R Notebook

Code

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```
library(openxlsx)

#xlsxFile <- system.file("extdata","Test1_Appl_Reg_v5_Data.xlsx", package = "openxlsx")
df1 <- read.xlsx(xlsxFile = "xr16054.xlsx", sheet = 1, skipEmptyRows = FALSE)
mlr <- lm(formula=Salary ~ GPA + Activities, data=df1)
summary(mlr)
```

```

Call:
lm(formula = Salary ~ GPA + Activities, data = df1)

Residuals:
    Min      1Q  Median      3Q     Max 
-2.1087 -0.6306 -0.1198  0.5621  2.2754 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept)  24.3092     3.1919   7.616 0.000125 ***
GPA           3.8416     1.2342   3.113 0.017016 *  
Activities    1.6810     0.5291   3.177 0.015560 *  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.448 on 7 degrees of freedom
Multiple R-squared:  0.8245,    Adjusted R-squared:  0.7743 
F-statistic: 16.44 on 2 and 7 DF,  p-value: 0.002267
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```
#confint(mlr)
#sigma(mlr)/mean(df1$Salary)

pred <- data.frame(GPA=3.6,Activities=3 )
predict(mlr,newdata=pred)
```

```
       1 
43.18204 
```

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```
predict(mlr,newdata=pred, interval = "prediction")
```

```
       fit      lwr      upr
1 43.18204 38.83742 47.52666
```

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```
predict(mlr,newdata=pred, interval = "confidence")
```

```
       fit     lwr      upr
1 43.18204 40.5075 45.85658
```

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```
confint(mlr,level = 0.95)
```

```
                2.5 %    97.5 %
(Intercept) 16.7615272 31.856922
GPA          0.9232792  6.759986
Activities   0.4297571  2.932202
```

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```
print("a) the formual for the MLR is y = 24.309224 +3.841633x1 + 1.680980x2")
```

```
[1] "a) the formual for the MLR is y = 24.309224 +3.841633x1 + 1.680980x2"
```

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```
print("b) the estimated salary for dave is 43.18204")
```

```
[1] "b) the estimated salary for dave is 43.18204"
```

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```
print("c) the standard error for model is 1.448")
```

```
[1] "c) the standard error for model is 1.448"
```

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```
print("d) the prediction interval is (38.83742,47.52666)")
```

```
[1] "d) the prediction interval is (38.83742,47.52666)"
```

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```
print("e) the confidence interval is (40.5075,45.85658)")
```

```
[1] "e) the confidence interval is (40.5075,45.85658)"
```

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```
print("f) the confidence for the popualtion partial regression b1 = (0.9232792, 6.759986) and b2 = (0.4297571, 2.932202)")
```

```
[1] "f) the confidence for the popualtion partial regression b1 = (0.9232792, 6.759986) and b2 = (0.4297571, 2.932202)"
```

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```
print("g) the data shows great significances due to the p value being 0.002")
```

```
[1] "g) the data shows great significances due to the p value being 0.002"
```

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```
print("g) the analysis does show support for the application of the MLR. The medians is only -0.1198")
```

```
[1] "g) the analysis does show support for the application of the MLR. The medians is only -0.1198"
```

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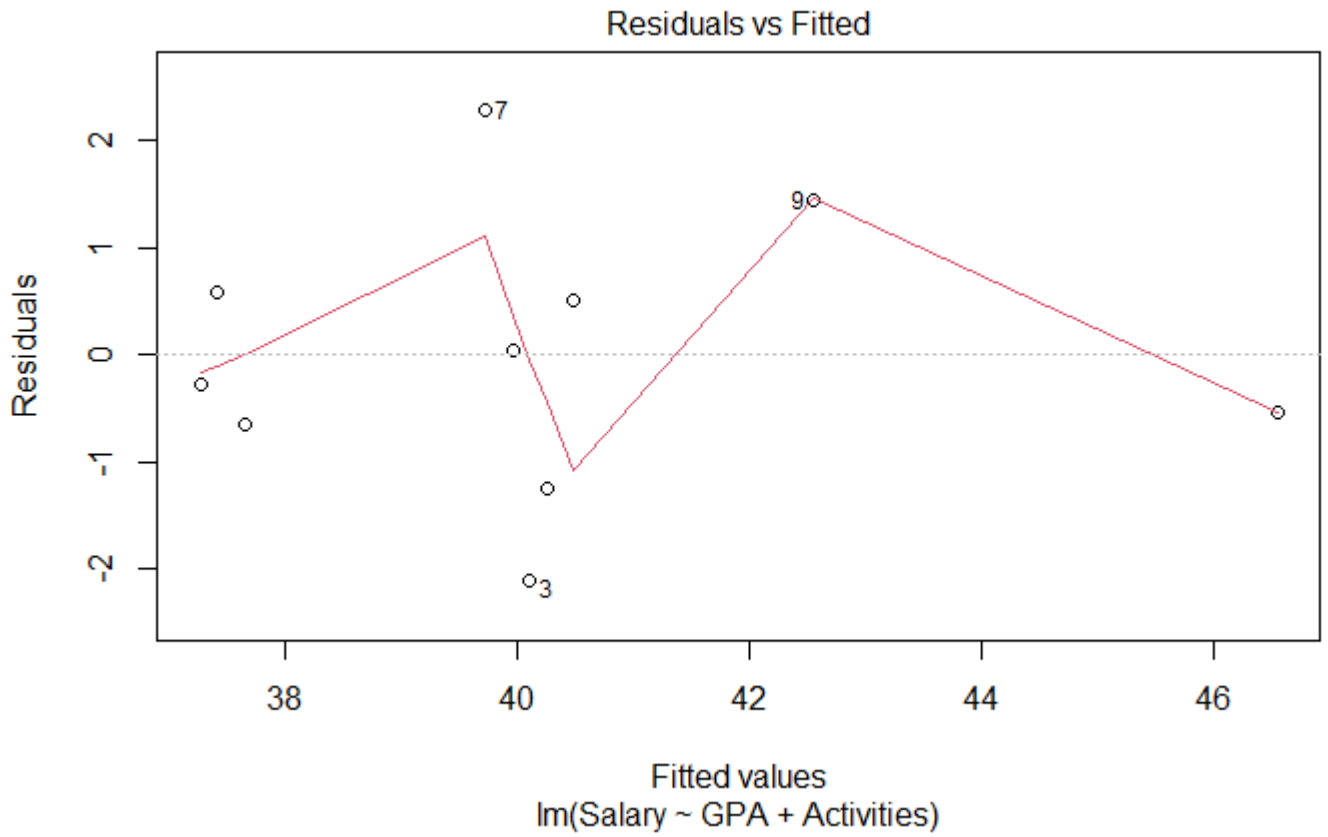
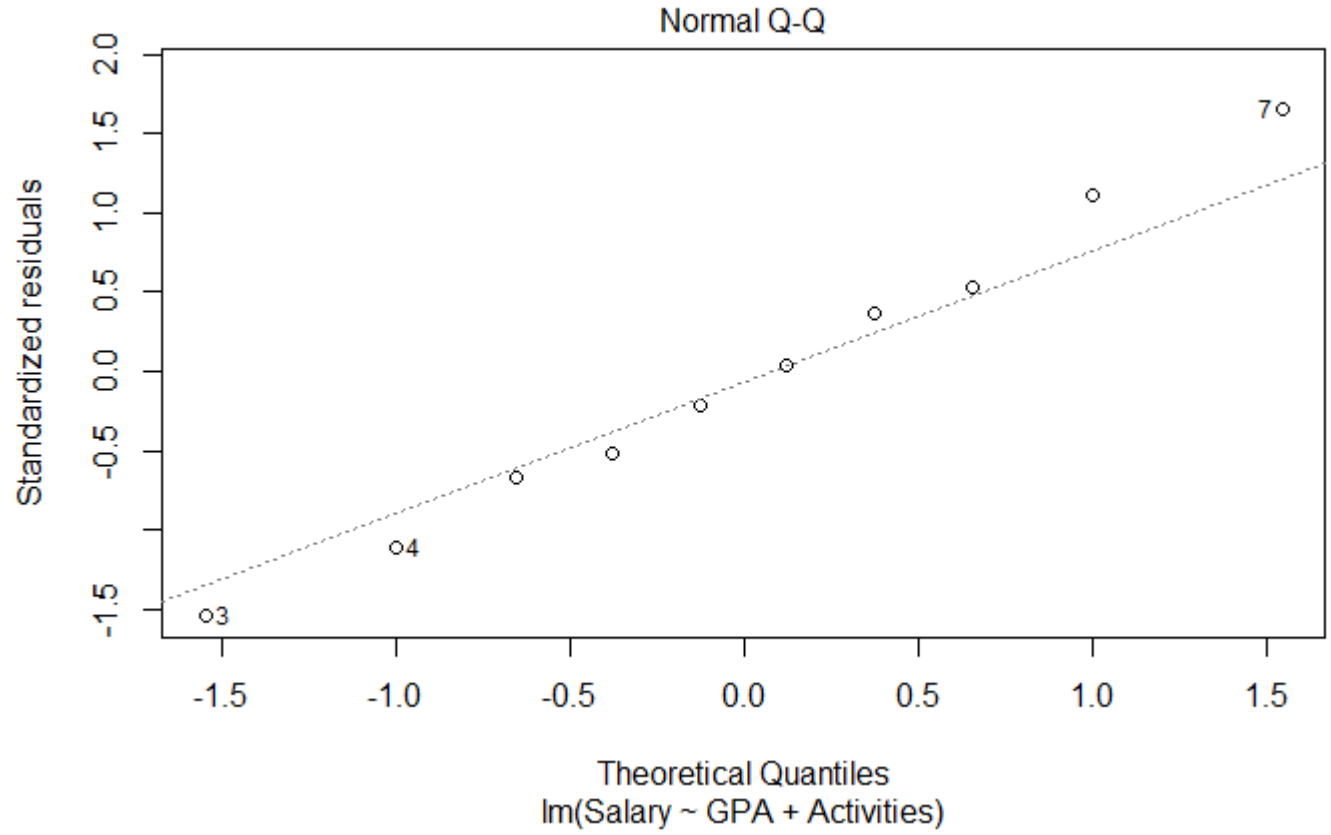
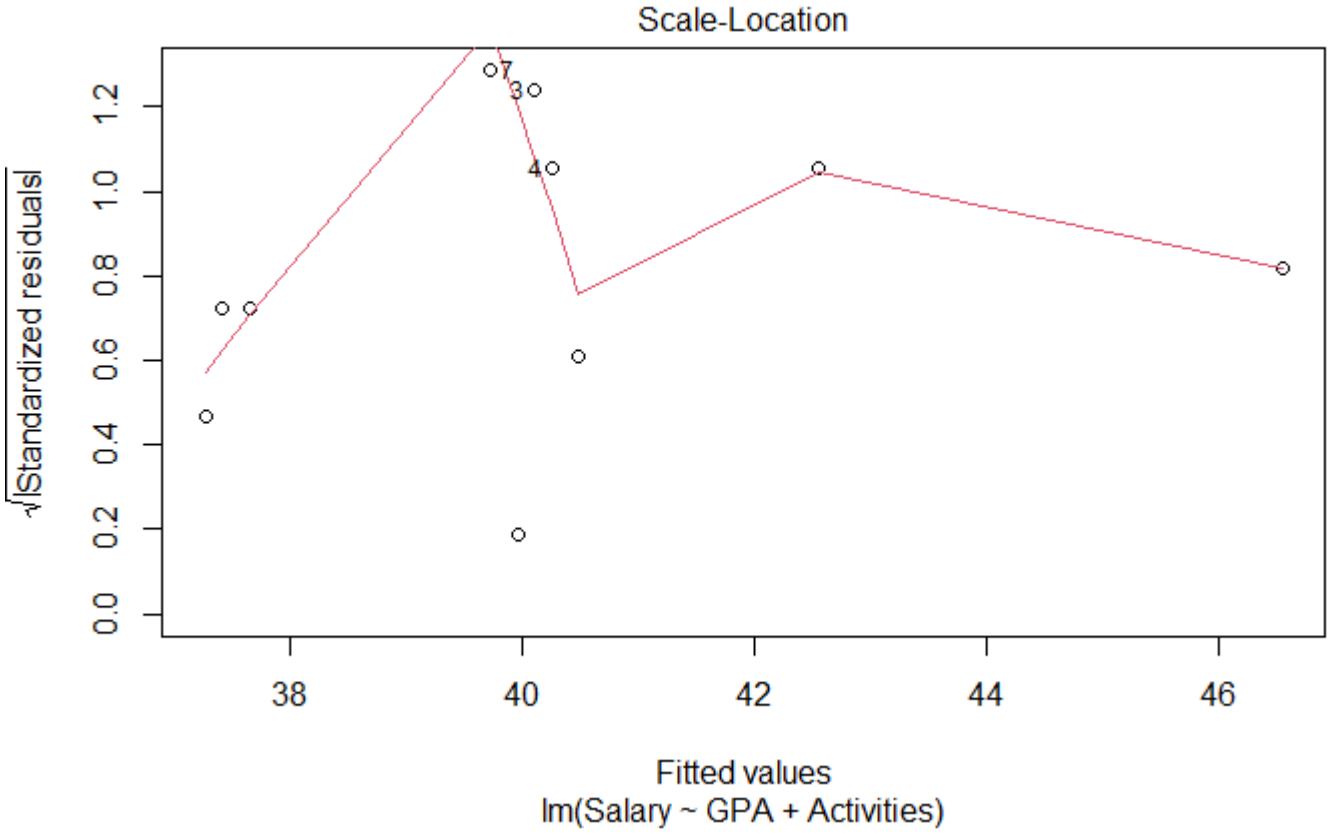
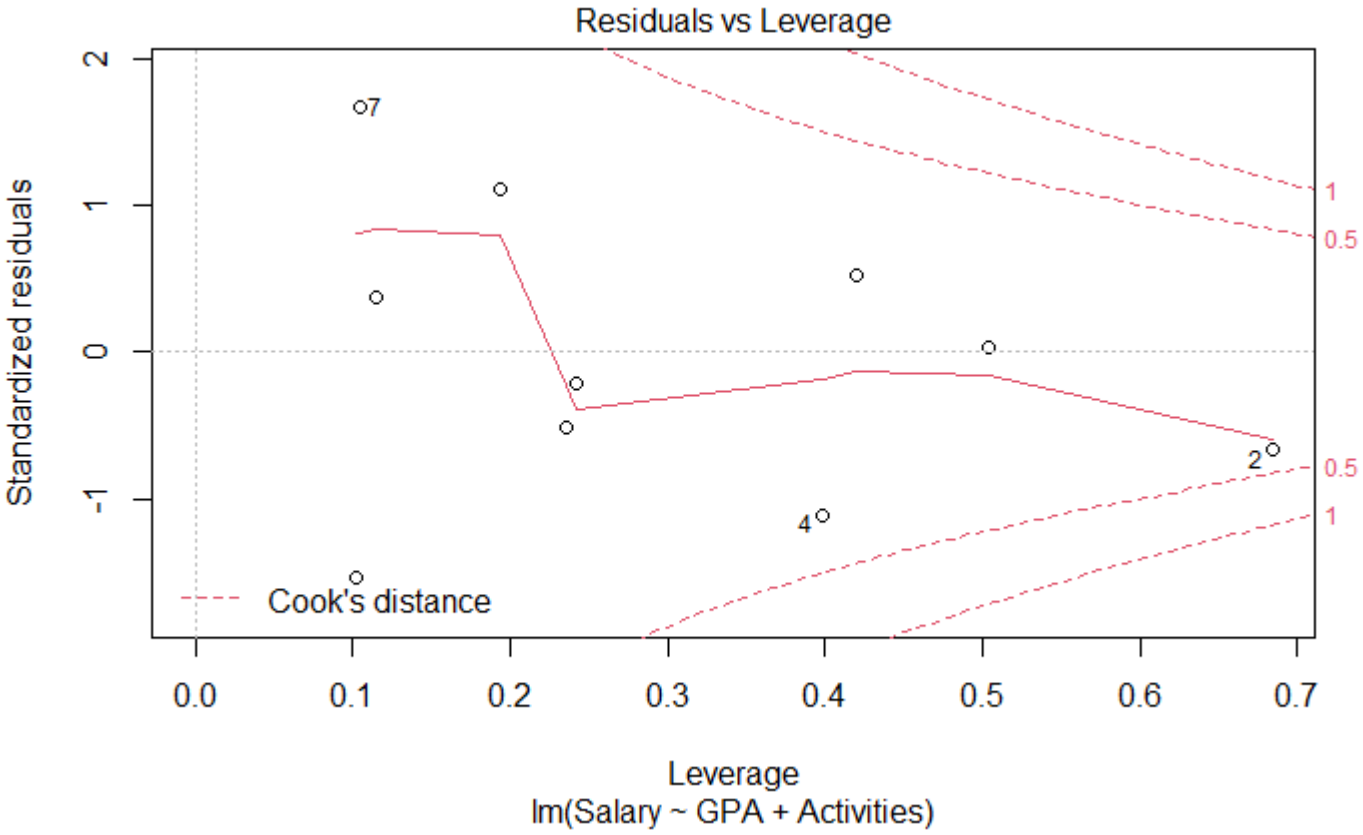
```
plot(mlr)
```




Normal Q-Q
Standardized residuals
2.0
1.5
1.0
0.5
0.0
-0.5
-1.5
7
4
3
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles
lm(Salary ~ GPA + Activities)


Scale-Location
√|Standardized residuals|
1.2
1.0
0.8
0.6
0.4
0.2
0.0
7
3
4
38
40
42
44
46
Fitted values
lm(Salary ~ GPA + Activities)


Residuals vs Leverage
Standardized residuals
Leverage
lm(Salary ~ GPA + Activities)
Cook's distance
7
2
4
1
0.5
0.5
1
2
1
0
-1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7