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STAT1221

Homework #9

MINITAB Output

**Chapter 16**

9b)

Regression Analysis: YHouse versus X1House, X2House, ... se, X4House

Forward Selection of Terms

Candidate terms: X1House, X2House, X3House, X4House

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ----Step 1---- | | ----Step 2---- | | ----Step 3---- | |
|  | Coef | P | Coef | P | Coef | P |
| Constant | -17.1 |  | -4.2 |  | -4.9 |  |
| X3House | 14.72 | 0.000 | 10.14 | 0.000 | 10.53 | 0.000 |
| X1House |  |  | 1.303 | 0.005 | 0.815 | 0.138 |
| X4House |  |  |  |  | 0.458 | 0.145 |
|  |  |  |  |  |  |  |
| S |  | 5.72604 |  | 5.04127 |  | 4.92751 |
| R-sq |  | 74.17% |  | 80.69% |  | 82.24% |
| R-sq(adj) |  | 73.25% |  | 79.26% |  | 80.19% |
| R-sq(pred) |  | 62.43% |  | 68.98% |  | 70.69% |
| Mallows’ Cp |  | 13.04 |  | 5.18 |  | 4.85 |

*α to enter = 0.15*

Analysis of Variance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | Adj SS | Adj MS | F-Value | P-Value |
| Regression | 3 | 2922.72 | 974.240 | 40.12 | 0.000 |
| X1House | 1 | 56.96 | 56.956 | 2.35 | 0.138 |
| X3House | 1 | 632.29 | 632.290 | 26.04 | 0.000 |
| X4House | 1 | 54.90 | 54.900 | 2.26 | 0.145 |
| Error | 26 | 631.29 | 24.280 |  |  |
| Lack-of-Fit | 18 | 631.29 | 35.072 | \* | \* |
| Pure Error | 8 | 0.00 | 0.000 |  |  |
| Total | 29 | 3554.01 |  |  |  |

Model Summary

|  |  |  |  |
| --- | --- | --- | --- |
| S | R-sq | R-sq(adj) | R-sq(pred) |
| 4.92751 | 82.24% | 80.19% | 70.69% |

Coefficients

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Term | Coef | SE Coef | T-Value | P-Value | VIF |
| Constant | -4.9 | 10.6 | -0.47 | 0.645 |  |
| X1House | 0.815 | 0.532 | 1.53 | 0.138 | 3.34 |
| X3House | 10.53 | 2.06 | 5.10 | 0.000 | 2.13 |
| X4House | 0.458 | 0.305 | 1.50 | 0.145 | 1.98 |

Regression Equation

|  |  |  |
| --- | --- | --- |
| YHouse | = | -4.9 + 0.815 X1House + 10.53 X3House + 0.458 X4House |

Fits and Diagnostics for Unusual Observations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Obs | YHouse | Fit | Resid | Std Resid |  |  |
| 3 | 83.10 | 83.78 | -0.68 | -0.19 |  | X |
| 17 | 40.60 | 56.52 | -15.92 | -3.90 | R |  |

*R  Large residual  
X  Unusual X*

9b)

Regression Analysis: YHouse versus X1House, X2House, ... se, X4House

Backward Elimination of Terms

Candidate terms: X1House, X2House, X3House, X4House

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ----Step 1---- | | ----Step 2---- | |
|  | Coef | P | Coef | P |
| Constant | -7.7 |  | -4.9 |  |
| X1House | 0.804 | 0.137 | 0.815 | 0.138 |
| X2House | 3.62 | 0.186 |  |  |
| X3House | 9.22 | 0.000 | 10.53 | 0.000 |
| X4House | 0.614 | 0.067 | 0.458 | 0.145 |
|  |  |  |  |  |
| S |  | 4.84906 |  | 4.92751 |
| R-sq |  | 83.46% |  | 82.24% |
| R-sq(adj) |  | 80.81% |  | 80.19% |
| R-sq(pred) |  | 69.79% |  | 70.69% |
| Mallows’ Cp |  | 5.00 |  | 4.85 |

*α to remove = 0.15*

Analysis of Variance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | Adj SS | Adj MS | F-Value | P-Value |
| Regression | 3 | 2922.72 | 974.240 | 40.12 | 0.000 |
| X1House | 1 | 56.96 | 56.956 | 2.35 | 0.138 |
| X3House | 1 | 632.29 | 632.290 | 26.04 | 0.000 |
| X4House | 1 | 54.90 | 54.900 | 2.26 | 0.145 |
| Error | 26 | 631.29 | 24.280 |  |  |
| Lack-of-Fit | 18 | 631.29 | 35.072 | \* | \* |
| Pure Error | 8 | 0.00 | 0.000 |  |  |
| Total | 29 | 3554.01 |  |  |  |

Model Summary

|  |  |  |  |
| --- | --- | --- | --- |
| S | R-sq | R-sq(adj) | R-sq(pred) |
| 4.92751 | 82.24% | 80.19% | 70.69% |

Coefficients

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| --- | --- | --- | --- | --- | --- |
| Term | Coef | SE Coef | T-Value | P-Value | VIF |
| Constant | -4.9 | 10.6 | -0.47 | 0.645 |  |
| X1House | 0.815 | 0.532 | 1.53 | 0.138 | 3.34 |
| X3House | 10.53 | 2.06 | 5.10 | 0.000 | 2.13 |
| X4House | 0.458 | 0.305 | 1.50 | 0.145 | 1.98 |

Regression Equation

|  |  |  |
| --- | --- | --- |
| YHouse | = | -4.9 + 0.815 X1House + 10.53 X3House + 0.458 X4House |

Fits and Diagnostics for Unusual Observations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Obs | YHouse | Fit | Resid | Std Resid |  |  |
| 3 | 83.10 | 83.78 | -0.68 | -0.19 |  | X |
| 17 | 40.60 | 56.52 | -15.92 | -3.90 | R |  |

*R  Large residual  
X  Unusual X*