Simple Linear Regression Model (Moore and McCabe, 1999)

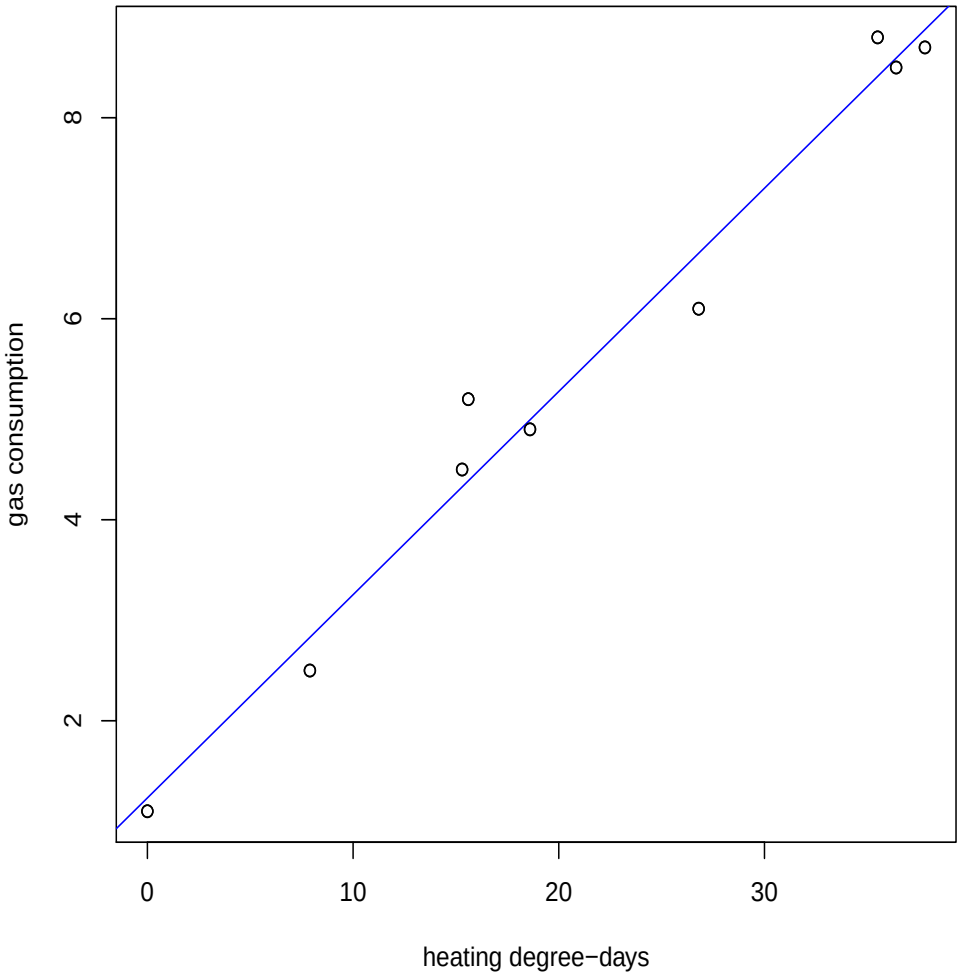
This example examines the relationship between the gas consumption (Y) for a home and the "temperature" (X) over a 9 month period (heating season). The precise definition of the variables and the data set are given below.

Y: average daily gas consumption in hundreds of cubic feet over a one month period.

X: the corresponding average number of heating degree-days per day during the month.

Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
X	15.6	26.8	37.8	36.4	35.5	18.6	15.3	7.9	0.0
Y	5.2	6.1	8.7	8.5	8.8	4.9	4.5	2.5	1.1

How does Y depend on X? Try a simple linear model using R.



R commands and outputs

```
> x=c(15.6,26.8,37.8,36.4,35.5,18.6,15.3,7.9,0.0)
> y=c(5.2,6.1,8.7,8.5,8.8,4.9,4.5,2.5,1.1)
>
> plot(x,y,xlab="heating degree-days", ylab="gas consumption")
> model1=lm(y~x)
> abline(model1, col="blue")
> points(x,y)
>
> summary(model1)

Call:
lm(formula = y ~ x)

Residuals:
    Min      1Q  Median      3Q     Max
-0.55162 -0.17595 -0.09349  0.17381  0.81315

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.23235    0.28604   4.308  0.00353 **
x            0.20221    0.01145  17.663  4.6e-07 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.4345 on 7 degrees of freedom
Multiple R-squared: 0.9781,     Adjusted R-squared: 0.9749
F-statistic:   312 on 1 and 7 DF,  p-value: 4.596e-07
```