Lab-4 Report

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1)
(a)

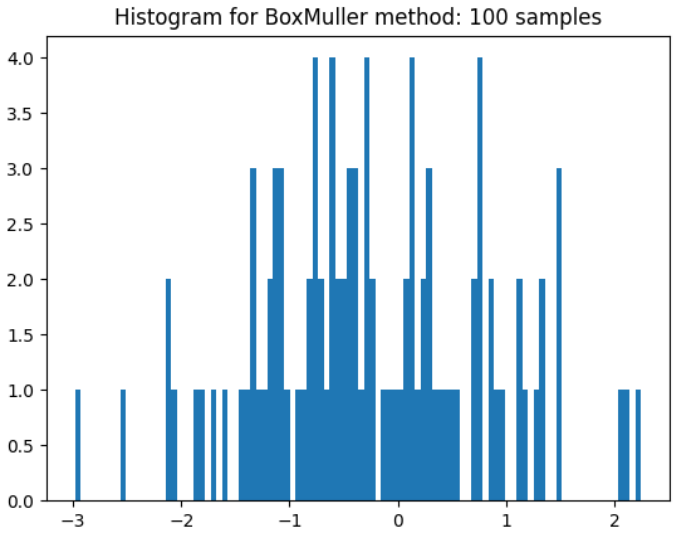
Box Muller:

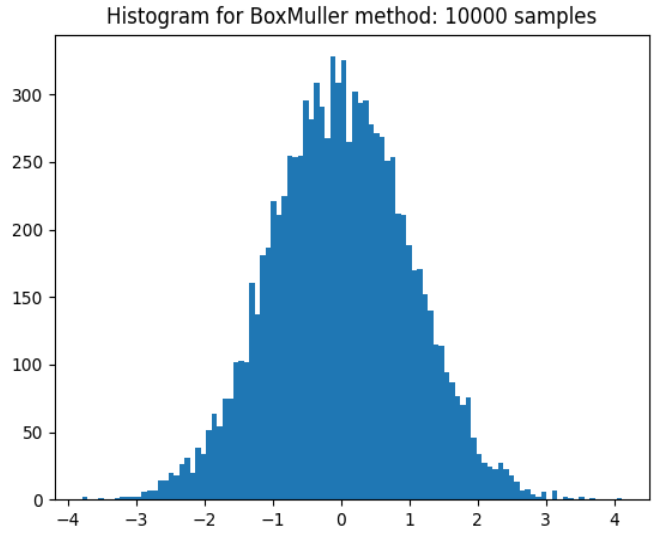
Samples	Mean	Variance
100	-0.2501	1.0638
10000	-0.0028	1.0178

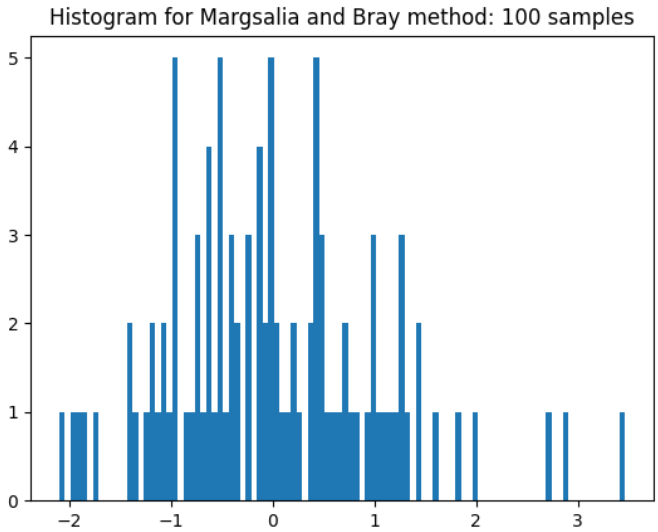
Margsalia and Bray:

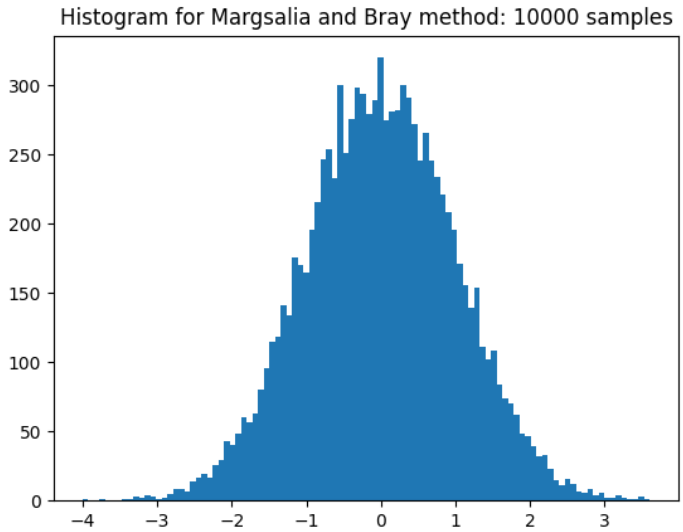
Samples	Mean	Variance
100	0.0091	1.0821
10000	0.0055	1.0074

(b)



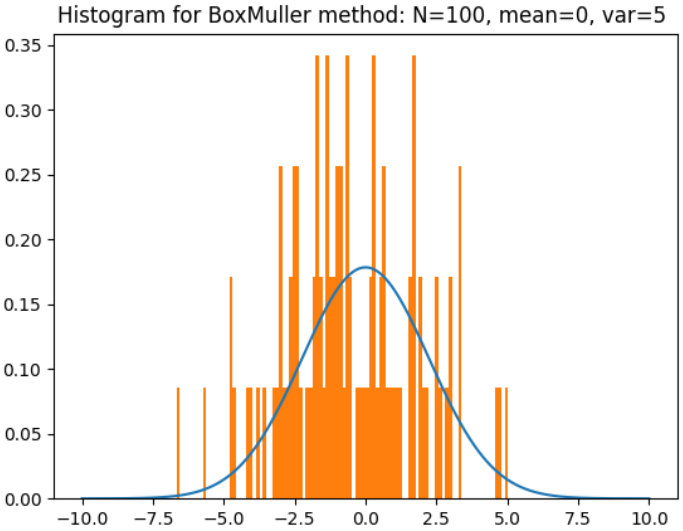


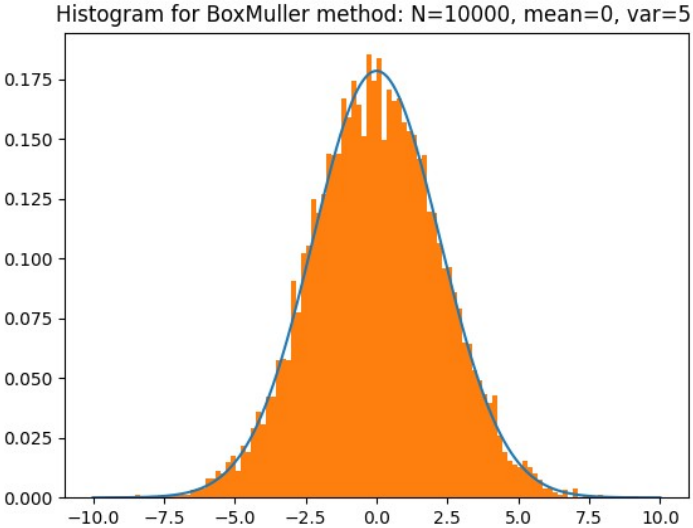


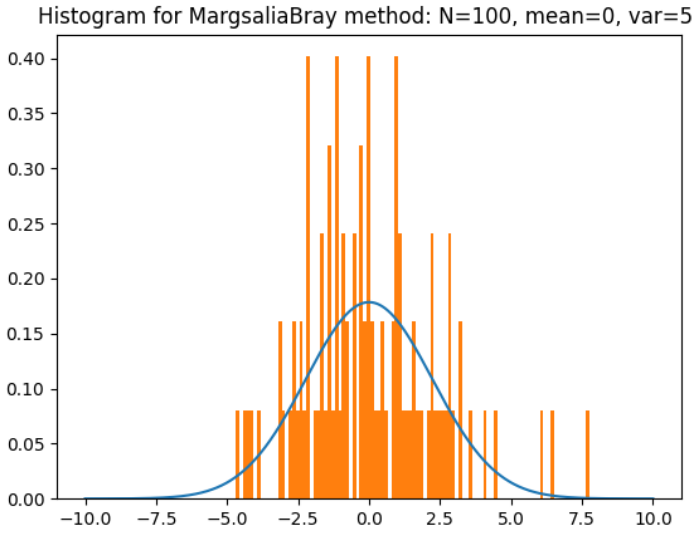


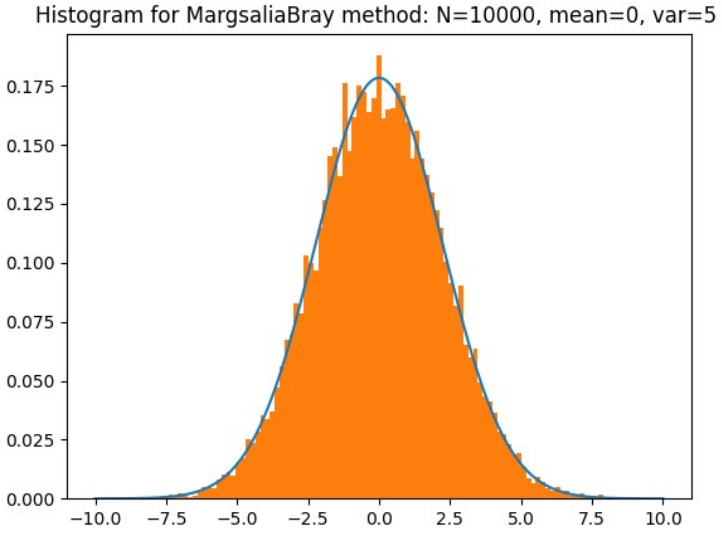
(c)

Mean = 0 and Variance = 5

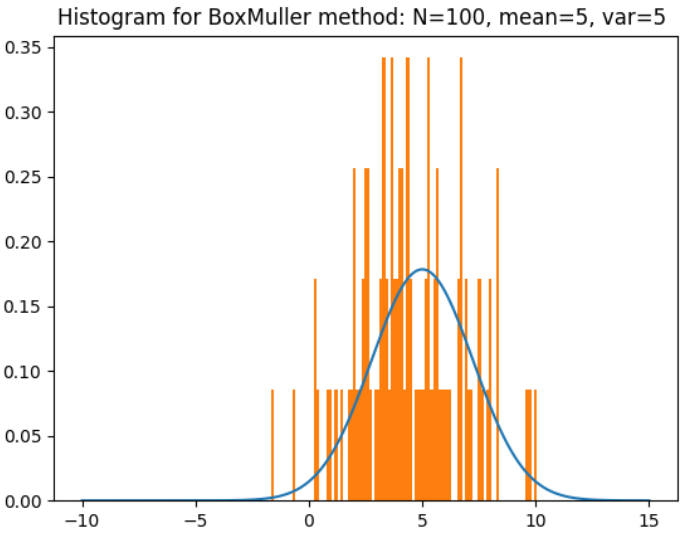


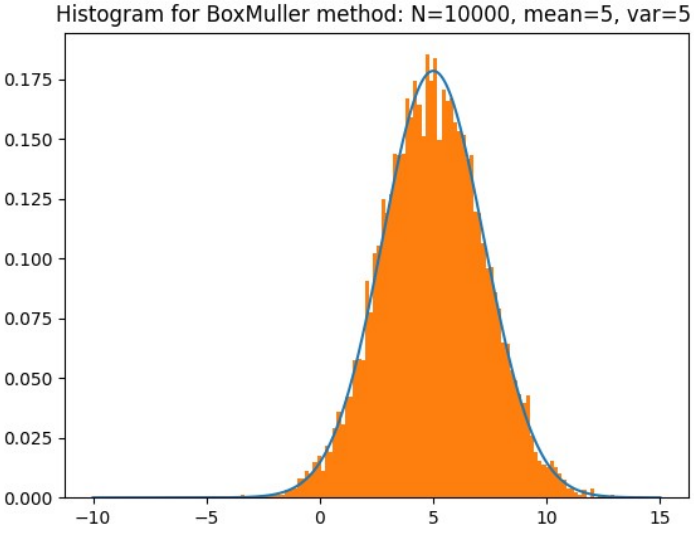


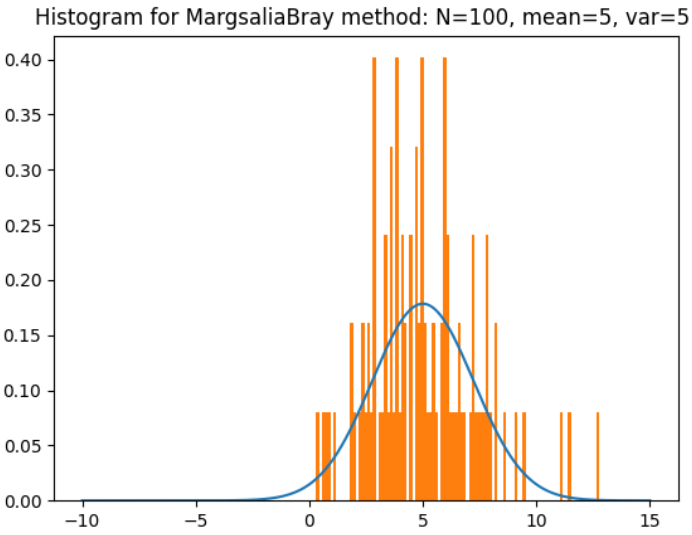


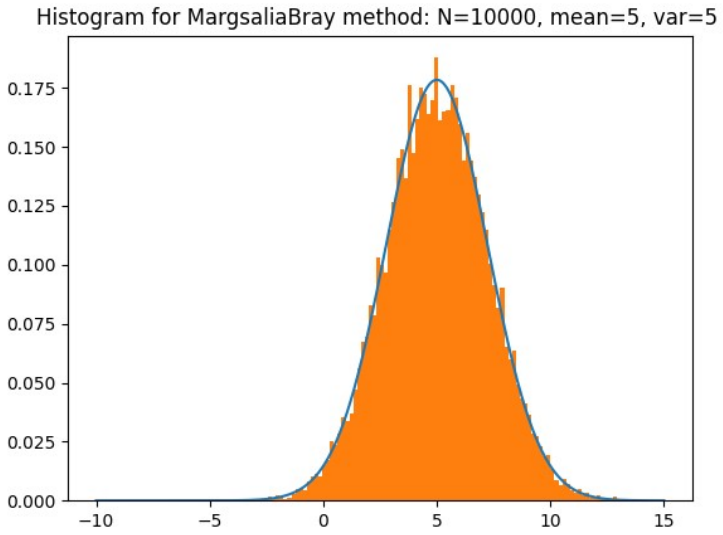


Mean = 5 and Variance = 5









2)

Method	Samples	Time
Box Miller	100	0.000145s
Margsalia and Bray	100	0.000192s
Box Miller	10000	0.009504s
Margsalia and Bray	10000	0.017189s

Observations:

- Box Miller is faster because it does not use acceptance rejection, it takes O(N) time.
- Whereas Margsalia and Bray method is slower because for each sample it rejects on average ~0.214*N samples, thus it takes longer than Box Miller Method.

3)

For 100 samples, portion of values rejected = 0.166667
For 10000 samples, portion of values rejected = 0.214947

$1-\pi/4 = 0.214601$