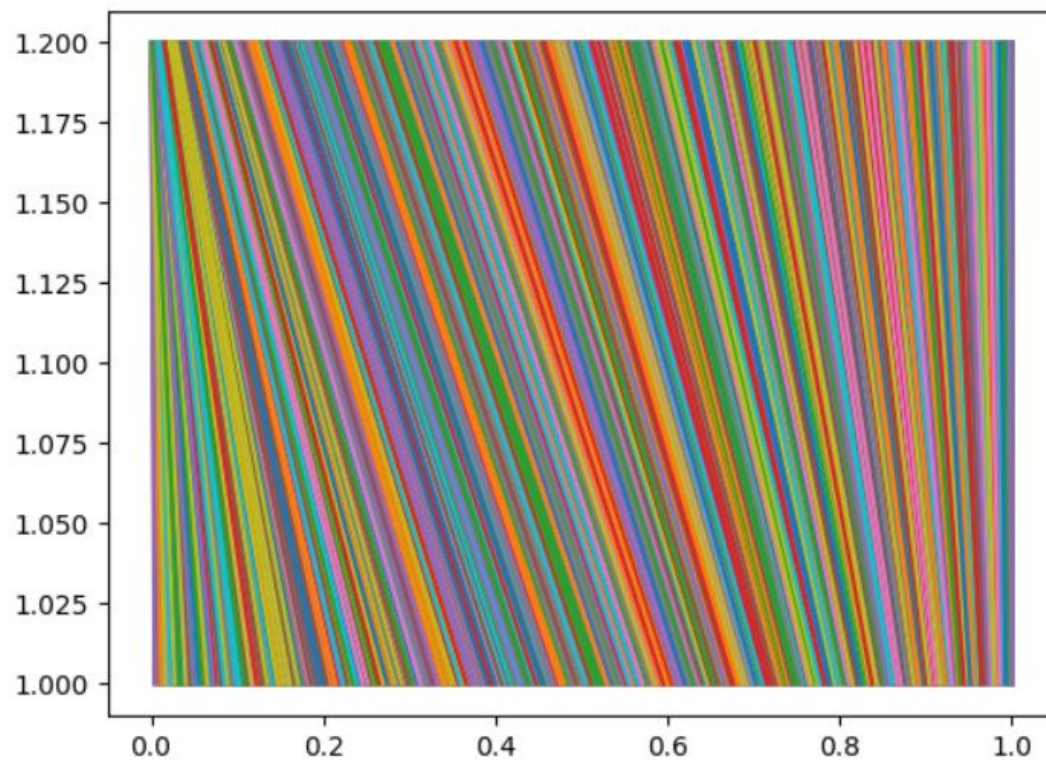


FIGURE 2:

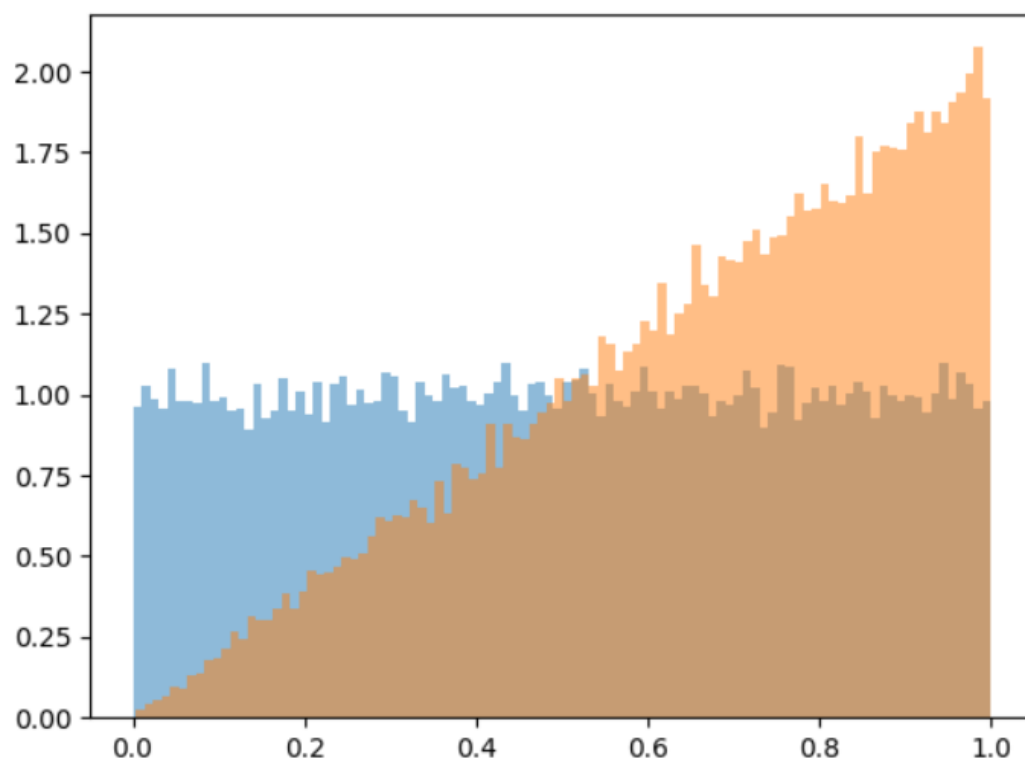


FIGURE 3:

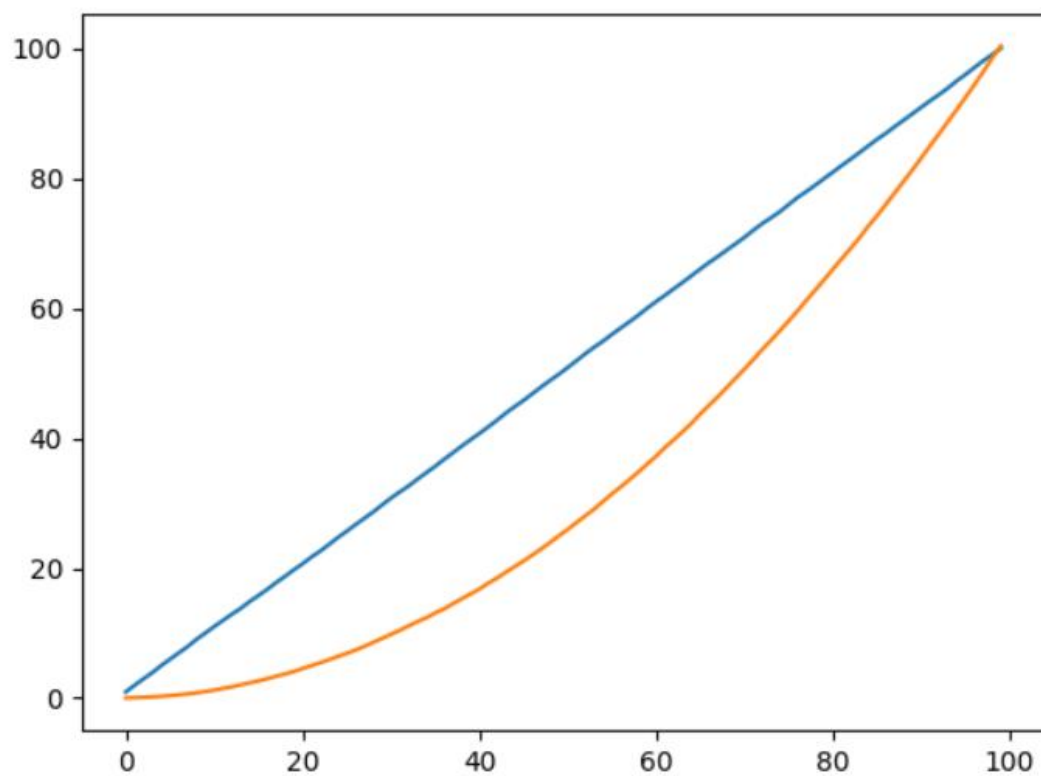


FIGURE 4-5 :

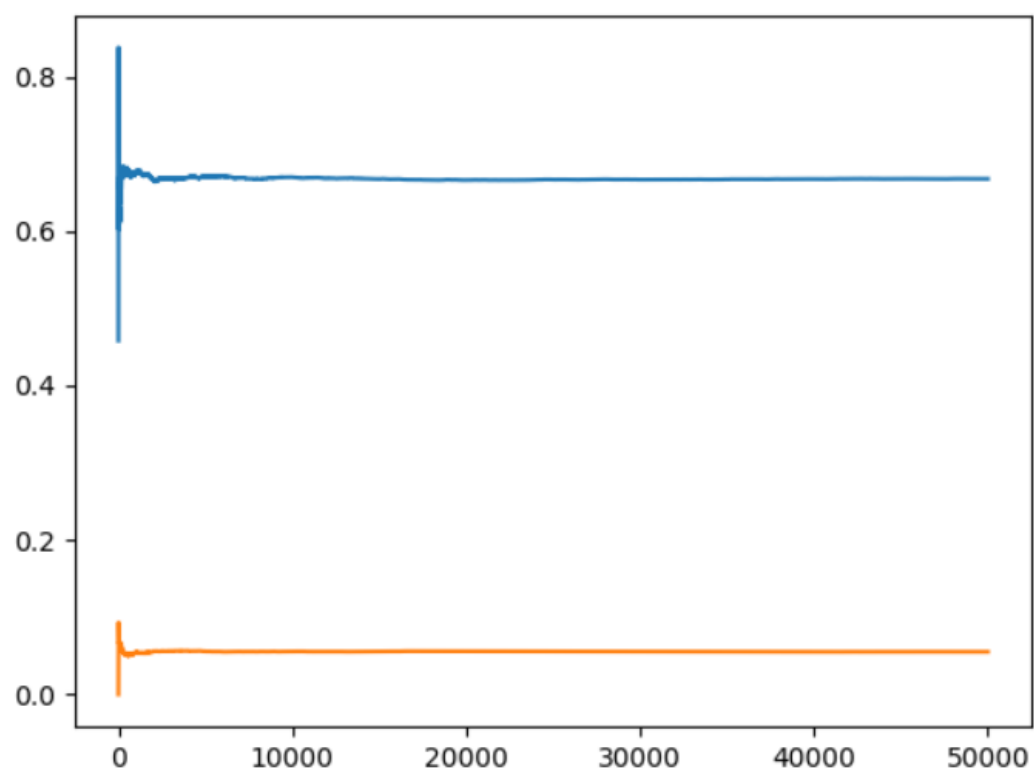


FIGURE 6:

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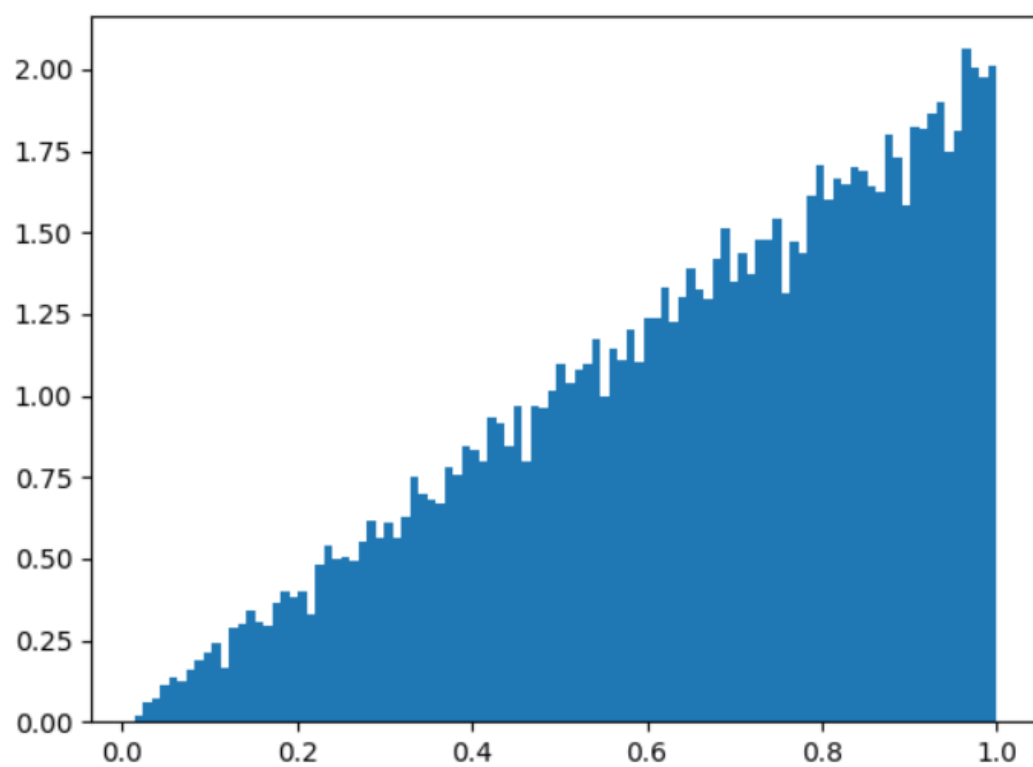


FIGURE 7:

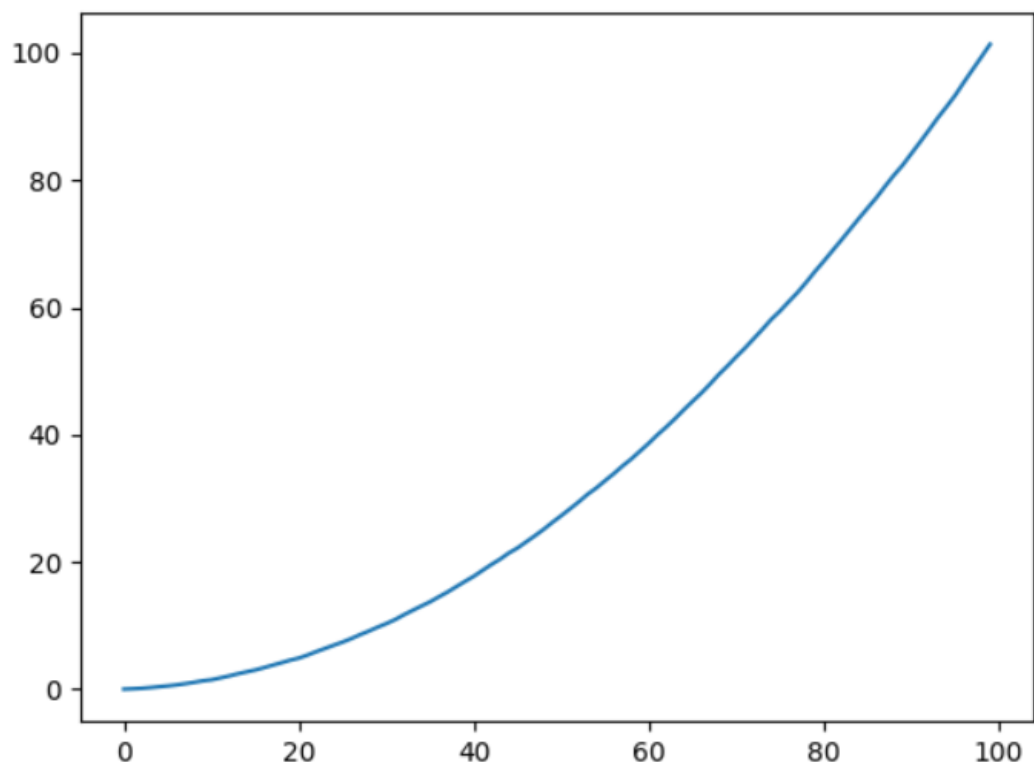




FIGURE 8-9:

