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ROLL NO: 1801CS08
CS575 - LAB4

Colab Link -
https://colab.research.google.com/drive/1WM8jds9aTlH_DIKIEbDL5eBKflixn0Qj?usp=sharing

Task 1
Q1.

Group 1	Group 2	Group 3
85	79	91
86	78	92
88	88	93
75	94	85
78	92	87
94	85	84
98	83	82
79	85	88
71	82	95
80	81	96

Group 1:

Mean = 83.4, Median = 82.5
Variance = 64.04, Standard Deviation = 8.002499609497024
Skewness = 0.3201841554571654, Kurtosis = -0.8410405582706946

Group 2:

Mean = 84.7, Median = 84.0
Variance = 25.21, Standard Deviation = 5.020956084253277
Skewness = 0.5278629787066954, Kurtosis = -0.8351499132790328

Group 3:

Mean = 89.3, Median = 89.5
Variance = 20.810000000000002, Standard Deviation = 4.561797891182818
Skewness = -0.07432765851857329, Kurtosis = -1.3094067951011432

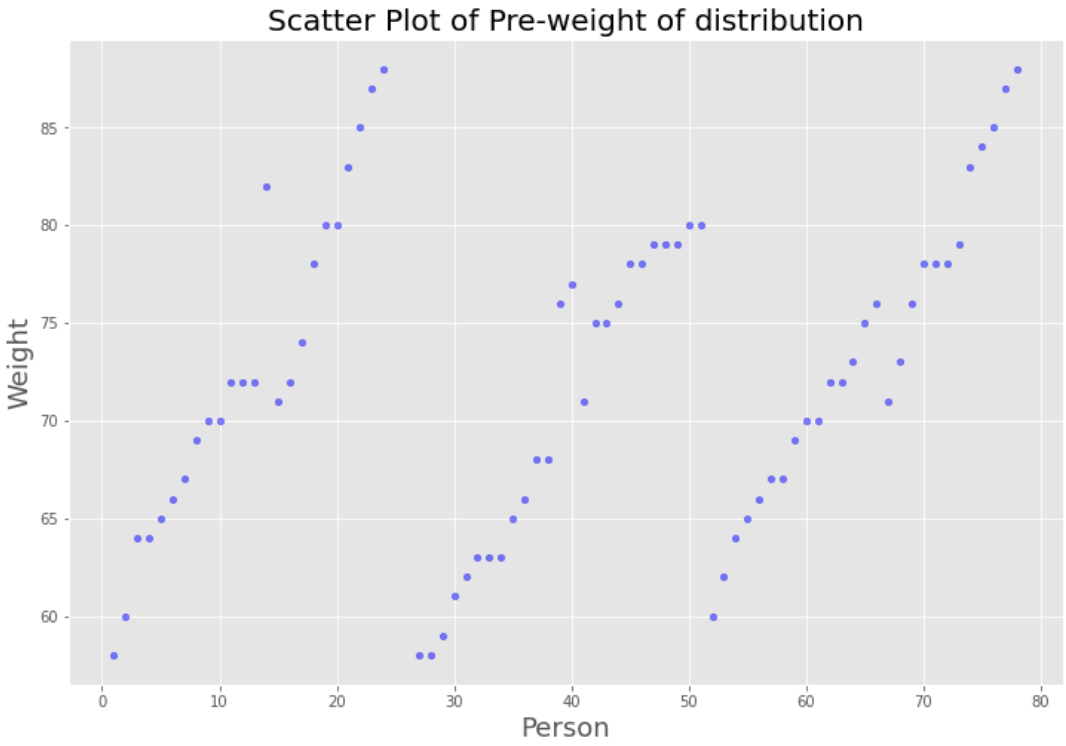
Q3:

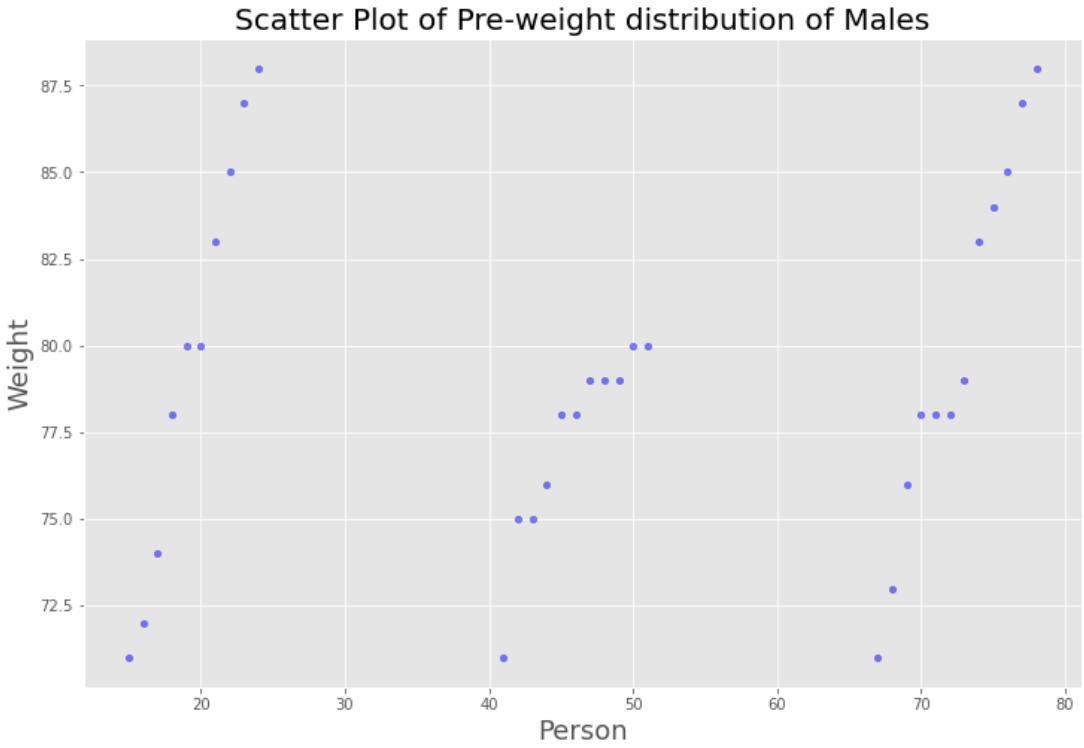
F One-way Anova Test

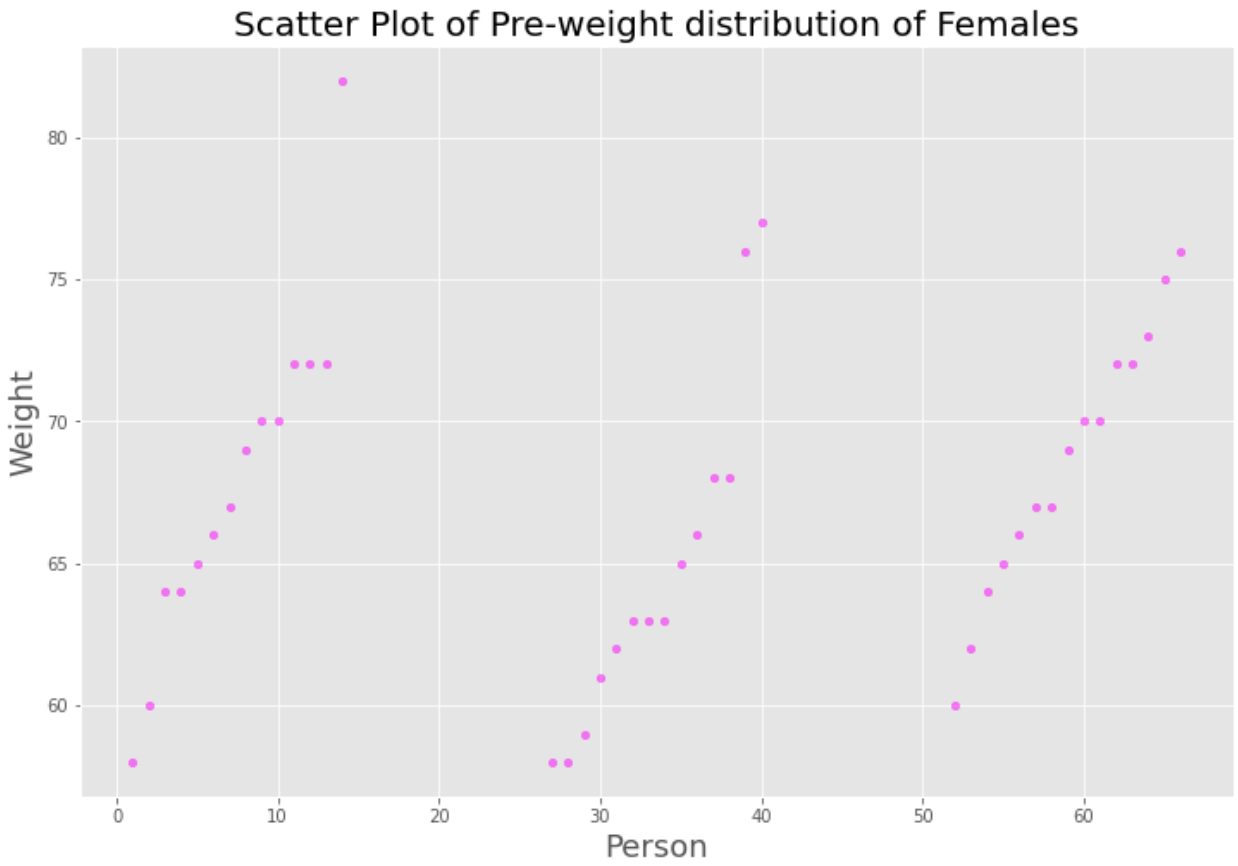
F-statistic = 2.3575322551335565, P-value = 0.11384795345837273

P value > 0.05 indicates that there is possibility of mean of 3 groups being from same distribution and hence we cannot reject the Null hypothesis

Task 2
Q1.


Scatter Plot of Pre-weight of distribution
Weight
Person
85
80
75
70
65
60
0
10
20
30
40
50
60
70
80


Scatter Plot of Pre-weight distribution of Males
Weight
Person
87.5
85.0
82.5
80.0
77.5
75.0
72.5
20
30
40
50
60
70
80



Q2. Anova Test Result

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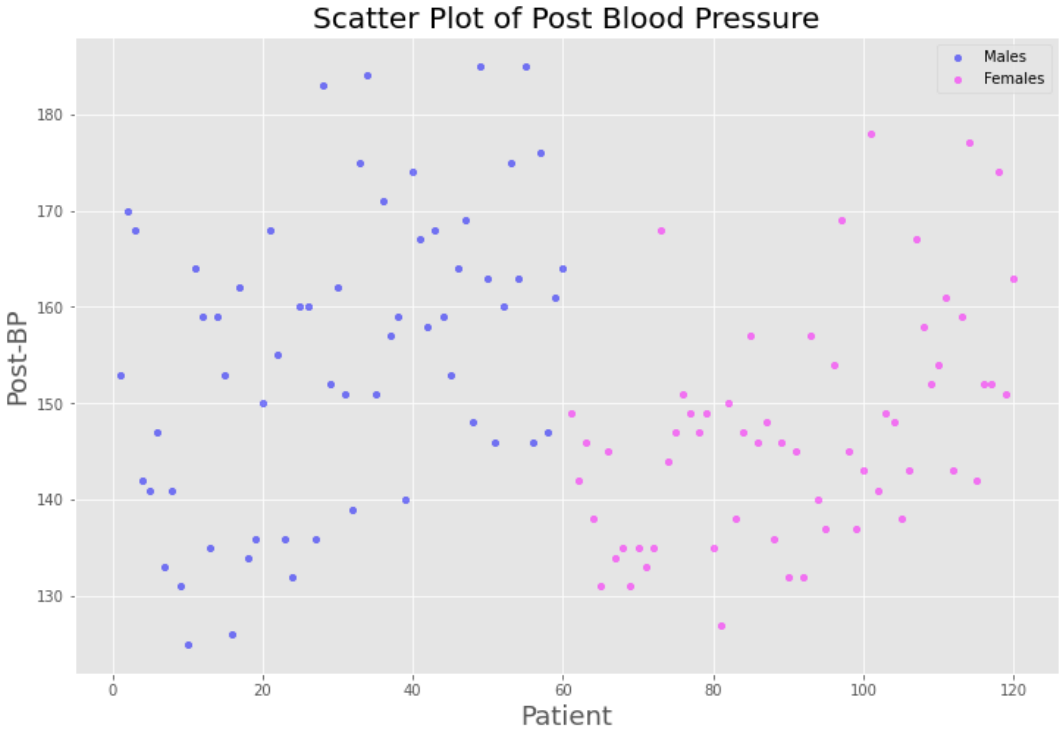
F_onewayResult(statistic=1.247834694837041, pvalue=0.29317702104020305)
```

Pvalue of 0.29 give significant evidence that we cannot reject null hypothesis

Task 3

Q1.



Q2.

	bp_before_male	bp_after_male	bp_before_female	bp_after_female
count	60.000000	60.000000	60.000000	60.000000
mean	159.266667	155.516667	153.633333	147.200000
std	11.413442	15.243217	10.735600	11.742722
min	140.000000	125.000000	138.000000	127.000000
25%	150.750000	145.000000	144.750000	138.000000
50%	158.000000	158.500000	151.000000	146.000000
75%	170.000000	164.750000	161.250000	152.000000
max	185.000000	185.000000	185.000000	178.000000

Q3.

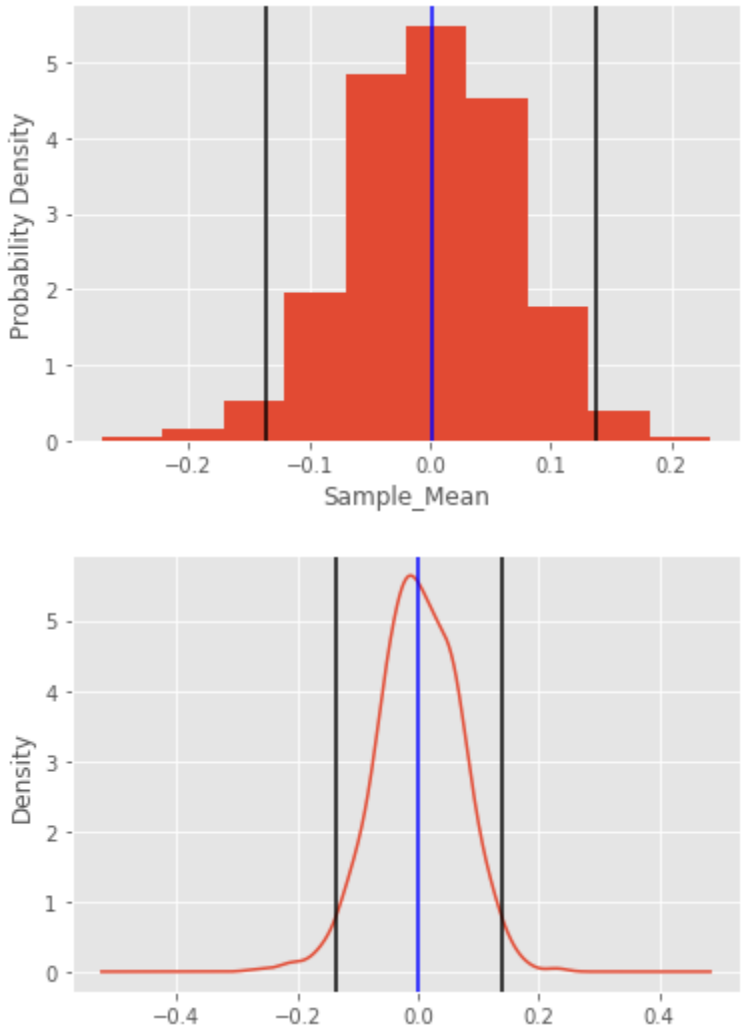
Null Hypothesis : Mean of blood pressure for both male and female are equal

Alternate Hypothesis : Mean of blood pressure for both male and female are different

t=3.348, df=118, cv=1.658, p=0.001
Reject the null hypothesis that the means are equal.
Reject the null hypothesis that the means are equal.

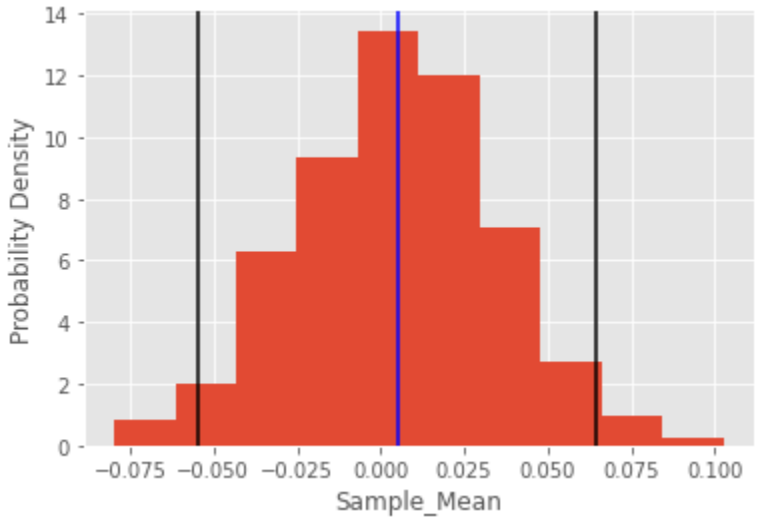
We got t value as 3.348 and p = 0.001 which is less than significance level hence rejecting the Null Hypothesis

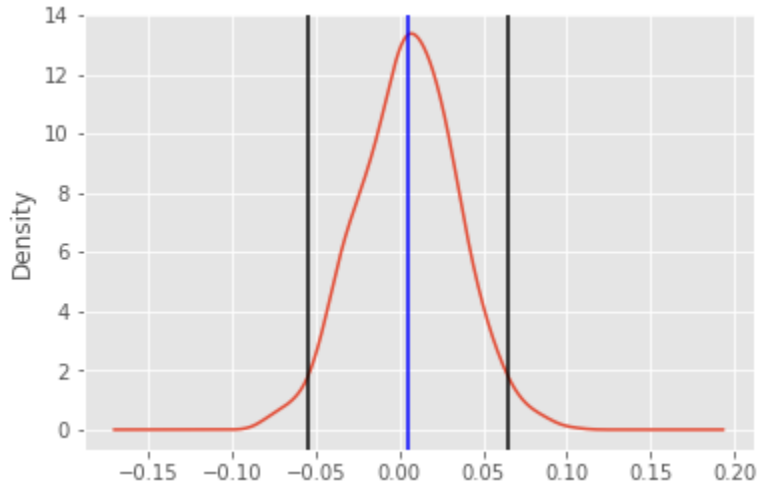
Task 4
Q1.



Probability Density with sample size = 100

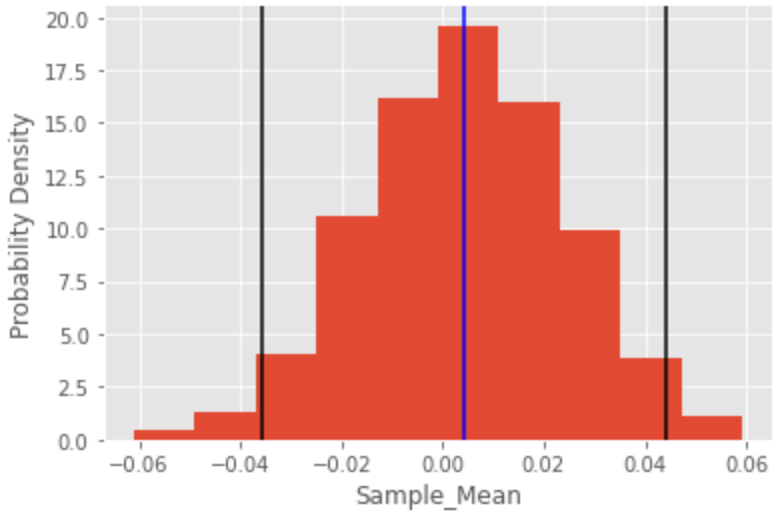
Q2.

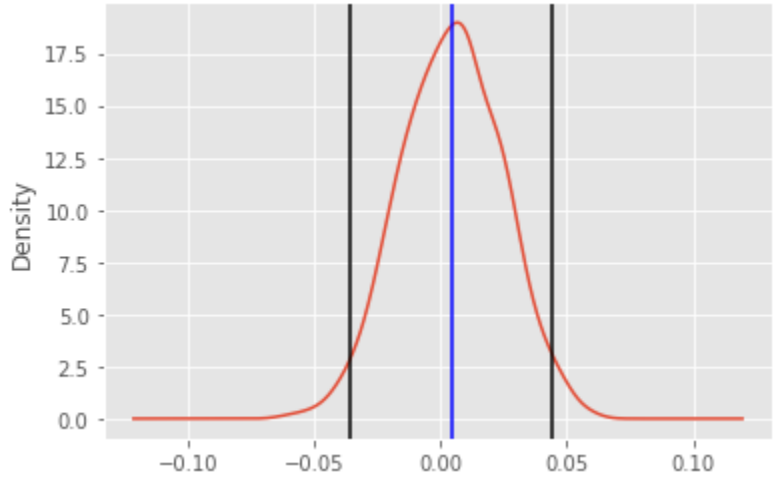




Probability Density with sample size = 500

Q3.

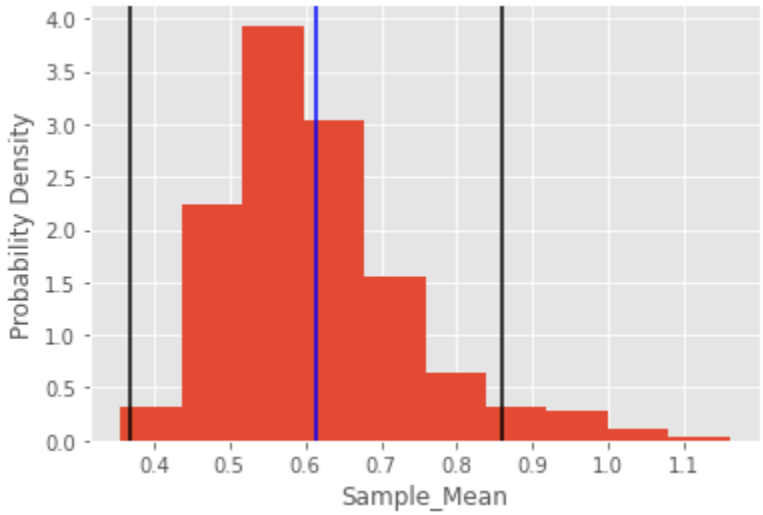


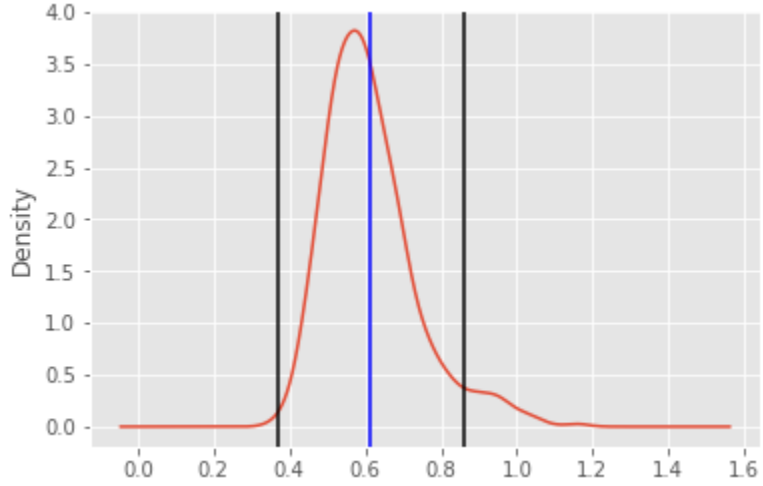


Probability Density with sample size = 1000

We observed that on increasing the sample size from 100 to 1000 the standard deviation of sample mean decreases.

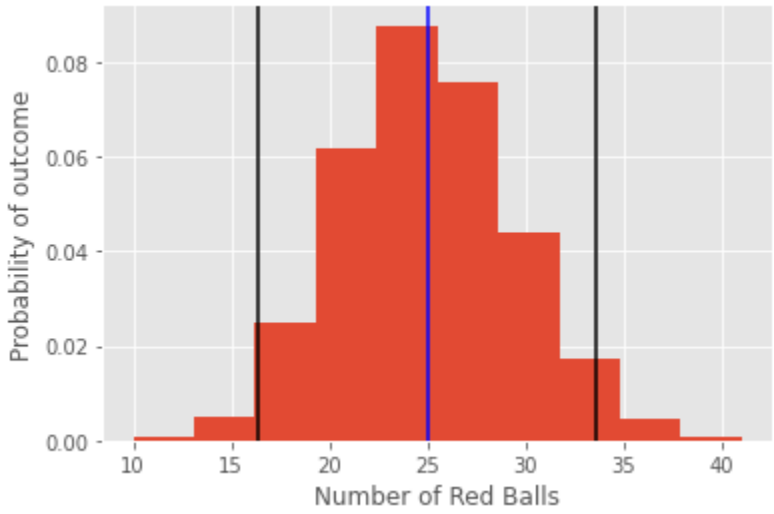
Task 5

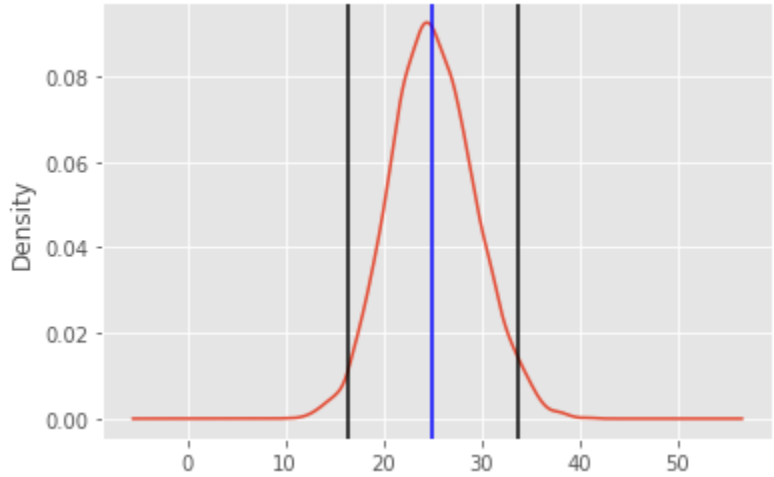




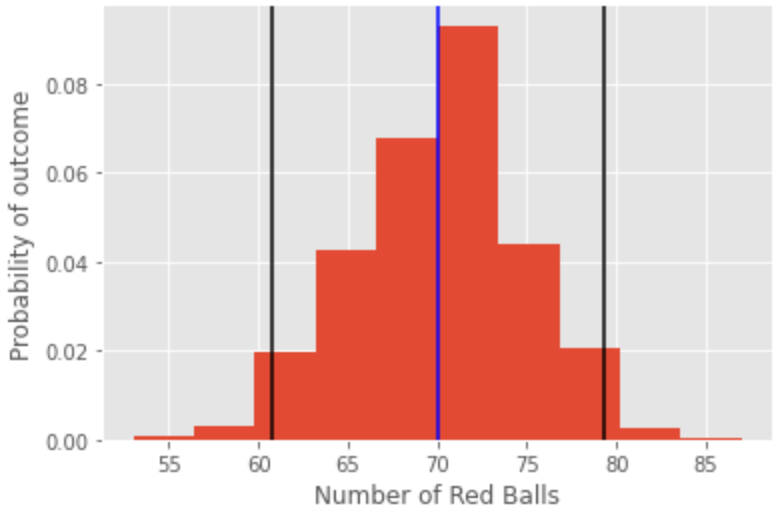
On sampling standard deviation values on XOM sp500 values. We found that it is highly positively skewed

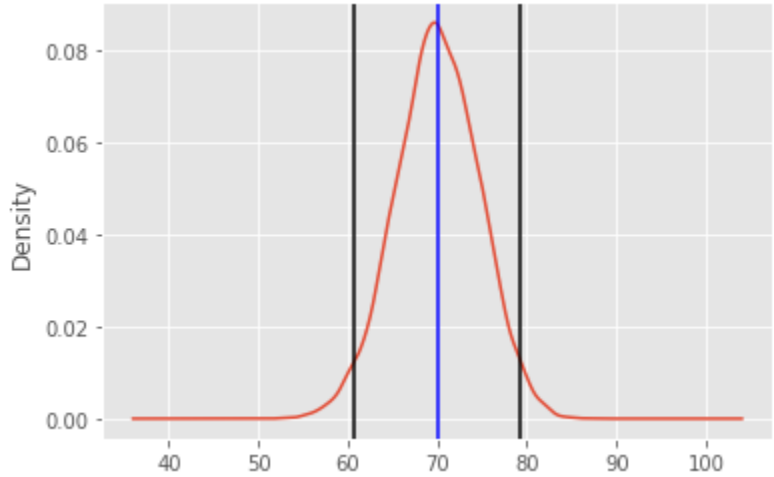
Task 6





Probability density when number of red balls = 25%





Probability density when number of red balls = 70%

We observed that the mean percentage of red balls is nearly equal to actual percentage of red balls in the bag. This is expected as no. of experiments done is large = 10000