

Intro to Shiny

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What is Shiny?

Shiny is an R package that lets you build interactive web apps right from R! It allows users to change graphic inputs dynamically.

First, make sure to install shiny:

```
install.packages("shiny")
```

Shiny apps are contained in a single script called `app.R`, which has 3 components:

- a user interface object (`ui`)
- a server function (`server`)
- a call to the `shinyApp` function

Shiny app script skeleton

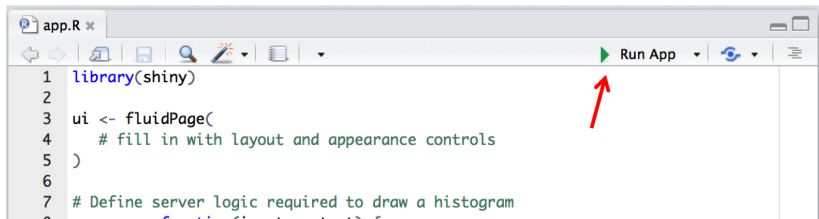
This would all be in `app.R`

```
1 library(shiny)
2
3 ui <- fluidPage(
4   # fill in with layout and appearance controls
5 )
6
7 # Define server logic required to draw a histogram
8 server <- function(input, output) {
9   # fill in with instructions to build app
10 }
11
12 # Run the application
13 shinyApp(ui = ui, server = server)
14
15
```

Running the app

There are 2 (recommended) options.

- If using RStudio

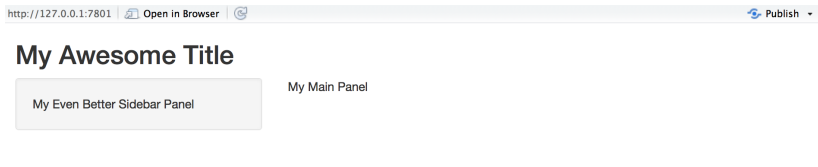


- Or save the file `app.R` in a folder (e.g. "My-Shiny-App") and run:

```
library(shiny)
runApp("My-Shiny-App")
```

The UI: introduction

- Use the function `fluidPage` to create the display
- To get this:



- Do this:

```
ui <- fluidPage(  
  titlePanel("My Awesome Title"),  
  
  sidebarLayout(  
    sidebarPanel("My Even Better Sidebar Panel"),  
    mainPanel("My Main Panel")  
  )  
)
```

The UI: widgets

- You can use widgets to collect a (or many) value(s) from the user

Basic widgets

actionButton

Buttons

Action

Submit

dateRangeInput

Date range

2017-06-21 to 2017-06-21

radioButtons

Radio buttons

- ☒ Choice 1
☐ Choice 2
☐ Choice 3

checkboxInput

Single checkbox

☒ Choice A

fileInput

File input

Browse... No file selected

checkboxGroupInput

Checkbox group

- ☒ Choice 1
☐ Choice 2
☐ Choice 3

helpText

Help text

Note: help text isn't a true widget, but it provides an easy way to add text to accompany other widgets.

dateInput

Date input

2014-01-01

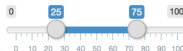
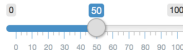
numericInput

Numeric input

1

sliderInput

Sliders



textInput

Text input


Enter text...

The UI: iris example

```
ui <- fluidPage(  
  titlePanel("The famous iris dataset"),  
  
  sidebarLayout(  
    sidebarPanel(  
      helpText("Create plots based on iris species."),  
      selectInput("type",  
        label = "Species",  
        choices = list("Setosa", "Versicolor", "Virginica"),  
        selected = "Setosa"),  
      checkboxGroupInput("vars",  
        label = "Variables",  
        choices = list("Sepal Length", "Sepal Width",  
          "Petal Length", "Petal Width"),  
        selected = c("Sepal Length", "Petal Length"))  
    ),  
    mainPanel("Cool things will eventually happen here")  
  )  
)
```

The UI: iris example

http://127.0.0.1:7801

 Open in Browser



 Publish ▾

The famous iris dataset

Create plots based on iris species.

Species

setosa ▾

Variables

- ☒ sepal length
- ☐ sepal width
- ☒ petal length
- ☐ petal width

Cool things will eventually happen here

The UI: adding objects

- We can add R objects to the UI:
 - Plot, table, text
 - among others...
- Can be placed inside the sidebarPanel or mainPanel
- Returning to the iris example, suppose we want to include some text and a plot that depends on values from the UI:

```
ui <- fluidPage(  
  titlePanel("The famous iris dataset"),  
  
  sidebarLayout(  
    ...  
    mainPanel(  
      textOutput("selected_species"),  
      plotOutput("irisplot")  
    )  
  )  
)
```

The Server: introduction

- Now that we told Shiny where to display our object, we need to tell Shiny how to build the object
- To do this we use the `server` function
- It will take `input`, which is a list-like object storing current values of all widgets in the app. Recall the names you used in the `ui` (`type` and `vars` in the `iris` case)
- It will produce `output`, which should contain the output of one of Shiny's `render*` functions
 - `renderPlot`, `renderTable`, `renderText`
 - among others

The Server: iris example

- Recall: type is the name of the iris species and vars is a 2-dim vector containing the variables
- Also recall what the iris dataset looks like:

```
## Sepal.Length Sepal.Width Petal.Length Petal.Width Species
## 1          5.1          3.5          1.4          0.2 setosa
## 2          4.9          3.0          1.4          0.2 setosa
```

```
server <- function(input, output) {
  output$selected_species <- renderText({
    paste("You have selected the", input$type, "species")
  })

  output$irisplot <- renderPlot({
    data.to.plot <- iris[iris$Species == tolower(input$type), ]
    x <- data.to.plot[, gsub(" ", ".", input$vars[1])]
    y <- data.to.plot[, gsub(" ", ".", input$vars[2])]
    plot(x, y, xlab=input$vars[1], ylab=input$vars[2], pch=16)
  })
}
```

The Server: iris example

http://127.0.0.1:7801 [Open in Browser](#)

[Publish](#)

The famous iris dataset

Create plots based on iris species.

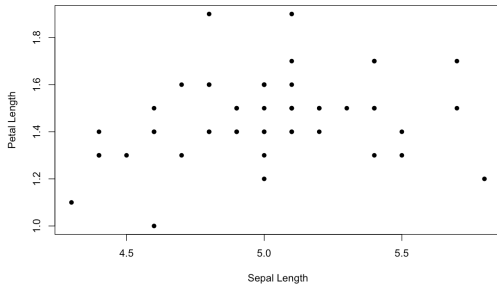
Species

Setosa

Variables

- ☒ Sepal Length
- ☐ Sepal Width
- ☒ Petal Length
- ☐ Petal Width

You have selected the Setosa species



Conclusion

- Shiny is an awesome way to visualize information
- You can make way more complicated Shiny apps
- Check out <https://shiny.rstudio.com/> for videos and written tutorials on all the things you can do with Shiny!

Stocks

As another example, let's suppose we want to examine stock prices of some tech companies. Pretend that this is what we are after:

http://127.0.0.1:7801 [Open in Browser](#) [Publish](#)

Tech Stocks

Visualize stocks

Ticker Symbol

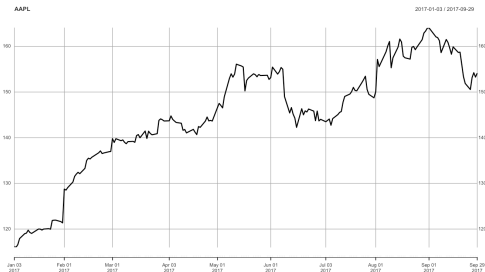
☒ AAPL

☐ GOOG

☐ MSFT

☐ FB

2017-01-01 to 2017-10-01



You will need to use the package `quantmod` to obtain stock prices from Yahoo

Stocks: skeleton

```
library(shiny)
library(quantmod)

ui <- fluidPage(
  titlePanel("Tech Stocks"),

  sidebarLayout(
    sidebarPanel(
      helpText( ... ),
      radioButtons( ... ),
      dateRangeInput( ... )
    ),
    mainPanel( ... )
  )
)

# Define server logic for making the plot
server <- function(input, output) {
  ...
}

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

Stocks: UI

```
ui <- fluidPage(  
  titlePanel("Tech Stocks"),  
  
  sidebarLayout(  
    sidebarPanel(  
      helpText("Visualize stocks"),  
      radioButtons("stock",  
        label = "Ticker Symbol",  
        choices = list("AAPL", "GOOG", "MSFT", "FB"),  
        selected = "AAPL"),  
      dateRangeInput("dates", label="",  
        start="2017-01-01", end="2017-10-01",  
        min="2017-01-01", max="2017-10-01")  
    ),  
    mainPanel(  
      plotOutput("stockplot")  
    )  
  )  
)
```


Stocks: server

```
server <- function(input, output) {  
  output$stockplot <- renderPlot({  
    start <- as.Date(input$dates[1])  
    end <- as.Date(input$dates[2])  
  
    getSymbols(input$stock, src = "yahoo", from = start,  
              to = end,  
              warnings=FALSE)  
    plot(eval(parse(text=input$stock))[, paste0(input$stock, ".Close")],  
         main = input$stock)  
  })  
}
```