



**R Studio**

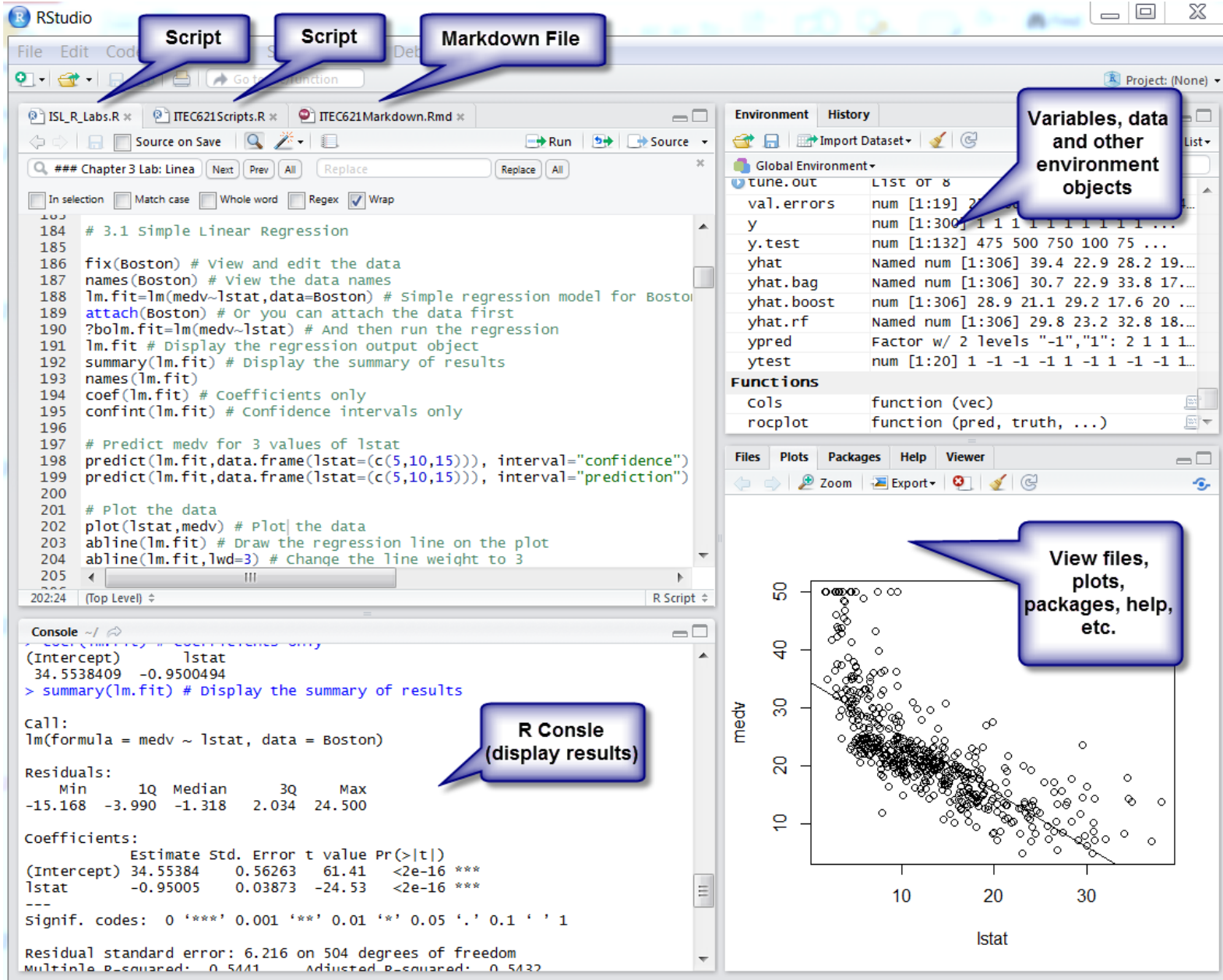


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# R Studio

- **R** can run directly in your computer
- But **R Studio** is a powerful **user interface** that facilitates the use of R
- It is **free** and **open source**
- It has **Windows** and **Mac** versions
- It comes with useful built-in **R packages**
- It provides **additional tools** to create reports and publish results, e.g.:
  - **Markdown** <http://rmarkdown.rstudio.com/> – an easy to use editor to “knit” (i.e., produce) R reports in HTML, MS Word and PDF.
  - **Shiny** <https://www.rstudio.com/products/shiny/> -- an R package that provides a powerful web framework to provide interactive applications web using R.

# R Studio Interface



The screenshot displays the R Studio environment with several callouts highlighting key features:

- Script**: Points to the source editor tabs at the top, showing files like `ISL_R_Labs.R`, `ITEC621Scripts.R`, and `ITEC621Markdown.Rmd`.
- Script**: Points to the source editor area containing R code for linear regression analysis on the `Boston` dataset.
- Markdown File**: Points to the `ITEC621Markdown.Rmd` file in the script tabs.
- Variables, data and other environment objects**: Points to the **Environment** pane on the right, which lists objects like `val.errors`, `y`, `y.test`, `yhat`, `yhat.bag`, `yhat.boost`, `yhat.rf`, `ypred`, and `ytest`.
- View files, plots, packages, help, etc.**: Points to the **Plots** pane on the right, which displays a scatter plot of `medv` vs `lstat` with a regression line.
- R Console (display results)**: Points to the **Console** pane at the bottom, which shows the output of the R commands, including the summary of the linear model fit.

**Source Editor Code:**

```
## 3.1 Simple Linear Regression
fix(Boston) # view and edit the data
names(Boston) # view the data names
lm.fit=lm(medv~lstat,data=Boston) # Simple regression model for Boston
attach(Boston) # or you can attach the data first
?bolm.fit=lm(medv~lstat) # And then run the regression
lm.fit # Display the regression output object
summary(lm.fit) # Display the summary of results
names(lm.fit)
coef(lm.fit) # Coefficients only
confint(lm.fit) # Confidence intervals only

# Predict medv for 3 values of lstat
predict(lm.fit,data.frame(lstat=c(5,10,15))), interval="confidence")
predict(lm.fit,data.frame(lstat=c(5,10,15))), interval="prediction")

# Plot the data
plot(lstat,medv) # Plot the data
abline(lm.fit) # Draw the regression line on the plot
abline(lm.fit,lwd=3) # Change the line weight to 3
```

**Console Output:**

```
(Intercept)    lstat 
34.5538409   -0.9500494 
> summary(lm.fit) # Display the summary of results

Call:
lm(formula = medv ~ lstat, data = Boston)

Residuals:
    Min       1Q   Median       3Q      Max 
-15.168   -3.990   -1.318    2.034   24.500 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  34.55384    0.56263   61.41  <2e-16 ***
lstat        -0.95005    0.03873  -24.53  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 6.216 on 504 degrees of freedom
Multiple R-squared:  0.5441    Adjusted R-squared:  0.5432
```



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