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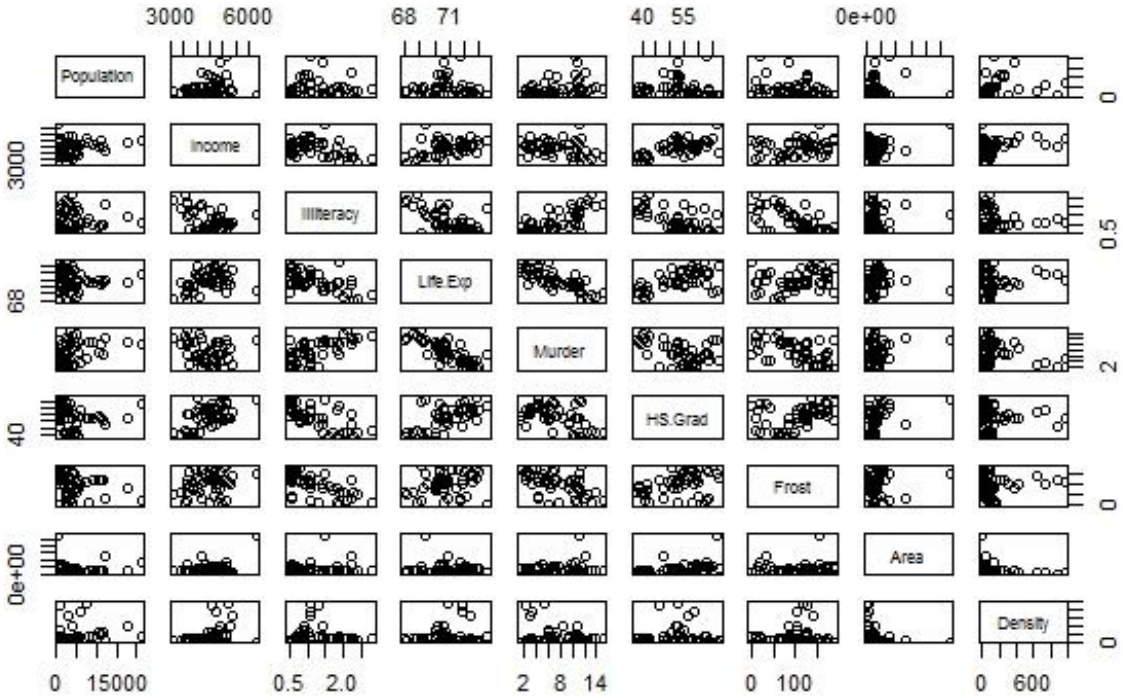
Question 1:

```
> state_x77 <- read.csv("C:/Users/Salil Kanetkar/Downloads/state_x77.csv")
>   View(state_x77)
> state.x77
```

	Population	Income	Illiteracy	Life Exp	Murder	HS Grad	Frost	Area
Alabama	3615	3624	2.1	69.05	15.1	41.3	20	50708
Alaska	365	6315	1.5	69.31	11.3	66.7	152	566432
Arizona	2212	4530	1.8	70.55	7.8	58.1	15	113417
Arkansas	2110	3378	1.9	70.66	10.1	39.9	65	51945
California	21198	5114	1.1	71.71	10.3	62.6	20	156361
Colorado	2541	4884	0.7	72.06	6.8	63.9	166	103766
Connecticut	3100	5348	1.1	72.48	3.1	56.0	139	4862
Delaware	579	4809	0.9	70.06	6.2	54.6	103	1982
Florida	8277	4815	1.3	70.66	10.7	52.6	11	54090
Georgia	4931	4091	2.0	68.54	13.9	40.6	60	58073
Hawaii	868	4963	1.9	73.60	6.2	61.9	0	6425
Idaho	813	4119	0.6	71.87	5.3	59.5	126	82677
Illinois	11197	5107	0.9	70.14	10.3	52.6	127	55748
Indiana	5313	4458	0.7	70.88	7.1	52.9	122	36097
Iowa	2861	4628	0.5	72.56	2.3	59.0	140	55941
Kansas	2280	4669	0.6	72.58	4.5	59.9	114	81787
Kentucky	3387	3712	1.6	70.10	10.6	38.5	95	39650
Louisiana	3806	3545	2.8	68.76	13.2	42.2	12	44930
Maine	1058	3694	0.7	70.39	2.7	54.7	161	30920
Maryland	4122	5299	0.9	70.22	8.5	52.3	101	9891
Massachusetts	5814	4755	1.1	71.83	3.3	58.5	103	7826
Michigan	9111	4751	0.9	70.63	11.1	52.8	125	56817
Minnesota	3921	4675	0.6	72.96	2.3	57.6	160	79289
Mississippi	2341	3098	2.4	68.09	12.5	41.0	50	47296
Missouri	4767	4254	0.8	70.69	9.3	48.8	108	68995
Montana	746	4347	0.6	70.56	5.0	59.2	155	145587
Nebraska	1544	4508	0.6	72.60	2.9	59.3	139	76483
Nevada	590	5149	0.5	69.03	11.5	65.2	188	109889
New Hampshire	812	4281	0.7	71.23	3.3	57.6	174	9027
New Jersey	7333	5237	1.1	70.93	5.2	52.5	115	7521

```
> str(state.x77)
 num [1:50, 1:8] 3615 365 2212 2110 21198 ...
 - attr(*, "dimnames")=List of 2
  ..$ : chr [1:50] "Alabama" "Alaska" "Arizona" "Arkansas" ...
  ..$ : chr [1:8] "Population" "Income" "Illiteracy" "Life Exp" ...
> st = as.data.frame(state.x77)
> View(st)
> View(st)
> str(st)
'data.frame':   50 obs. of  8 variables:
 $ Population: num  3615 365 2212 2110 21198 ...
 $ Income    : num  3624 6315 4530 3378 5114 ...
 $ Illiteracy: num  2.1 1.5 1.8 1.9 1.1 0.7 1.1 0.9 1.3 2 ...
 $ Life Exp  : num  69 69.3 70.5 70.7 71.7 ...
 $ Murder    : num  15.1 11.3 7.8 10.1 10.3 6.8 3.1 6.2 10.7 13.9 ...
 $ HS Grad   : num  41.3 66.7 58.1 39.9 62.6 63.9 56 54.6 52.6 40.6 ...
 $ Frost     : num  20 152 15 65 20 166 139 103 11 60 ...
 $ Area      : num  50708 566432 113417 51945 156361 ...
> colnames(st)[4] = "Life.Exp"
> colnames(st)[6] = "HS.Grad"
> st[,9] = st$Population * 1000 / st$Area
> colnames(st)[9] = "Density"
> str(st)
'data.frame':   50 obs. of  9 variables:
 $ Population: num  3615 365 2212 2110 21198 ...
 $ Income    : num  3624 6315 4530 3378 5114 ...
 $ Illiteracy: num  2.1 1.5 1.8 1.9 1.1 0.7 1.1 0.9 1.3 2 ...
 $ Life.Exp  : num  69 69.3 70.5 70.7 71.7 ...
 $ Murder    : num  15.1 11.3 7.8 10.1 10.3 6.8 3.1 6.2 10.7 13.9 ...
 $ HS.Grad   : num  41.3 66.7 58.1 39.9 62.6 63.9 56 54.6 52.6 40.6 ...
 $ Frost     : num  20 152 15 65 20 166 139 103 11 60 ...
 $ Area      : num  50708 566432 113417 51945 156361 ...
 $ Density   : num  71.291 0.644 19.503 40.62 135.571 ...
```

```
> summary(st)
   Population        Income       Illiteracy       Life.Exp         Murder      
 Min.   :  365   Min.   :3098   Min.   :0.500   Min.   :67.96   Min.   : 1.400  
 1st Qu.: 1080   1st Qu.:3993   1st Qu.:0.625   1st Qu.:70.12   1st Qu.: 4.350  
 Median : 2838   Median :4519   Median :0.950   Median :70.67   Median : 6.850  
 Mean   : 4246   Mean   :4436   Mean   :1.170   Mean   :70.88   Mean   : 7.378  
 3rd Qu.: 4968   3rd Qu.:4814   3rd Qu.:1.575   3rd Qu.:71.89   3rd Qu.:10.675  
 Max.   :21198   Max.   :6315   Max.   :2.800   Max.   :73.60   Max.   :15.100  
    HS.Grad          Frost             Area           Density       
 Min.   :37.80   Min.   :  0.00   Min.   :  1049   Min.   :  0.6444  
 1st Qu.:48.05   1st Qu.: 66.25   1st Qu.: 36985   1st Qu.: 25.3352  
 Median :53.25   Median :114.50   Median : 54277   Median : 73.0154  
 Mean   :53.11   Mean   :104.46   Mean   : 70736   Mean   :149.2245  
 3rd Qu.:59.15   3rd Qu.:139.75   3rd Qu.: 81163   3rd Qu.:144.2828  
 Max.   :67.30   Max.   :188.00   Max.   :566432   Max.   :975.0033  
> cor(st)
            Population     Income   Illiteracy    Life.Exp     Murder      HS.Grad
Population  1.00000000  0.2082276  0.107622373 -0.06805195  0.3436428 -0.09848975
Income      0.20822756  1.0000000 -0.437075186  0.34025534 -0.2300776  0.61993232
Illiteracy  0.10762237 -0.4370752  1.000000000 -0.58847793  0.7029752 -0.65718861
Life.Exp   -0.06805195  0.3402553 -0.588477926  1.00000000 -0.7808458  0.58221620
Murder      0.34364275 -0.2300776  0.702975199 -0.78084575  1.0000000 -0.48797102
HS.Grad    -0.09848975  0.6199323 -0.657188609  0.58221620 -0.4879710  1.00000000
Frost      -0.33215245  0.2262822 -0.671946968  0.26206801 -0.5388834  0.36677970
Area        0.02254384  0.3633154  0.077261132 -0.10733194  0.2283902  0.33354187
Density     0.24622789  0.3299683  0.009274348  0.09106176 -0.1850352 -0.08836721
                Frost         Area      Density
Population -0.332152454  0.02254384  0.246227888
Income      0.226282179  0.36331544  0.329968277
Illiteracy -0.671946968  0.07726113  0.009274348
Life.Exp    0.262068011 -0.10733194  0.091061763
Murder     -0.538883437  0.22839021 -0.185035233
HS.Grad     0.366779702  0.33354187 -0.088367214
Frost       1.000000000  0.05922910  0.002276734
Area        0.059229102  1.00000000 -0.341388515
Density     0.002276734 -0.34138851  1.000000000
```




```
> options(show.signif.stars=F)
> names(st)
[1] "Population" "Income"     "Illiteracy" "Life.Exp"   "Murder"     "HS.Grad"
[7] "Frost"      "Area"       "Density"
> model1 = lm(Life.Exp ~ Population + Income + Illiteracy + Murder +
+                  +                          HS.Grad + Frost + Area + Density, data=st)
> summary(model1)

Call:
lm(formula = Life.Exp ~ Population + Income + Illiteracy + Murder +
    +HS.Grad + Frost + Area + Density, data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.47514 -0.45887 -0.06352  0.59362  1.21823

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.995e+01  1.843e+00  37.956  < 2e-16
Population   6.480e-05  3.001e-05   2.159   0.0367
Income       2.701e-04  3.087e-04   0.875   0.3867
Illiteracy   3.029e-01  4.024e-01   0.753   0.4559
Murder      -3.286e-01  4.941e-02  -6.652 5.12e-08
HS.Grad      4.291e-02  2.332e-02   1.840   0.0730
Frost       -4.580e-03  3.189e-03  -1.436   0.1585
Area        -1.558e-06  1.914e-06  -0.814   0.4205
Density     -1.105e-03  7.312e-04  -1.511   0.1385

Residual standard error: 0.7337 on 41 degrees of freedom
Multiple R-squared:  0.7501,    Adjusted R-squared:  0.7013
F-statistic: 15.38 on 8 and 41 DF,  p-value: 3.787e-10
```

```
> summary.aov(model1)
             Df Sum Sq Mean Sq F value   Pr(>F)
Population    1  0.409   0.409   0.760  0.38849
Income        1 11.595  11.595  21.541 3.53e-05
Illiteracy    1 19.421  19.421  36.081 4.23e-07
Murder        1 27.429  27.429  50.959 1.05e-08
HS.Grad       1  4.099   4.099   7.615  0.00861
Frost         1  2.049   2.049   3.806  0.05792
Area          1  0.001   0.001   0.002  0.96438
Density       1  1.229   1.229   2.283  0.13847
Residuals    41 22.068   0.538
```

```
> model2 = update(model1, .~.-Area)
> summary(model2)

Call:
lm(formula = Life.Exp ~ Population + Income + Illiteracy + Murder +
    HS.Grad + Frost + Density, data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.50252 -0.40471 -0.06079  0.58682  1.43862

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.094e+01  1.378e+00  51.488  < 2e-16
Population   6.249e-05  2.976e-05   2.100   0.0418
Income       1.485e-04  2.690e-04   0.552   0.5840
Illiteracy   1.452e-01  3.512e-01   0.413   0.6814
Murder      -3.319e-01  4.904e-02  -6.768 3.12e-08
HS.Grad      3.746e-02  2.225e-02   1.684   0.0996
Frost       -5.533e-03  2.955e-03  -1.873   0.0681
Density     -7.995e-04  6.251e-04  -1.279   0.2079

Residual standard error: 0.7307 on 42 degrees of freedom
Multiple R-squared:  0.746,     Adjusted R-squared:  0.7037
F-statistic: 17.63 on 7 and 42 DF,  p-value: 1.173e-10
```

```
> anova(model1, model2)
Analysis of Variance Table

Model 1: Life.Exp ~ Population + Income + Illiteracy + Murder + +HS.Grad +
    Frost + Area + Density
Model 2: Life.Exp ~ Population + Income + Illiteracy + Murder + HS.Grad +
    Frost + Density
  Res.Df    RSS Df Sum of Sq      F Pr(>F)
1     41 22.068
2     42 22.425 -1  -0.35639 0.6621 0.4205
```

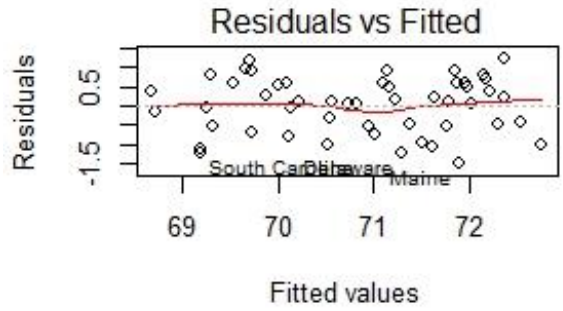
```
> model3 = update(model2, .~.-Illiteracy)
> summary(model3)

Call:
lm(formula = Life.Exp ~ Population + Income + Murder + HS.Grad +
    Frost + Density, data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.49555 -0.41246 -0.05336  0.58399  1.50535

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.131e+01  1.042e+00  68.420  < 2e-16
Population   5.811e-05  2.753e-05   2.110   0.0407
Income       1.324e-04  2.636e-04   0.502   0.6181
Murder      -3.208e-01  4.054e-02  -7.912 6.32e-10
HS.Grad      3.499e-02  2.122e-02   1.649   0.1065
Frost       -6.191e-03  2.465e-03  -2.512   0.0158
Density     -7.324e-04  5.978e-04  -1.225   0.2272

Residual standard error: 0.7236 on 43 degrees of freedom
Multiple R-squared:  0.745,     Adjusted R-squared:  0.7094
F-statistic: 20.94 on 6 and 43 DF,  p-value: 2.632e-11
```

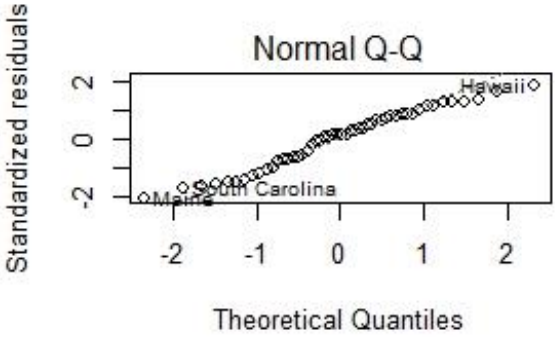
```
> model4 = update(model3, .~.-Income)
> summary(model4)

Call:
lm(formula = Life.Exp ~ Population + Murder + HS.Grad + Frost +
    Density, data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.56877 -0.40951 -0.04554  0.57362  1.54752

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.142e+01  1.011e+00  70.665  < 2e-16
Population   6.083e-05  2.676e-05   2.273  0.02796
Murder      -3.160e-01  3.910e-02  -8.083 3.07e-10
HS.Grad      4.233e-02  1.525e-02   2.776  0.00805
Frost       -5.999e-03  2.414e-03  -2.485  0.01682
Density     -5.864e-04  5.178e-04  -1.132  0.26360

Residual standard error: 0.7174 on 44 degrees of freedom
Multiple R-squared:  0.7435,    Adjusted R-squared:  0.7144
F-statistic: 25.51 on 5 and 44 DF,  p-value: 5.524e-12
```

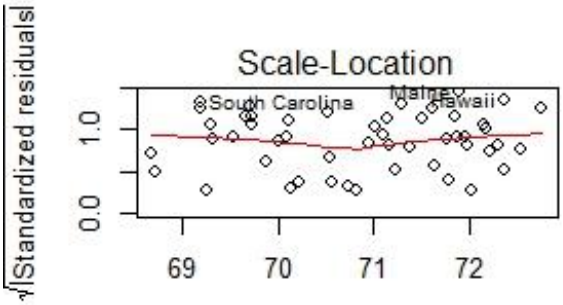
```
> model5 = update(model4, .~.-Density)
> summary(model5)

Call:
lm(formula = Life.Exp ~ Population + Murder + HS.Grad + Frost,
    data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.47095 -0.53464 -0.03701  0.57621  1.50683

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.103e+01  9.529e-01  74.542  < 2e-16
Population   5.014e-05  2.512e-05   1.996  0.05201
Murder      -3.001e-01  3.661e-02  -8.199 1.77e-10
HS.Grad      4.658e-02  1.483e-02   3.142  0.00297
Frost       -5.943e-03  2.421e-03  -2.455  0.01802

Residual standard error: 0.7197 on 45 degrees of freedom
Multiple R-squared:  0.736,     Adjusted R-squared:  0.7126
F-statistic: 31.37 on 4 and 45 DF,  p-value: 1.696e-12

> anova(model5, model4)
Analysis of Variance Table

Model 1: Life.Exp ~ Population + Murder + HS.Grad + Frost
Model 2: Life.Exp ~ Population + Murder + HS.Grad + Frost + Density
  Res.Df    RSS Df Sum of Sq      F Pr(>F)
1     45 23.308
2     44 22.648  1   0.66005 1.2823 0.2636

> model6 = update(model5, .~.-Population)
> summary(model6)

Call:
lm(formula = Life.Exp ~ Murder + HS.Grad + Frost, data = st)

Residuals:
    Min      1Q  Median      3Q     Max
-1.5015 -0.5391  0.1014  0.5921  1.2268

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 71.036379   0.983262  72.246  < 2e-16
Murder      -0.283065   0.036731  -7.706 8.04e-10
HS.Grad      0.049949   0.015201   3.286  0.00195
Frost       -0.006912   0.002447  -2.824  0.00699

Residual standard error: 0.7427 on 46 degrees of freedom
Multiple R-squared:  0.7127,    Adjusted R-squared:  0.6939
F-statistic: 38.03 on 3 and 46 DF,  p-value: 1.634e-12
```

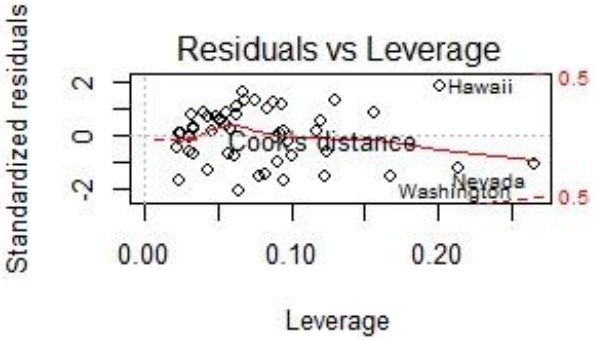
```
> step(model1, direction="backward")
Start:  AIC=-22.89
Life.Exp ~ Population + Income + Illiteracy + Murder + +HS.Grad +
    Frost + Area + Density

             Df Sum of Sq    RSS     AIC
- Illiteracy  1    0.3050 22.373 -24.208
- Area        1    0.3564 22.425 -24.093
- Income      1    0.4120 22.480 -23.969
<none>                    22.068 -22.894
- Frost       1    1.1102 23.178 -22.440
- Density     1    1.2288 23.297 -22.185
- HS.Grad     1    1.8225 23.891 -20.926
- Population  1    2.5095 24.578 -19.509
- Murder      1   23.8173 45.886  11.707

Step:  AIC=-24.21
Life.Exp ~ Population + Income + Murder + HS.Grad + Frost + Area +
    Density

             Df Sum of Sq    RSS     AIC
- Area        1    0.1427 22.516 -25.890
- Income      1    0.2316 22.605 -25.693
<none>                    22.373 -24.208
- Density     1    0.9286 23.302 -24.174
- HS.Grad     1    1.5218 23.895 -22.918
- Population  1    2.2047 24.578 -21.509
- Frost       1    3.1324 25.506 -19.656
- Murder      1   26.7071 49.080  13.072

Step:  AIC=-25.89
Life.Exp ~ Population + Income + Murder + HS.Grad + Frost + Density

             Df Sum of Sq    RSS     AIC
- Income      1     0.132 22.648 -27.598
- Density     1     0.786 23.302 -26.174
<none>                    22.516 -25.890
- HS.Grad     1     1.424 23.940 -24.824
- Population  1     2.332 24.848 -22.962
- Population  1     2.659 25.307 -24.046
- Frost       1     3.179 25.827 -23.030
- HS.Grad     1     3.966 26.614 -21.529
- Murder      1    33.626 56.274  15.910

Step:  AIC=-28.16
Life.Exp ~ Population + Murder + HS.Grad + Frost

             Df Sum of Sq    RSS     AIC
<none>                    23.308 -28.161
- Population  1     2.064 25.372 -25.920
- Frost       1     3.122 26.430 -23.877
- HS.Grad     1     5.112 28.420 -20.246
- Murder      1    34.816 58.124  15.528

Call:
lm(formula = Life.Exp ~ Population + Murder + HS.Grad + Frost,
    data = st)

Coefficients:
(Intercept)   Population       Murder      HS.Grad        Frost
  7.103e+01    5.014e-05   -3.001e-01    4.658e-02   -5.943e-03
```

```
> confint(model6)
                2.5 %       97.5 %
(Intercept) 69.05717472 73.015582905
Murder      -0.35700149 -0.209128849
HS.Grad      0.01935043  0.080546980
Frost       -0.01183825 -0.001985219
Error: could not find function "predict"
> predict(model6, list(Murder=10.5, HS.Grad=48, Frost=100))
       1
69.77056
```









```
> par(mfrow=c(2,2))
> plot(model6)
> par(mfrow=c(1,1))
> model6[[1]]
 (Intercept)       Murder      HS.Grad        Frost
71.036378813 -0.283065168  0.049948704 -0.006911735
> model6[[2]]
       Alabama         Alaska        Arizona       Arkansas     California
    0.36325842    -0.80873734    -1.07681421     0.93888883     0.60063821
      Colorado    Connecticut       Delaware        Florida        Georgia
    0.90409006     0.48472687    -1.23666537     0.10114571    -0.17498630
        Hawaii          Idaho       Illinois        Indiana          Iowa
    1.22680042     0.23279723     0.26968086     0.05432904     0.19534036
        Kansas       Kentucky      Louisiana         Maine       Maryland
    0.61342480     0.79770164    -0.56481311    -1.50150772    -0.32455693
 Massachusetts       Michigan      Minnesota    Mississippi       Missouri
   -0.48235430     0.96231978     0.80350324    -1.11037437     0.59509781
       Montana       Nebraska         Nevada  New Hampshire     New Jersey
   -0.94669741     0.38328311    -0.70837880    -0.54666731    -0.46189744
     New Mexico       New York North Carolina   North Dakota           Ohio
    0.10159299     0.53349703    -0.05444180     0.91307523     0.07808745
       Oklahoma         Oregon   Pennsylvania   Rhode Island South Carolina
    0.18464735    -0.41031105    -0.51622769     0.10314800    -1.23162114
   South Dakota      Tennessee          Texas          Utah        Vermont
    0.05138438     0.58330361     1.19135836     0.72277428     0.46958000
       Virginia     Washington  West Virginia      Wisconsin        Wyoming
   -0.06731035    -1.04976581    -1.04653483     0.60046076    -0.73927257
> sort(model6$resid)
         Maine       Delaware South Carolina    Mississippi        Arizona
   -1.50150772    -1.23666537    -1.23162114    -1.11037437    -1.07681421
    Washington  West Virginia        Montana         Alaska        Wyoming
   -1.04976581    -1.04653483    -0.94669741    -0.80873734    -0.73927257
       Nevada      Louisiana  New Hampshire   Pennsylvania  Massachusetts
   -0.70837880    -0.56481311    -0.54666731    -0.51622769    -0.48235430
     New Jersey         Oregon       Maryland        Georgia       Virginia
   -0.46189744    -0.41031105    -0.32455693    -0.17498630    -0.06731035
North Carolina   South Dakota        Indiana           Ohio        Florida
   -0.05444180     0.05138438     0.05432904     0.07808745     0.10114571
     New Mexico   Rhode Island       Oklahoma           Iowa          Idaho
```

```
> model7 = lm(scale(Life.Exp) ~ scale(Murder) + scale(HS.Grad) + scale(Frost),data=st)
> summary(model7)

Call:
lm(formula = scale(Life.Exp) ~ scale(Murder) + scale(HS.Grad) +
    scale(Frost), data = st)

Residuals:
     Min       1Q   Median       3Q      Max
-1.11853 -0.40156  0.07551  0.44111  0.91389

Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)    -4.604e-15  7.824e-02   0.000  1.00000
scale(Murder)  -7.784e-01  1.010e-01  -7.706 8.04e-10
scale(HS.Grad)  3.005e-01  9.146e-02   3.286  0.00195
scale(Frost)   -2.676e-01  9.477e-02  -2.824  0.00699

Residual standard error: 0.5532 on 46 degrees of freedom
Multiple R-squared:  0.7127,    Adjusted R-squared:  0.6939
F-statistic: 38.03 on 3 and 46 DF,  p-value: 1.634e-12

> -0.283 * sd(st$Murder) / sd(st$Life.Exp)
[1] -0.778241
> pcor = function(a,b,c)
+ {
+     (cor(a,b)-cor(a,c)*cor(b,c))/sqrt((1-cor(a,c)^2)*(1-cor(b,c)^2))
+ }
> pcor(st$Life.Exp, st$Murder, st$HS.Grad)
[1] -0.6999659
> rm(list=ls())
> data(airquality)
> na.omit(airquality) -> airquality
> lm(Ozone ~ Solar.R + Wind + Temp + Month,
+    data=airquality) -> model

> coef(model)
 (Intercept)      Solar.R         Wind         Temp        Month
-58.05383883   0.04959683  -3.31650940   1.87087379  -2.99162786
> (prediction <- c(1,200,11,80,6) * coef(model))
(Intercept)     Solar.R        Wind        Temp       Month
 -58.053839    9.919365  -36.481603  149.669903  -17.949767
> sum(prediction)
[1] 47.10406
> predict(model, list(Solar.R=200,Wind=11,Temp=80,Month=6), interval="conf")
       fit      lwr      upr
1 47.10406 41.10419 53.10393
> predict(model, list(Solar.R=200,Wind=11,Temp=80,Month=6), interval="pred")
       fit      lwr      upr
1 47.10406 5.235759 88.97236
```

Question 2:

```
> print(beta)
 [1] -4.464971e-15  2.155162e-01  1.236232e-01  1.375182e-01 -9.037716e-01
 [6]  2.581696e-01 -1.773567e-01 -9.901668e-02 -1.818867e-01  4.916640e+00
> print(beta_hat)

-4.484355e-15  2.155162e-01  1.236232e-01  1.375182e-01 -9.037716e-01  2.581696e-01

-1.773567e-01 -9.901668e-02 -1.818867e-01
> lm(Y~X)

Call:
lm(formula = Y ~ X)

Coefficients:
(Intercept)           X1           X2           X3           X4           X5
 -4.465e-15    2.155e-01    1.236e-01    1.375e-01   -9.038e-01    2.582e-01
         X6           X7           X8
 -1.774e-01   -9.902e-02   -1.819e-01
```

Question 3:

```
In [33]: runfile('H:/UCLA Fall 2015/202 - Statistics Programming/HW2/HomeWork2MyQR.py',
wdir='H:/UCLA Fall 2015/202 - Statistics Programming/HW2')
[ -3.51153028e-15   2.15516209e-01   1.23623247e-01   1.37518248e-01
  -9.03771619e-01   2.58169566e-01  -1.77356656e-01  -9.90166751e-02
  -1.81886709e-01]
[ -3.42272422e-15   2.15516209e-01   1.23623247e-01   1.37518248e-01
  -9.03771619e-01   2.58169566e-01  -1.77356656e-01  -9.90166751e-02
  -1.81886709e-01]
```