Lab3

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1

a)

BOX-MULLER N(0,1):

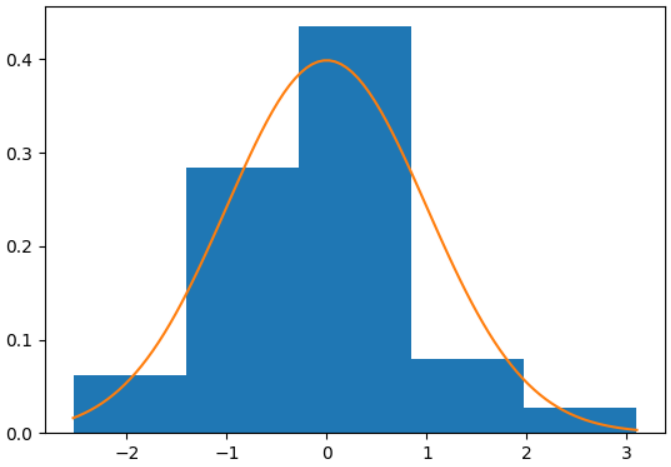
	N:100	N:10000
Mean	0.0324	0.0129
Variance	0.97	0.992

MARSAGLIA-BRAY N(0,1):

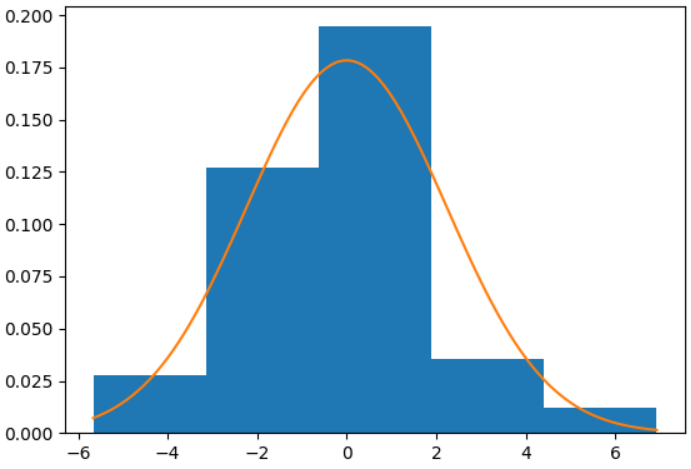
	N:100	N:10000
Mean	0.0293	0.0041
Variance	0.956	0.9844

b)

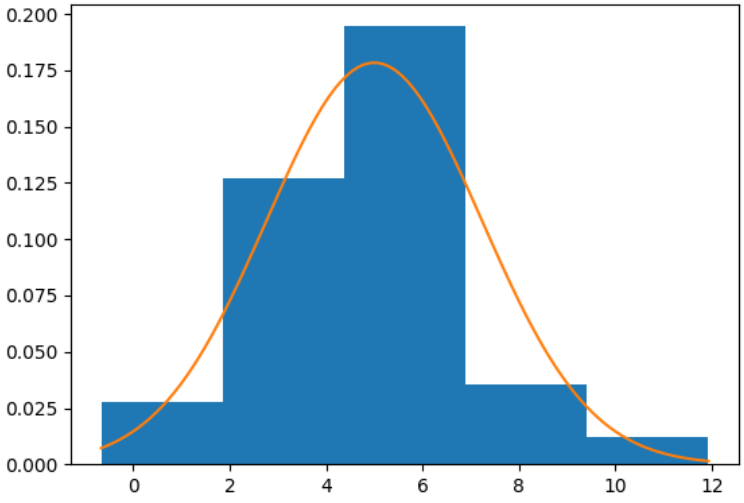
BOX-MULLER:



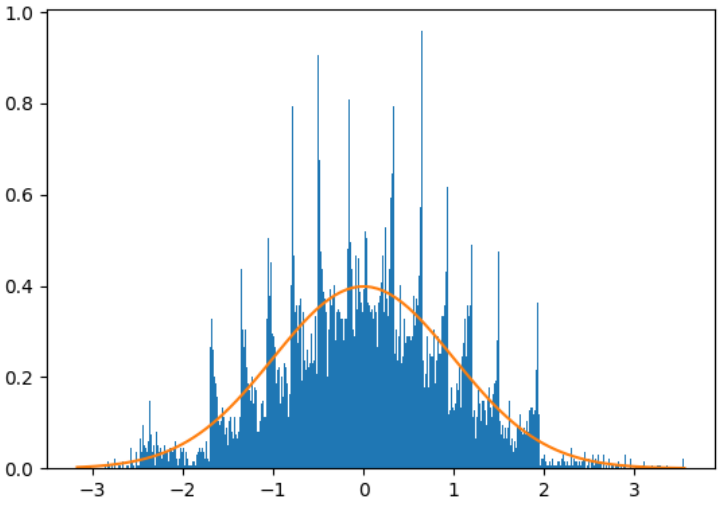
Sample size=100 N(0,1)



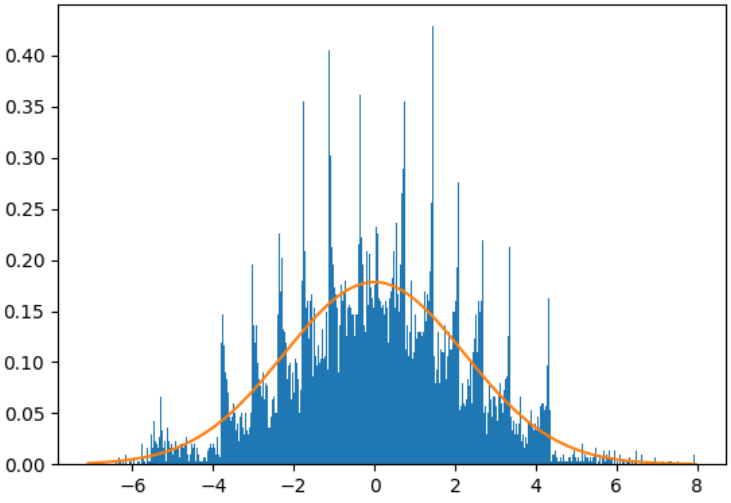
Sample size=100 N(0,5)



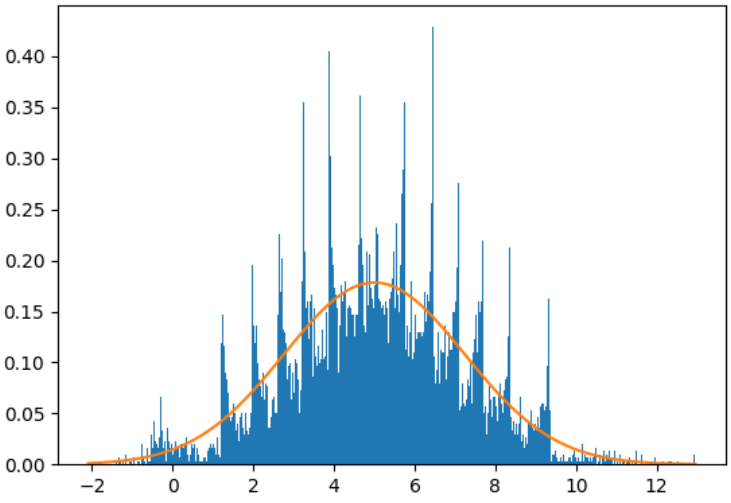
Sample size=100 N(5,5)



Sample size=10000 N(0,1)

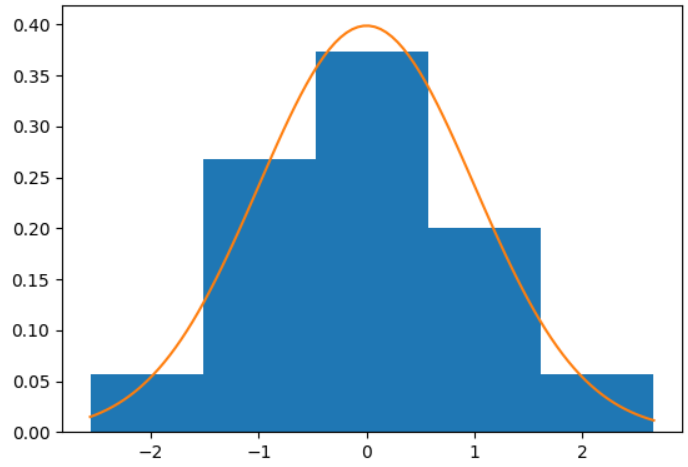


Sample size=10000 N(0,5)

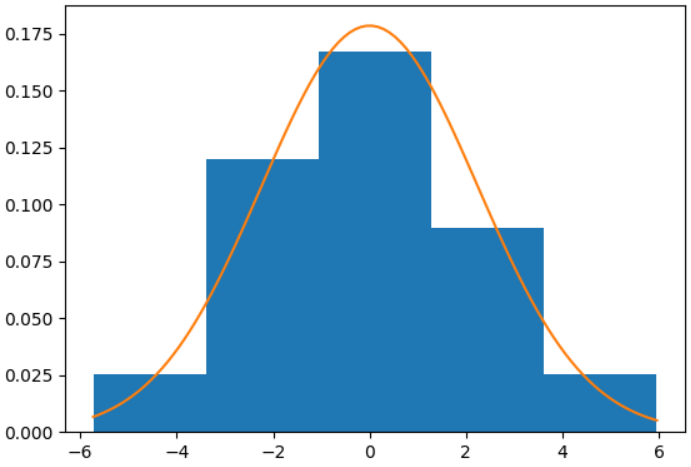


Sample size=10000 N(5,5)

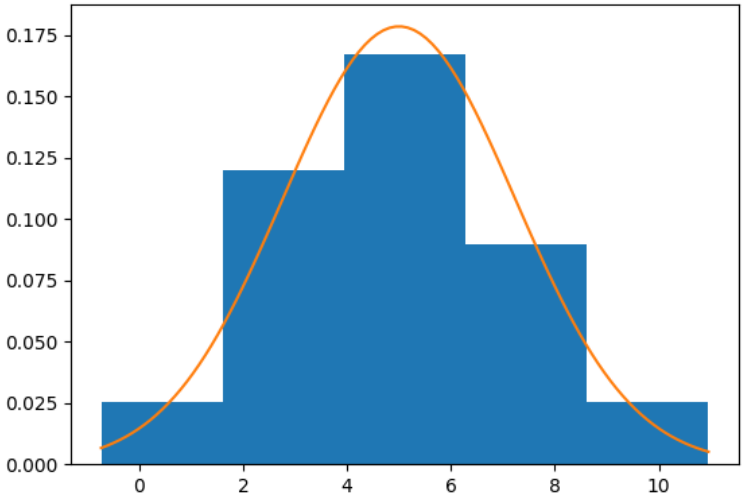
MARSAGLIA-BRAY:



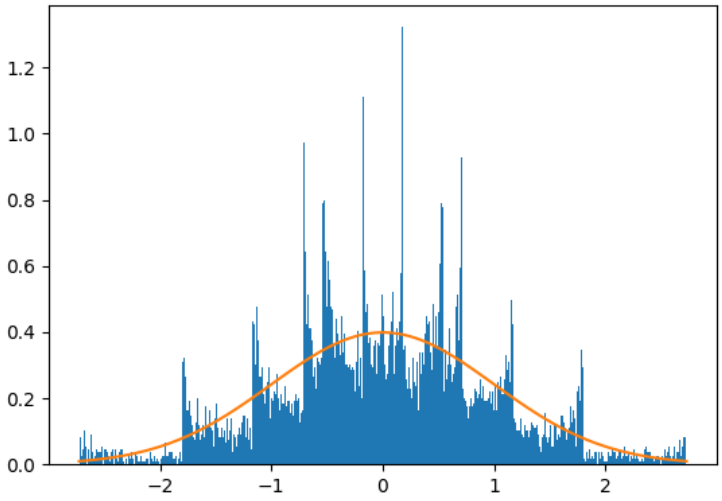
Sample size=100 N(0,1)



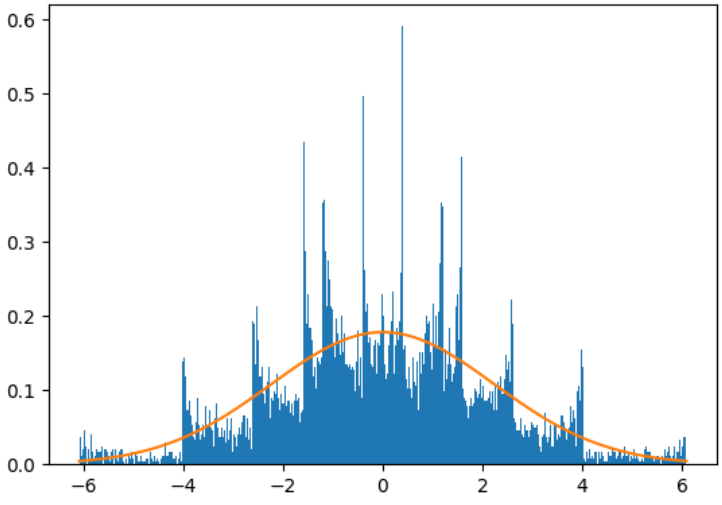
Sample size=100 N(0,5)



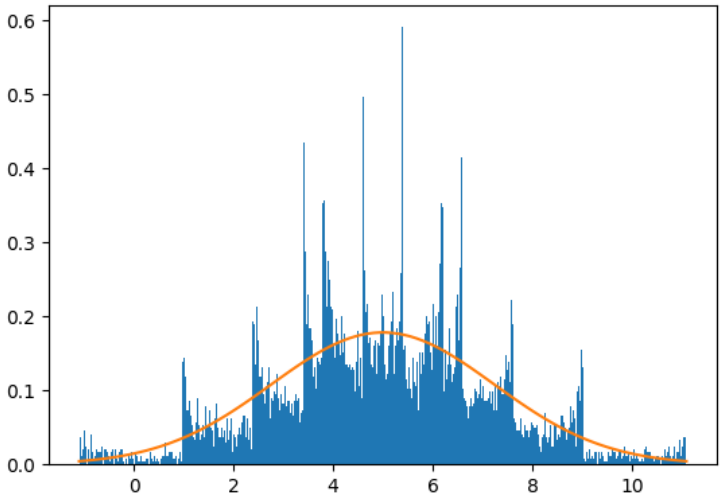
Sample size=100 N(5,5)



Sample size=10000 N(0,1)



Sample size=10000 N(0,5)



Sample size=10000 N(5,5)

c)

Observation:Both the plots are same except that one is shifted along the x-axis with respect to the other

2

Marsgalia and Bray method is faster than Box-Muller method.
Marsgalia and Bray method:0.0528s
Box-MUller mmethod:0..0634s

3

For Sample Size=100: 0.212
For Sample Size=10000: 0.202

These are very close to $1 - \frac{\pi}{4} = 0.214$