



# LECTURE VII. INTRODUCTION TO SHINY

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# LECTURE VII. INTRODUCTION TO SHINY

WHAT IS SHINY

WEB APP EXAMPLES WITH SHINY

INITIAL ACTIVITIES

# Shiny from Studio

- *Shiny is an R package that allows you to build interactive web applications from R scripts.*
- *Shiny allows you to export your time worked with R and expose it on a web page so that everyone can see it.*
- *Shiny makes you look "fantastic", it's easy to produce polished web applications with a minimal amount of pain.*

### **Instal·lació**

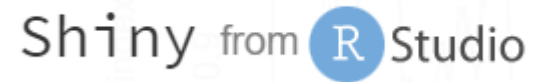
```
1 install.packages("shiny")  
2 library("shiny")|
```

Shiny makes it much easier for the R programmer to create web applications:

- It provides a carefully selected set of UI functions (UI for short) that generate the HTML, CSS, and JavaScript needed for common tasks. This means that you don't need to know the ins and outs of HTML/CSS/JavaScript until you want to go beyond the basics that Shiny has to offer.
- Introducing a new programming style called reactive scheduling that automatically tracks dependencies on code snippets. This means that whenever you change an entry, Shiny can automatically figure out how to do the least amount of work to update all related outputs.

Shiny from  Studio





### **Users use Shiny to:**

- *Create dashboards that track important high-level performance indicators, while making it easier to explore the metrics that need further investigation.*
- *Replace hundreds of PDF pages with interactive applications that allow the user to jump to the exact portion of the results that matter to them.*
- *Provide complex models to a non-technical audience with informative visualizations and interactive sensitivity analysis.*
- *Provide self-service data analytics for common workflows, replacing email requests with a Shiny app that allows people to upload their own data and perform standard analytics. You can make sophisticated R analytics available to users with no programming knowledge.*
- *Create interactive demonstrations to teach statistical and data science concepts that allow students to adjust inputs and observe the subsequent effects of these changes on an analysis.*

## WHAT IS SHINY?

Shiny from  Studio

Shiny gives you the ability to pass on some of your R superpowers to anyone who might use the web.





Introducción

Metodología

Resultados Nacionales <

Resultados Estatales <

>> Consultar resultados

>> Comparar resultados

Resultados Municipales

Explorar solicitudes de información <

Descargar bases de datos

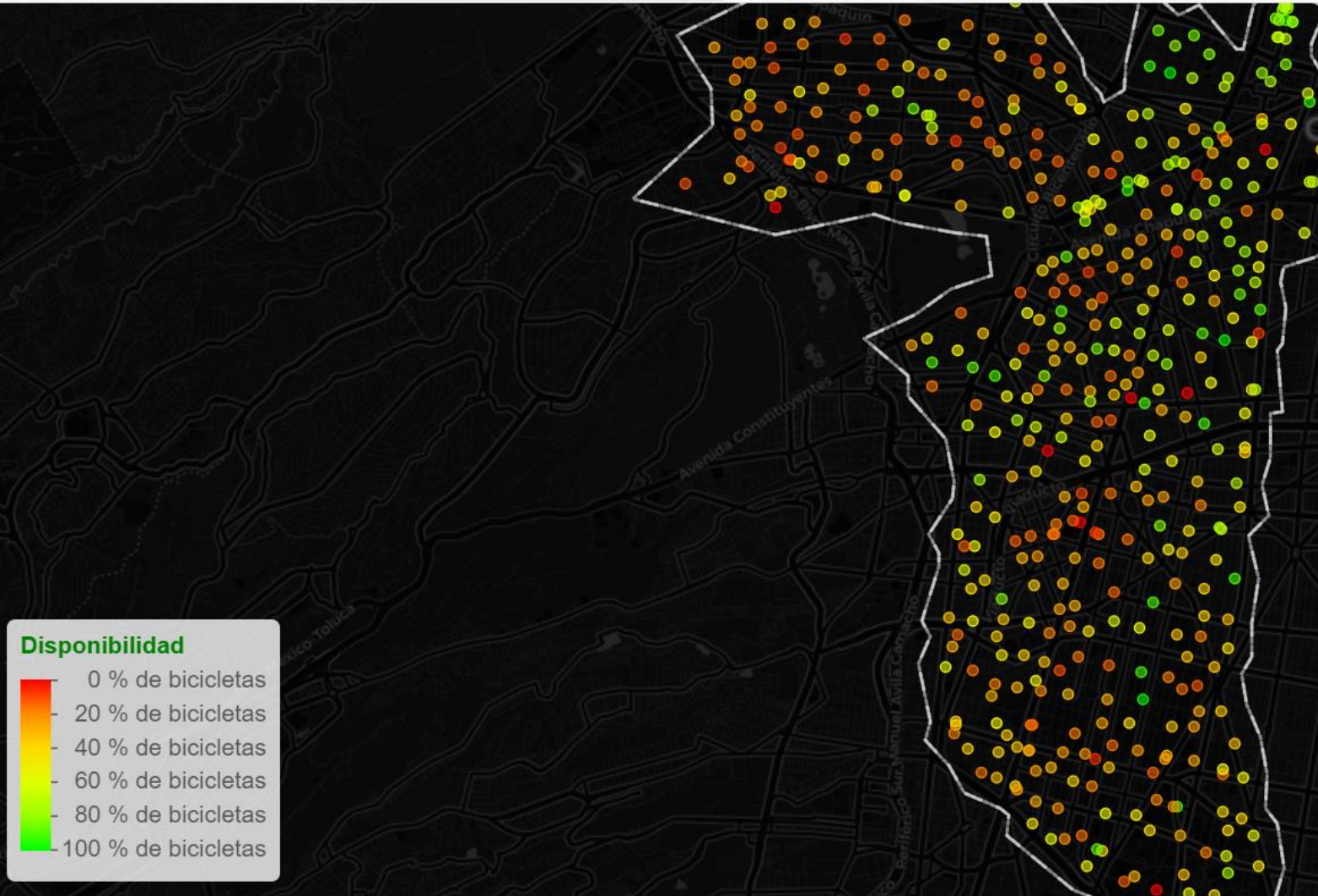
## Consultar resultados estatales

En el siguiente mapa se muestran los resultados obtenidos por cada estado en el Índice de Gobierno Abierto y en sus dos dimensiones: Transparencia y Participación.

*El tono oscurece conforme aumenta la calificación obtenida por el estado. Al dar clic sobre cualquier estado, se despliega en la parte inferior una serie de gráficas sobre los resultados específicos a la entidad y sus cambios con respecto a la Métrica 2017.*

### Índice de Gobierno Abierto, por estado





## Sistema de consulta de disponibilidad de bicicletas

Consulta la disponibilidad de bicicletas en días y horas recientes

Seleccione Fecha

Septiembre - 2 (lunes) ▼

Seleccione Hora

6 ▼

Seleccione Minuto

0 ▼

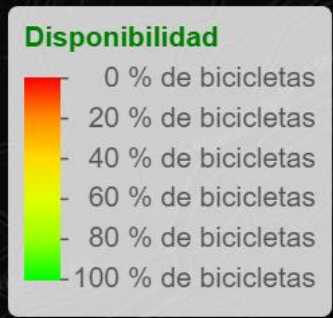
Consulta para un día y estación específicos

Seleccione Estación

1 RIO SENA-RIO BALSAS ▼

Disponibilidad de Bicicletas  
Estación Ecobici: 1 RIO SENA-RIO BALSAS

A zoomed-in map of the station '1 RIO SENA-RIO BALSAS'. The map shows a cluster of bicycle icons, each with a colored dot representing its availability. The icons are arranged in a grid-like pattern, and the colors range from red to green, indicating varying levels of availability across the station's area.





Red Caminos

Mapa Red de Caminos



### Entidades federativas

Seleccionar Estado

BAJA CALIFORNIA

Fuente: INEGI. Red Nacional de Caminos 2018.

\*Periodos de carga lentos debido al tamaño de los datos.

### Vialidades

- Caminos
- Carreteras

### DXY Data

Data on China.

98,316

Confirmed

4,636

Deaths

92,321

Recovered

#### Cases to plot

Confirmed

Deaths

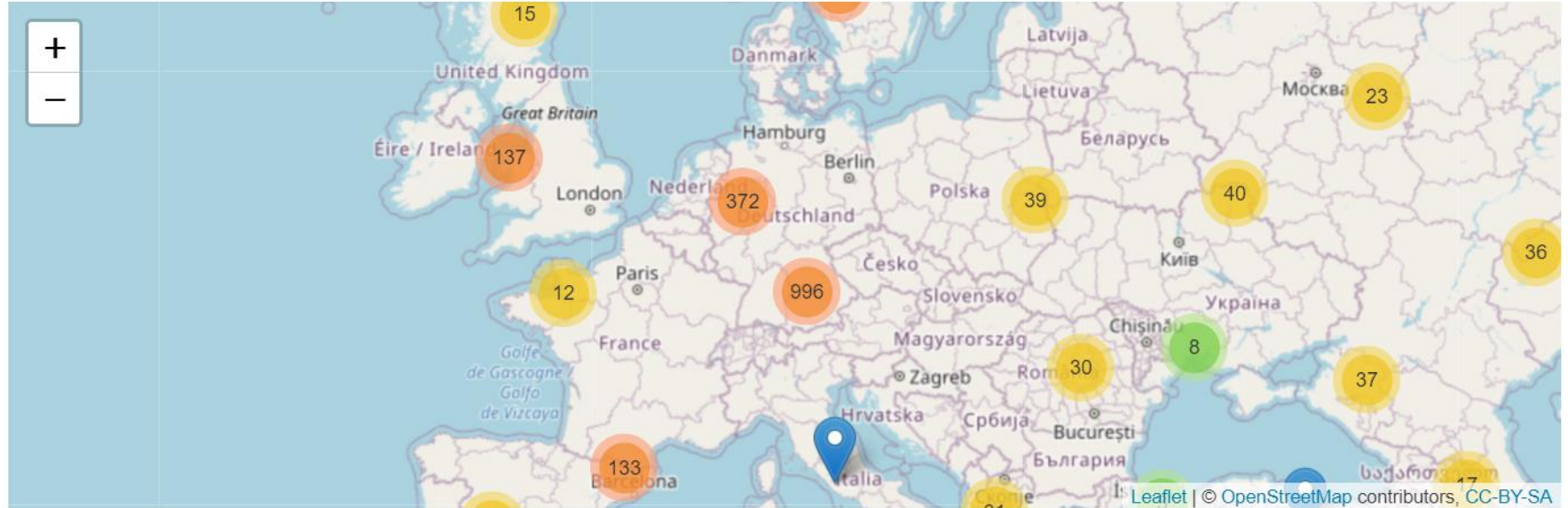
Recovered

### European Climate Assessment & Dataset (ECA&D) stations data browser

Browse the available stations in the Blended ECA Dataset. Click on each marker to see the time-series and the metadata.

Data from the European Climate Assessment & Dataset project. Processed data retrieved from [KNMI Climate Explorer Data description & policy](#)

Developed by [Matteo De Felice](#) (the author is not involved in the ECA&D project). The code is [available on Github](#) Thanks to Geert Jan van Oldenburgh and the KNMI (Koninklijk Nederlands Meteorologisch Instituut) for the data access



Click on a marker to show daily time-series data.

The horizontal lines are the 5th and 95th percentiles for the entire time-series. Change the number in the bottom left to apply a rolling average (default one day, i.e. no average)

#### Filter

Minimum number of years



Filter all the stations with

any  all



# INTERACTIVE APPLICATIONS DESIGNED WITH SHINY- PRACTICAL INTRODUCTION

RSTUDIO PREPARATION WITH SHINY

DEFAULT EXAMPLE WITH SHINY

DEFAULT EXAMPLE WITH SHINY- CODE BODY

INITIAL ACTIVITIES

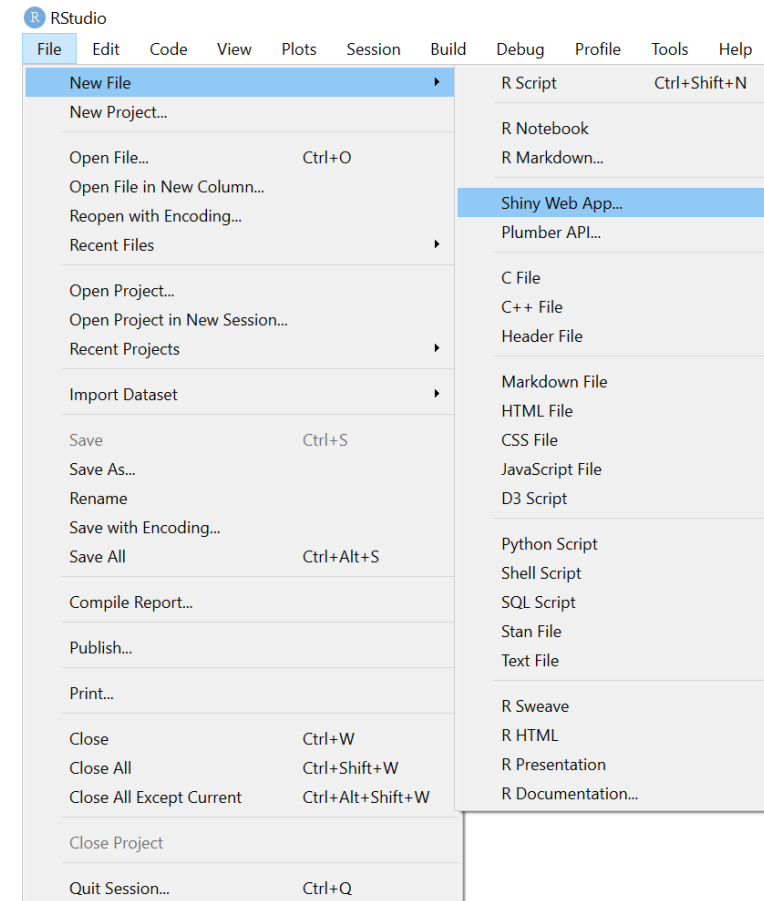
## Shiny from R Studio

### Instal·lació

```
1 install.packages("shiny")
2 library("shiny")
```


### Possible options for working with Shiny

- Create a file with R and save it in a folder called app (option 1)
- File-> new file-> new shiny web app (opció 2)



Shiny from  Studio

New Shiny Web Application



Application name:

Application type:  Single File (app.R)  
 Multiple File (ui.R/server.R)

Create within directory:

[? Shiny Web Applications](#)

# FIRST STEPS WITH SHINY. DEFAULT EXAMPLE WITH SHINY

## Shiny from R Studio

The screenshot displays the RStudio interface with a Shiny application being developed. The code editor shows the following R script:

```
1 #  
2 # This is a Shiny web application. You can run the applicatio  
3 # the 'Run App' button above.  
4 #  
5 # Find out more about building applications with Shiny here:  
6 #  
7 # http://shiny.rstudio.com/  
8 #  
9  
10 library(shiny)  
11  
12 # Define UI for application that draws a histogram  
13
```

The 'Run App' button in the toolbar is highlighted with a red box. The environment pane shows 'Global Environment' and 'Environment is empty'. The help viewer displays the documentation for the 'plotly' package, version 4.10.0, with the title 'Create Interactive Web Graphics via 'plotly.js'' and the R logo.

# FIRST STEPS WITH SHINY. DEFAULT EXAMPLE WITH SHINY

## Shiny from R Studio

The screenshot displays the RStudio interface. The main editor window shows a file named 'app.R' with the following code:

```
1 #  
2 # This is a Shiny web application. You can run the applicatio  
3 # the 'Run App' button above.  
4 #  
5 # Find out more about building applications with Shiny here:  
6 #  
7 # http://shiny.rstudio.com/  
8 #  
9  
10 library(shiny)  
11  
12 # Define UI for application that draws a histogram  
13
```

The code is enclosed in a red box. Below the code editor is the Console window, which shows the R version and copyright information:

```
R version 3.6.3 (2020-02-29) -- "Holding the windsock"  
Copyright (C) 2020 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32/x64 (64-bit)  
  
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and
```

On the right side of the RStudio interface, the Environment pane shows 'Global Environment' and 'Environment is empty'. Below it, the Help pane displays the documentation for the 'plotly.js' package, version 4.10.0, with the title 'Create Interactive Web Graphics via 'plotly.js'' and the R logo.

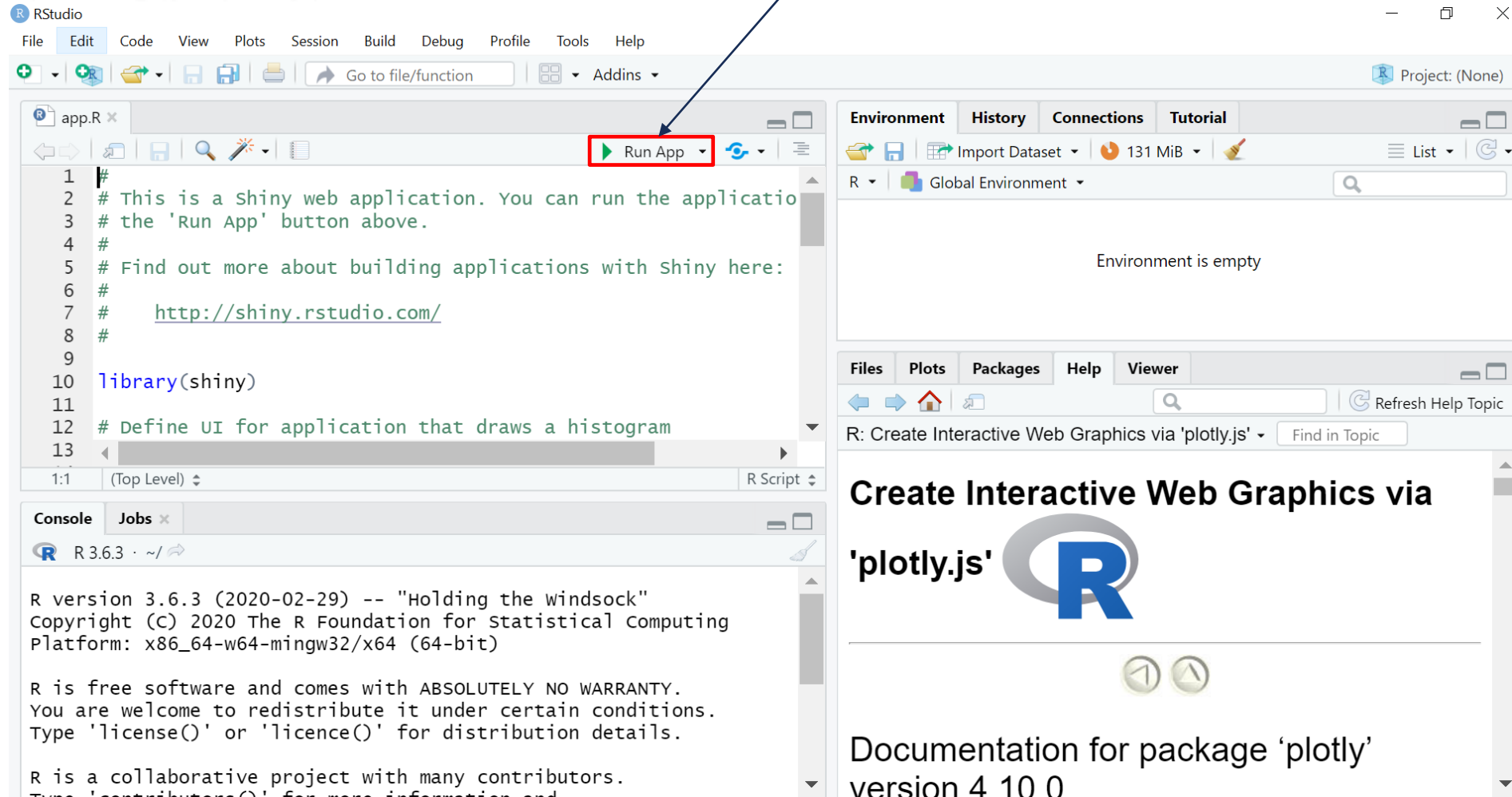
The code of the web app is complex and has a generic base structure



# FIRST STEPS WITH SHINY. DEFAULT EXAMPLE WITH SHINY

Shiny from  Studio

To run all the app code



The screenshot displays the RStudio interface with the following components:

- Editor:** Contains R code for a Shiny application. The code includes comments and a `library(shiny)` call. The `Run App` button is highlighted with a red box, and an arrow points to it from the text "To run all the app code".
- Environment:** Shows the Global Environment, which is currently empty.
- Console:** Displays the R startup message for version 3.6.3, including copyright information and a warning about the license.
- Help Viewer:** Shows the documentation for the 'plotly' package, version 4.10.0.

Shiny from  Studio

Result of doing "run app"

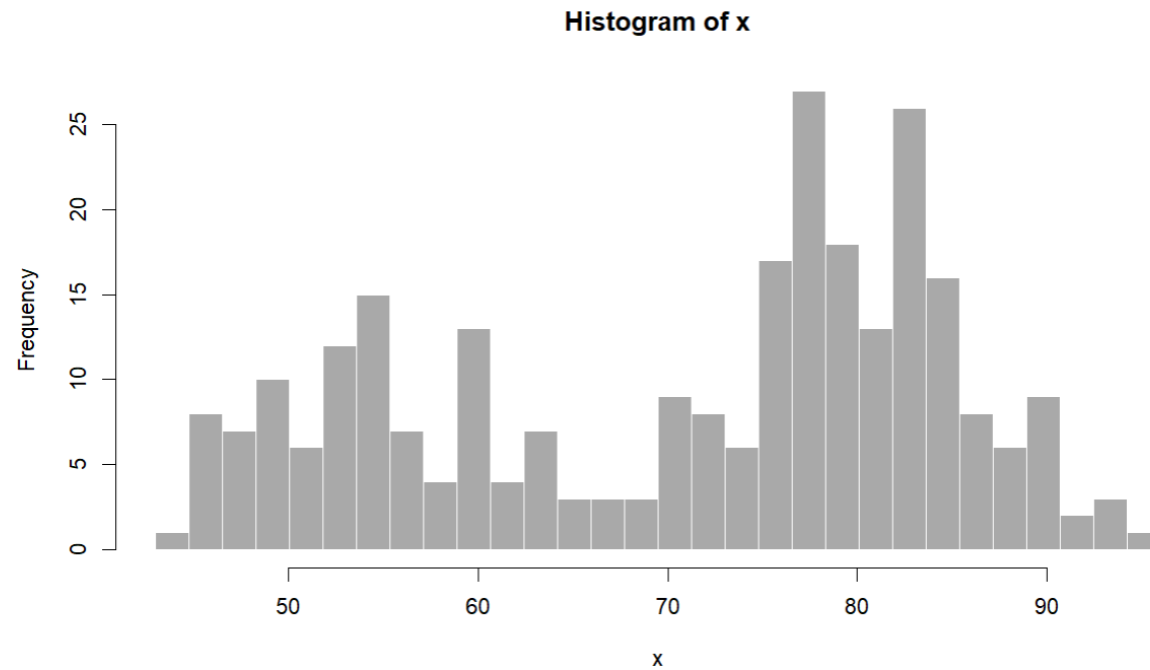
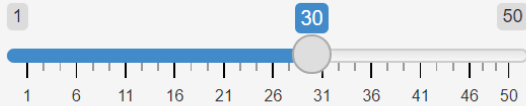
C:/Users/Anna/Desktop/1511-TEST/test-v1 - Shiny

http://127.0.0.1:5742 [Open in Browser](#)

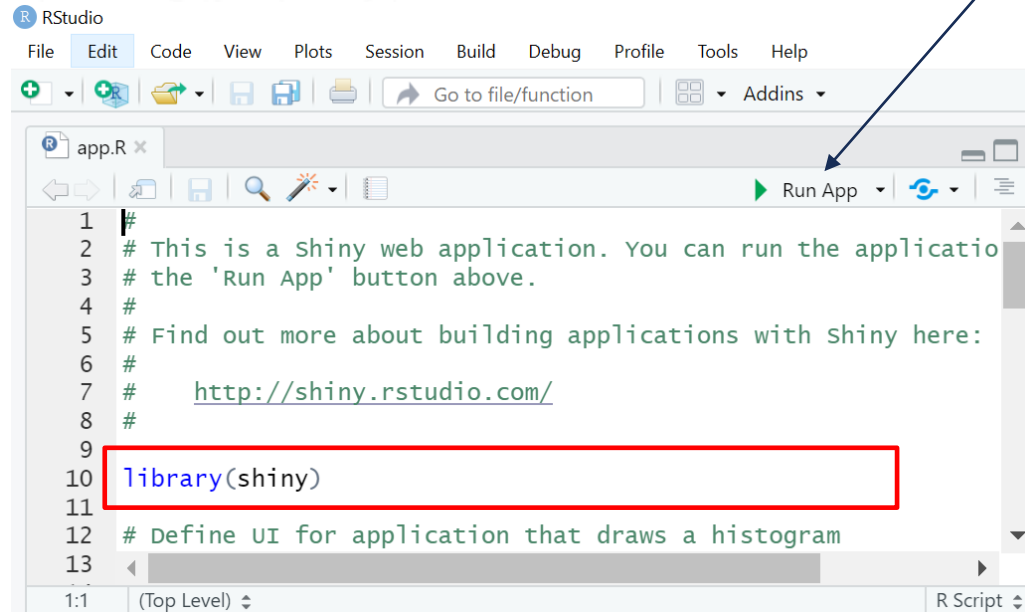
[Publish](#)

## Old Faithful Geyser Data

Number of bins:



Shiny from R Studio



```
1 #
2 # This is a Shiny web application. You can run the applicatio
3 # the 'Run App' button above.
4 #
5 # Find out more about building applications with shiny here:
6 #
7 # http://shiny.rstudio.com/
8 #
9
10 library(shiny)
11
12 # Define UI for application that draws a histogram
13
```

But...What's inside all the code?

- Required Packages
- Definition of the UI (User Interface)
- Server Definition
- The code to "run" in the application

## Shiny from R Studio

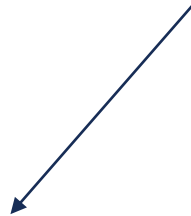
```
12 # Define UI for application that draws a histogram
13 ui <- fluidPage(
14
15   # Application title
16   titlePanel("Old Faithful Geyser Data"),
17
18   # sidebar with a slider input for number of bins
19   sidebarLayout(
20     sidebarPanel(
21       sliderInput("bins",
22                 "Number of bins:",
23                 min = 1,
24                 max = 50,
25                 value = 30)
26     ),
27
28     # show a plot of the generated distribution
29     mainPanel(
30       plotOutput("distPlot")
31     )
32   )
33 )
34
35
```

But... What's inside all the code?

- Required Packages
- Definition of the UI (User Interface)
- Server Definition
- The code to "run" in the application


Shiny from  Studio

But... What's inside all the code?



- Required Packages
- Definition of the UI (User Interface)
- **Server Definition**
- The code to "run" in the application

```
35 # Define server logic required to draw a histogram
36 server <- function(input, output) {
37
38   output$distPlot <- renderPlot({
39     # generate bins based on input$bins from ui.R
40     x <- faithful[, 2]
41     bins <- seq(min(x), max(x), length.out = input$bins + 1)
42
43     # draw the histogram with the specified number of bins
44     hist(x, breaks = bins, col = 'darkgray', border = 'white')
45   })
46 }
```

Shiny from  Studio

But...What's inside all the code?

```
48 # Run the application
49 shinyApp(ui = ui, server = server)
50
```

- Required Packages
- Definition of the UI (User Interface)
- Server Definition
- The code to "run" in the application

# FIRST STEPS WITH SHINY. INITIAL ACTIVITIES

The screenshot shows the RStudio interface with the following components:

- Code Editor:** Contains the following R code:

```
1 #  
2 # This is a shiny web application. You can run the applicatio  
3 # the 'Run App' button above.  
4 #  
5 # Find out more about building applications with shiny here:  
6 #  
7 # http://shiny.rstudio.com/  
8 #  
9  
10 library(shiny)  
11  
12 # Define UI for application that draws a histogram  
13
```
- Environment Pane:** Shows "Global Environment" and "Environment is empty".
- Viewer Pane:** Displays the documentation for the 'plotly' package, version 4.10.0. The title is "Create Interactive Web Graphics via 'plotly.js'" and it features the R logo.
- Console:** Shows the R version information: "R version 3.6.3 (2020-02-29) -- 'Holding the windsock'".

- Change the title
- Change the color of the chart bars
- Change the title of the slider

Shiny from  Studio

Shiny gives you the ability to pass on some of your R superpowers to anyone who might use the web.

# HOW DO WE DO IT???!?





## Let's learn how to publish the web-app

The screenshot shows the RStudio interface with the following components:

- Code Editor:** Contains R code for a Shiny application. The code includes a `mainPanel` with a `plotOutput` and a `server` function that uses `renderPlot` to generate a histogram. The `shinyApp` function is also present.
- Environment Pane:** Shows the 'Publish to Server' dialog box. It includes a 'Deploying...' status indicator, the R logo, and the following information:
  - Publish Files From:** C:/Users/Anna/Desktop/1511-TEST/test-v1
  - Publish From Account:** annabc: shinyapps.io (with an 'Add New Account' link)
  - Title:** test-v1
  - Files:** A list containing 'app.R' with a checked checkbox.
  - Launch browser:** A checked checkbox.
  - Buttons:** 'Publish' and 'Cancel' buttons.
- Buttons:** In the top right of the Environment pane, there are buttons for 'Reload App', 'Publish Application...', and 'Manage Accounts...'. The 'Publish Application...' button is highlighted with a red box.

Let's learn how to publish the web-app - You need to create a new account

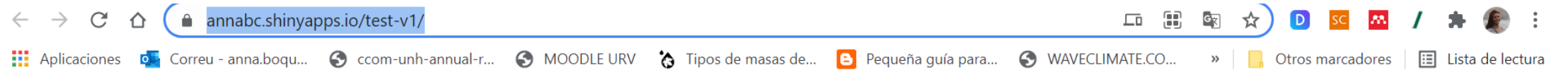
<https://www.shinyapps.io/>

The screenshot shows the RStudio interface with a Shiny application code editor on the left and a 'Publish to Server' dialog box on the right. The code in the editor includes a mainPanel with a plot and server logic for a histogram. The dialog box shows the file 'app.R' being published from the account 'annabc: shinyapps.io' with the title 'test-v1'. A 'Deploying...' notification is visible in the background.

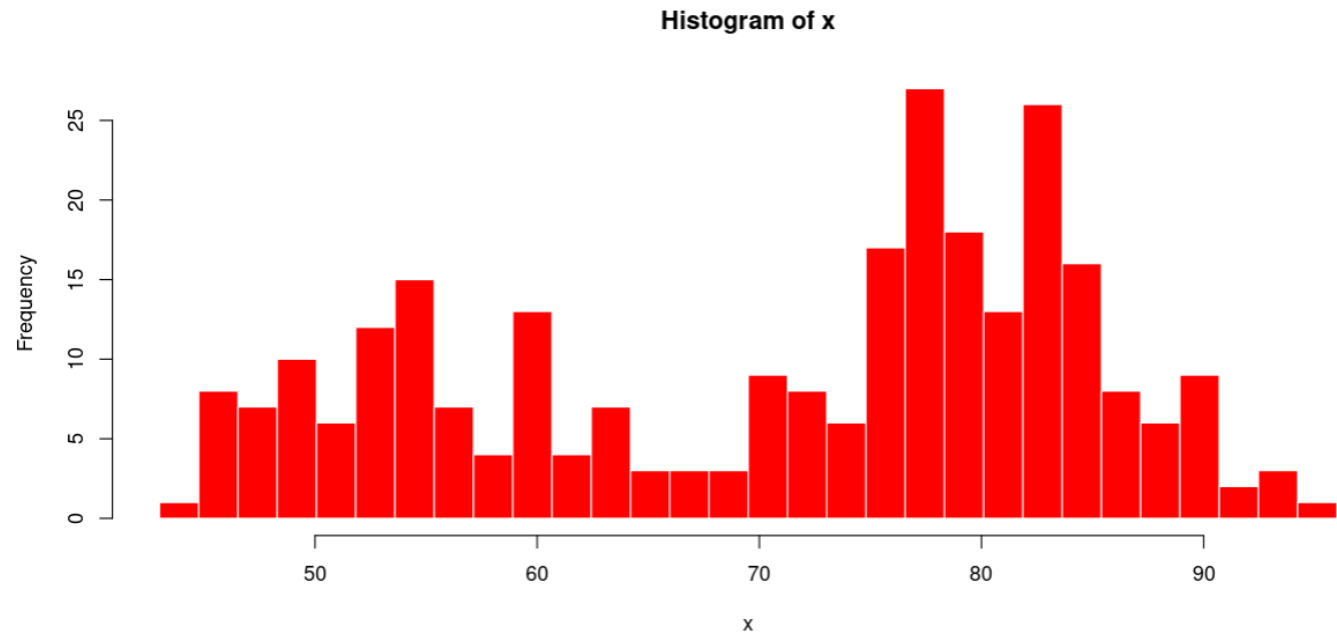
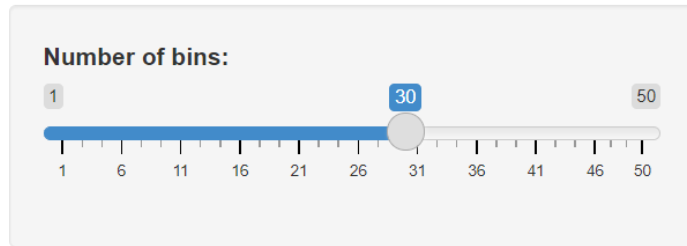
```
28 # Show a plot of the generated distribution
29 mainPanel(
30   plotOutput("distPlot")
31 )
32 )
33 )
34
35 # Define server logic required to draw a histogram
36 server <- function(input, output) {
37
38   output$distPlot <- renderPlot({
39     # generate bins based on input$bins from ui.R
40     x <- faithful[, 2]
41     bins <- seq(min(x), max(x), length.out = input$bins + 1)
42
43     # draw the histogram with the specified number of bins
44     hist(x, breaks = bins, col = 'red', border = 'white')
45   })
46 }
47
48 # Run the application
49 shinyApp(ui = ui, server = server)
50
```

Environment History Connections Tutorial  
R Global Environment  
Publish to Server  
Deploying...  
Publish From Account: [Add New Account](#)  
annabc: shinyapps.io  
Title: test-v1  
 Launch browser  
Publish Cancel

## Let's learn how to publish the web-app



## New data



# FIRST STEPS WITH SHINY. INITIAL ACTIVITIES

The screenshot shows the RStudio interface. The top-left pane contains the R script for a Shiny application:

```
1 #  
2 # This is a shiny web application. You can run the applicatio  
3 # the 'Run App' button above.  
4 #  
5 # Find out more about building applications with shiny here:  
6 #  
7 # http://shiny.rstudio.com/  
8 #  
9  
10 library(shiny)  
11  
12 # Define UI for application that draws a histogram  
13
```

The bottom-left pane shows the R console output:

```
R version 3.6.3 (2020-02-29) -- "Holding the windsock"  
Copyright (C) 2020 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32/x64 (64-bit)  
  
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and
```

The right-hand side of the RStudio window shows the Environment pane (empty) and a web browser displaying the documentation for the 'plotly' package, version 4.10.0. The browser title is "R: Create Interactive Web Graphics via 'plotly.js'".

- Change the title
- Change the color of the chart bars
- Change the title of the slider
- **Publish your first web app**