Applied Statistics HW1 #5 solution.
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```
#read data from external file.
data5 <- read.csv("F:/Assigmnents/Appstat/data5.csv", sep="")
View(data5)
#Assign predictor variable x is the latitude
x<-data5$Lat
#mean of x as no. of variable are 48
xbar<-mean(x)
c(xbar)= 39.43958

#Assign response variable y is the mortality
y<-data5$Mort
#mean of x as no. of variable are 48
ybar<-mean(y)
c(ybar)= 152.75

#the point of estimate b1 for B1
b1<-sum((x-xbar)*(y-ybar))/sum((x-xbar)*(x-xbar))
c(b1)= -6.031333

# t value as (1-alpha/2 = 0.975) and (n-2 = 46)DOF
t<-qt(0.975,46)
c(t)= 2.012896

#bo value
bo<-ybar-b1*xbar
c(bo)= 390.6232

#estimated Yhat of response variable y
yhat<-bo+b1*x

#MSE
MSE<- sum((y-yhat)*(y-yhat))/46
c(MSE)= 348.7359

#Standard error (Se) of b1
s<-sqrt(MSE)/sqrt(sum((x-xbar)*(x-xbar)))
c(s)= 0.5905047

#Confidence Interval C.I. [a,b]
a<-b1-t*s
c(a)= -7.219957

b<-b1+t*s
c(b)= -4.842708


# verify using R function
fit<-lm(y~x)
Call:lm(formula = y ~ x)
Coefficients:
(Intercept)            x
    390.623       -6.031
```

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confint(fit)
2.5 %     97.5 %
(Intercept) 343.431468 437.815026
x            -7.219957  -4.842708

summary(fit)
Call: lm(formula = y ~ x)
Residuals:
    Min      1Q  Median      3Q     Max
-38.527 -12.470   1.701  12.595  44.599
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 390.6232    23.4447   16.66  < 2e-16 ***
x            -6.0313     0.5905  -10.21 2.07e-13 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 18.67 on 46 degrees of freedom
Multiple R-squared:  0.694,    Adjusted R-squared:  0.6873
F-statistic: 104.3 on 1 and 46 DF,  p-value: 2.068e-13

#solution of Part2 for question5
#SSR
SSR<-(sum((yhat-ybar)*(yhat-ybar)))
c(SSR)= 36381.15

#SSE
SSE<-(sum((y-yhat)*(y-yhat)))
c(SSE)= 16041.85

#SST
SST<-(sum((y-ybar)*(y-ybar)))
c(SST) = 52423

#finding R-Square
rsquare<- SSR/SST
c(rsquare)= 0.6939921

plot(x,y)
lines(x,yhat,col="red", lwd ="2")
```