SADS Problem 5

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OPERATION

The data of weight (kg), height (cm) and chest circumference (cm) of 15 UG students selected from the multivariate normal distribution with mean vector sigma and variance- covariance matrix data, are given below.

```
sigma=matrix(c(44,49,21,49,61,27,21,27,17),nrow=3,ncol=3)
sigma
```

```
##      [,1] [,2] [,3]
## [1,]   44   49   21
## [2,]   49   61   27
## [3,]   21   27   17
```

Make the matrix in data frame

```
WeightX1=c(59,63,57,47,66,68,70,52,56,53,56,64,62,48,51)
HeightX2=c(152,157,156,147,166,168,171,151,154,152,156,169,163,151,153)
ChestX3=c(35,46,40,33,47,42,45,38,44,41,42,48,42,39,41)
data=data.frame(WeightX1,HeightX2,ChestX3)
data
```

WeightX1 <dbl>	HeightX2 <dbl>	ChestX3 <dbl>
59	152	35
63	157	46
57	156	40
47	147	33
66	166	47
68	168	42
70	171	45
52	151	38
56	154	44
53	152	41

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```
x=colMeans(data)
x
```

```
##  WeightX1  HeightX2   ChestX3
##  58.13333 157.73333  41.53333
```

Inverse of sigma

```
inv=solve(sigma)
 inv
```

```
##       [,1]       [,2]       [,3]
## [1,]  0.22 -0.1900000  0.0300000
## [2,] -0.19  0.2192857 -0.1135714
## [3,]  0.03 -0.1135714  0.2021429
```

to find the Xbar -mu

```
mu=c(58,157,42)
mu
```

```
## [1]  58 157  42
```

```
X= x-mu
 X
```

```
##   WeightX1   HeightX2    ChestX3
##  0.1333333  0.7333333 -0.4666667
```

chi square test

```
res=15*(t(X)%*%inv%*%X)
res
```

```
##          [,1]
## [1,] 3.040571
```

Conclusion:- At the given level of significane chi square is less the tabulated value of chi square test.i.e.The data of weight,height,chest circumference of 15 ug with sample is not varies,i.e. accepted