9) b) By observing the R-code output, we find that 0.4555484 is the largest adjusted R-squared and the corresponding model is the nineth model which contains five variates, which are EDUCATN, log(SALES), log(VAL), log(PCNTOWN), log(PROF). Also, the Mallow's C_p of the nineth model is 3.317091, which is smaller than 5+1=6. Furthermore, we find that the adjusted R-squared is 0.4555. This means that 45.55% of the variation in the log transformation of CEO compensation in thousands of dollars explained by the model, which includes five explanatory variables, which are the CEO's education level, the log transformation of sales revenues, the log transformation of market value of the CEO's stock, the log transformation of percentage of firm's market value owned by the CEO, the log transformation of profits of the firm before taxes.

Since the p-values of log(VAL) and log(PCNTOWN) are smaller than 0.05, we find that the log transformation of market value of the CEO's stock and the log transformation of percentage of firm's market value owned by the CEO are significantly related to the log transformation of the log transformation of CEO compensation after accounting for other variables. Other variables, including CEO's education level, the log transformation of sales revenues, the log transformation of profits of the firm before taxes, are not significantly related to the log transformation of CEO compensation after accounting for other variables in the model since their p-values are larger than 0.05 based on the R code output.

```
# b)
library(leaps)
newpositive <- positive
newpositive$PROF <- log(PROF)
newpositive$SALES <- log(SALES)
newpositive$VAL <- log(VAL)
newpositive$PCNTOWN <- log(PCNTOWN)
newpositive <- newpositive[,-1]
leaps(newpositive[,-3],log(COMP), method=c('adjr'),nbest=2,
      names=names(newpositive[,-3]))
leaps(newpositive[,-3],log(COMP), method=c('Cp'),nbest=2,
      names=names(newpositive[,-3]))
cmodel <- lm(log(COMP)~EDUCATN+log(SALES)+log(VAL)+log(PCNTOWN)+log(PROF))
summary(cmodel)
```

```
$which
    AGE EDUCATN TENURE EXPER SALES   VAL PCNTOWN  PROF
1 FALSE   FALSE  FALSE FALSE  TRUE FALSE   FALSE FALSE
1 FALSE   FALSE  FALSE FALSE FALSE  TRUE   FALSE FALSE
2 FALSE   FALSE  FALSE FALSE FALSE  TRUE    TRUE FALSE
2 FALSE   FALSE  FALSE FALSE  TRUE  TRUE   FALSE FALSE
3 FALSE    TRUE  FALSE FALSE FALSE  TRUE    TRUE FALSE
3 FALSE   FALSE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
4 FALSE    TRUE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
4 FALSE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE FALSE
5 FALSE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE  TRUE
5  TRUE    TRUE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
6  TRUE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE  TRUE
6 FALSE    TRUE   TRUE FALSE  TRUE  TRUE    TRUE  TRUE
7  TRUE    TRUE   TRUE FALSE  TRUE  TRUE    TRUE  TRUE
7  TRUE    TRUE  FALSE  TRUE  TRUE  TRUE    TRUE  TRUE
8  TRUE    TRUE   TRUE  TRUE  TRUE  TRUE    TRUE  TRUE

$label
[1] "(Intercept)" "AGE"         "EDUCATN"     "TENURE"      "EXPER"       "SALES"       "VAL"         "PCNTOWN"
[9] "PROF"

$size
 [1] 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9

$adjr2
 [1] 0.2426144 0.1616913 0.4203076 0.3425541 0.4411372 0.4278009 0.4522659 0.4394725 0.4555484 0.4450746 0.4479897
[12] 0.4461238 0.4374030 0.4373911 0.4265182



$which
    AGE EDUCATN TENURE EXPER SALES   VAL PCNTOWN  PROF
1 FALSE   FALSE  FALSE FALSE  TRUE FALSE   FALSE FALSE
1 FALSE   FALSE  FALSE FALSE FALSE  TRUE   FALSE FALSE
2 FALSE   FALSE  FALSE FALSE FALSE  TRUE    TRUE FALSE
2 FALSE   FALSE  FALSE FALSE  TRUE  TRUE   FALSE FALSE
3 FALSE    TRUE  FALSE FALSE FALSE  TRUE    TRUE FALSE
3 FALSE   FALSE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
4 FALSE    TRUE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
4 FALSE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE FALSE
5 FALSE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE  TRUE
5  TRUE    TRUE  FALSE FALSE FALSE  TRUE    TRUE  TRUE
6  TRUE    TRUE  FALSE FALSE  TRUE  TRUE    TRUE  TRUE
6 FALSE    TRUE   TRUE FALSE  TRUE  TRUE    TRUE  TRUE
7  TRUE    TRUE   TRUE FALSE  TRUE  TRUE    TRUE  TRUE
7  TRUE    TRUE  FALSE  TRUE  TRUE  TRUE    TRUE  TRUE
8  TRUE    TRUE   TRUE  TRUE  TRUE  TRUE    TRUE  TRUE

$label
[1] "(Intercept)" "AGE"         "EDUCATN"     "TENURE"      "EXPER"       "SALES"       "VAL"         "PCNTOWN"
[9] "PROF"

$size
 [1] 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9

$Cp
 [1] 20.278733 28.321912  3.606465 11.199022  2.597960  3.876980  2.575553  3.780207  3.317091  4.285061  5.053094
[12]  5.222279  7.032008  7.033072  9.000000
```

```
Call:
lm(formula = log(COMP) ~ EDUCATN + log(SALES) + log(VAL) + log(PCNTOWN) +
    log(PROF))

Residuals:
     Min       1Q   Median       3Q      Max
-0.99238 -0.32920  0.00299  0.21677  1.61486

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   5.93170    0.57511  10.314 2.82e-14 ***
EDUCATN      -0.22244    0.12418  -1.791 0.078950 .
log(SALES)    0.09645    0.08377   1.151 0.254764
log(VAL)      0.44604    0.11281   3.954 0.000229 ***
log(PCNTOWN) -0.39766    0.11813  -3.366 0.001424 **
log(PROF)    -0.16467    0.10223  -1.611 0.113179
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.4771 on 53 degrees of freedom
Multiple R-squared:  0.5025,    Adjusted R-squared:  0.4555
F-statistic: 10.71 on 5 and 53 DF,  p-value: 3.815e-07
```