Make a Census Explorer with Shiny

AriLamstein - AriLamstein.com

R-ladies, July 2015

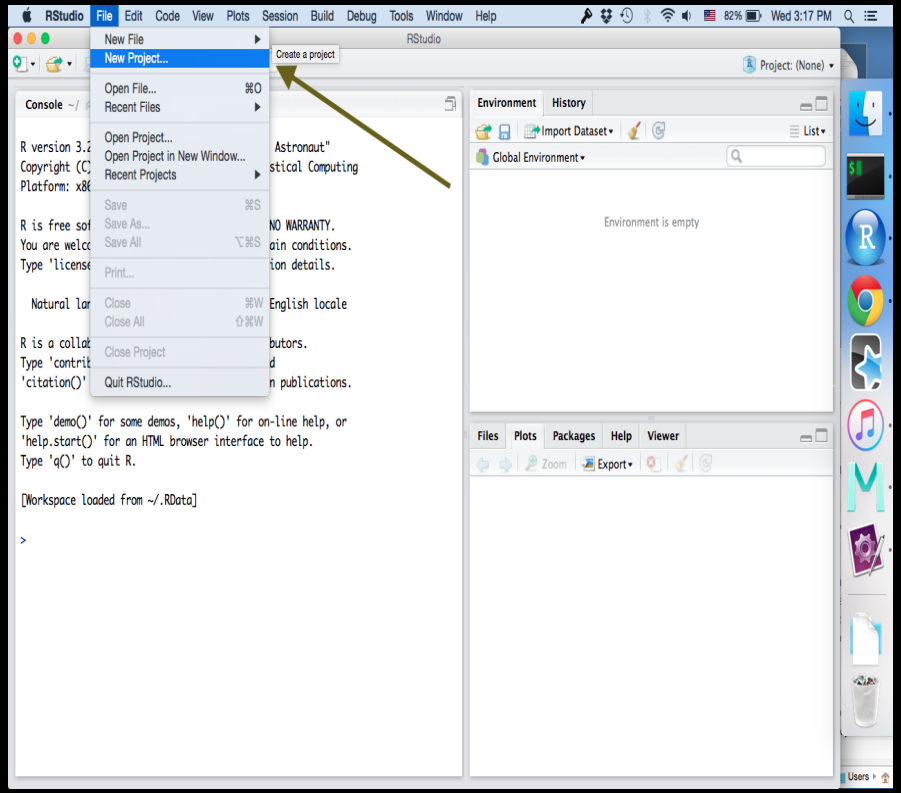
Part I

Default Shiny App

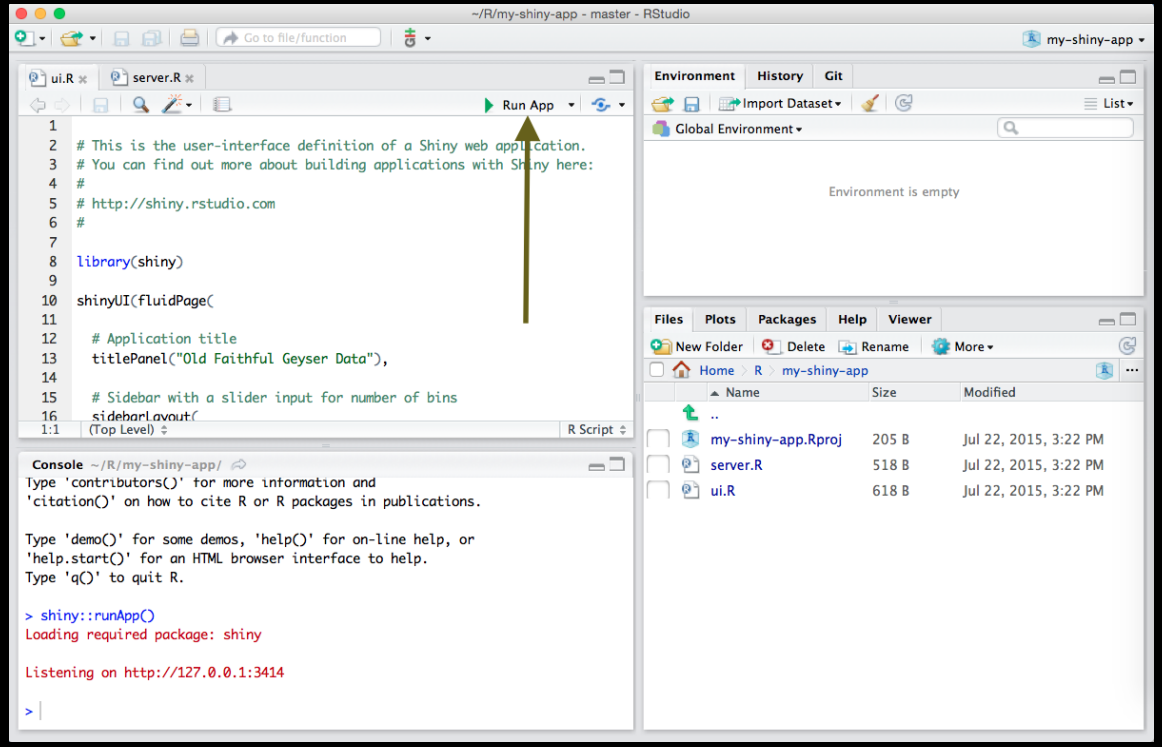
What is Shiny?

- Web apps in R
- Great for exploration
- Two files:
  - ui.R
  - server.R

Create


RStudio
File
Edit
Code
View
Plots
Session
Build
Debug
Tools
Window
Help
Wed 3:17 PM
New File
New Project...
Open File... ⌘O
Recent Files
Open Project...
Open Project in New Window...
Recent Projects
Save ⌘S
Save As...
Save All ⌥⌘S
Print...
Close ⌘W
Close All ⇧⌘W
Close Project
Quit RStudio...
Create a project
Project: (None)
Console
Environment
History
Import Dataset
List
Global Environment
Environment is empty
Files
Plots
Packages
Help
Viewer
Zoom
Export
Users

Run


~/R/my-shiny-app - master - RStudio
Go to file/function
my-shiny-app
ui.R
server.R
Run App
1 # This is the user-interface definition of a Shiny web application.
2 # You can find out more about building applications with Shiny here:
3 #
4 # http://shiny.rstudio.com
5 #
6
7 library(shiny)
8
9 shinyUI(fluidPage(
10
11 # Application title
12 titlePanel("Old Faithful Geyser Data"),
13
14 # Sidebar with a slider input for number of bins
15 sidebarLayout(
1:1 (Top Level) R Script
Console ~/R/my-shiny-app/
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
> shiny::runApp()
Loading required package: shiny
Listening on http://127.0.0.1:3414
>
Environment History Git
Import Dataset
List
Global Environment
Environment is empty
Files Plots Packages Help Viewer
New Folder Delete Rename More
Home R my-shiny-app
Name Size Modified
..
my-shiny-app.Rproj 205 B Jul 22, 2015, 3:22 PM
server.R 518 B Jul 22, 2015, 3:22 PM
ui.R 618 B Jul 22, 2015, 3:22 PM

~/R/kk - Shiny

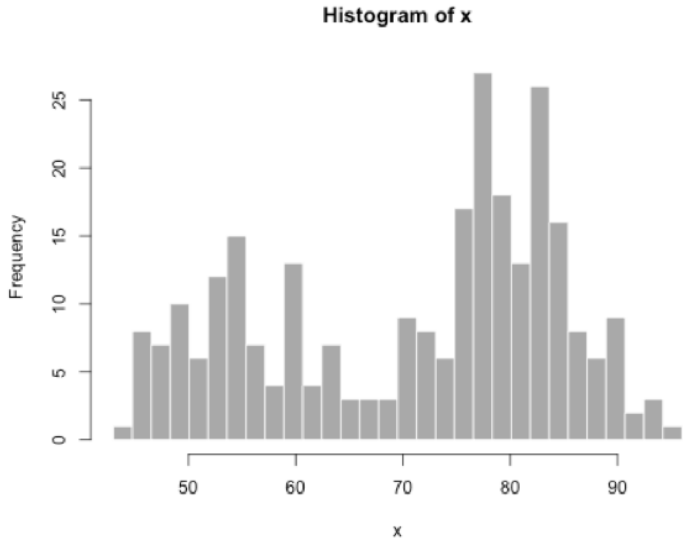
http://127.0.0.1:7457 | Open in Browser | Publish

Old Faithful Geyser Data

Number of bins:

1 30 50

1 6 11 16 21 26 31 36 41 46 50

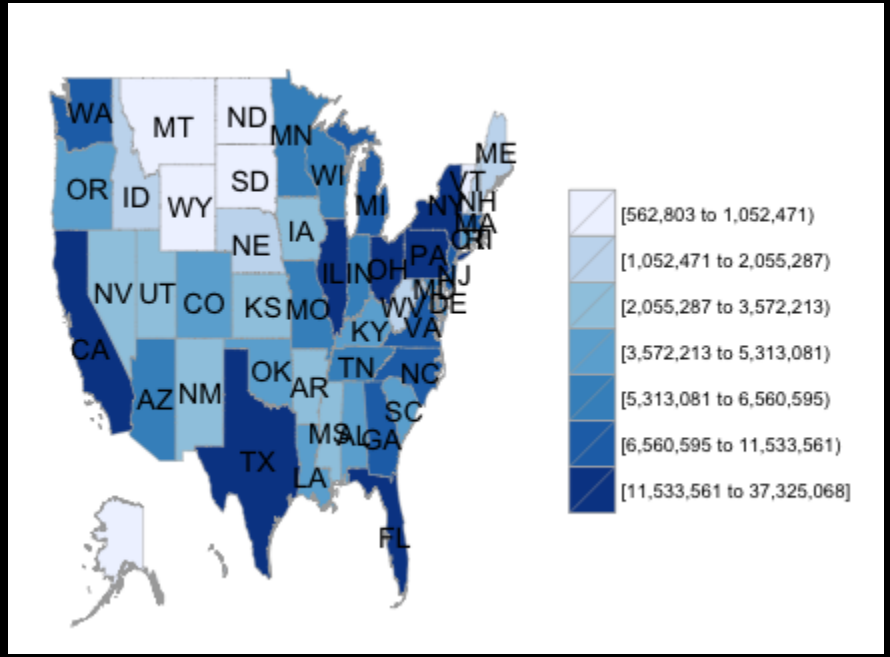


Part 2

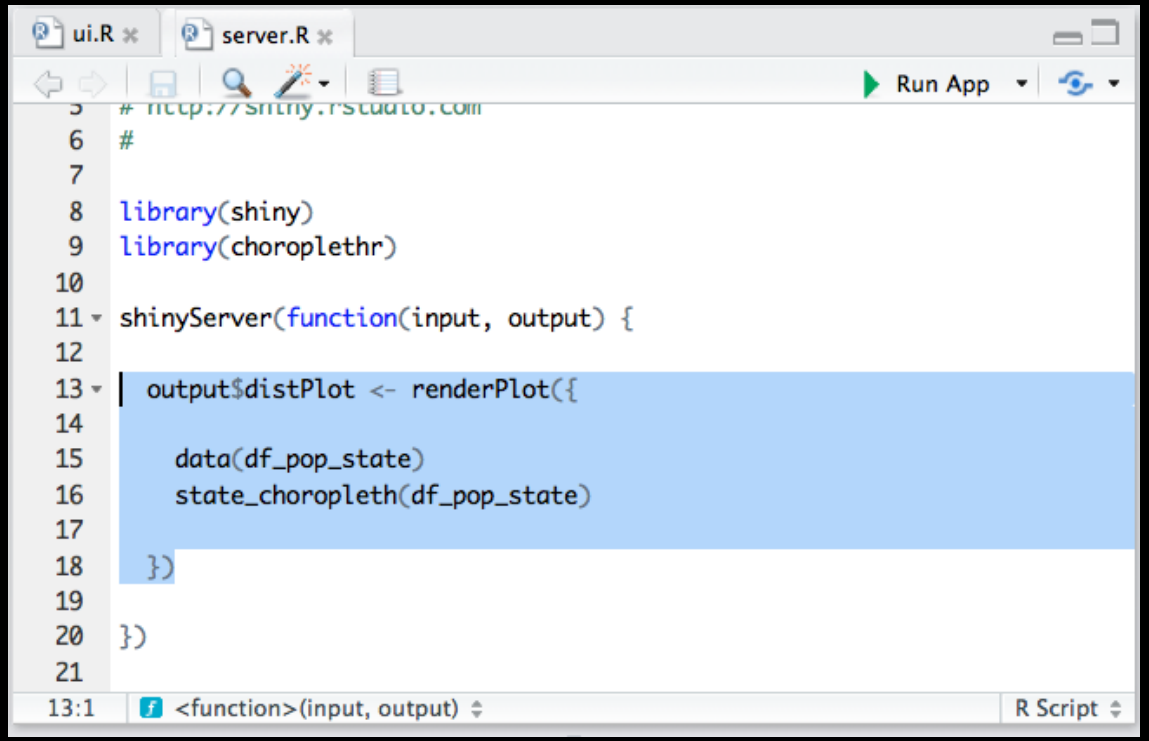
Default Shiny App -> Static Maps

Population Map - No Shiny

```
library(choroplethr)
data(df_pop_state)
state_choropleth(df_pop_state)
```

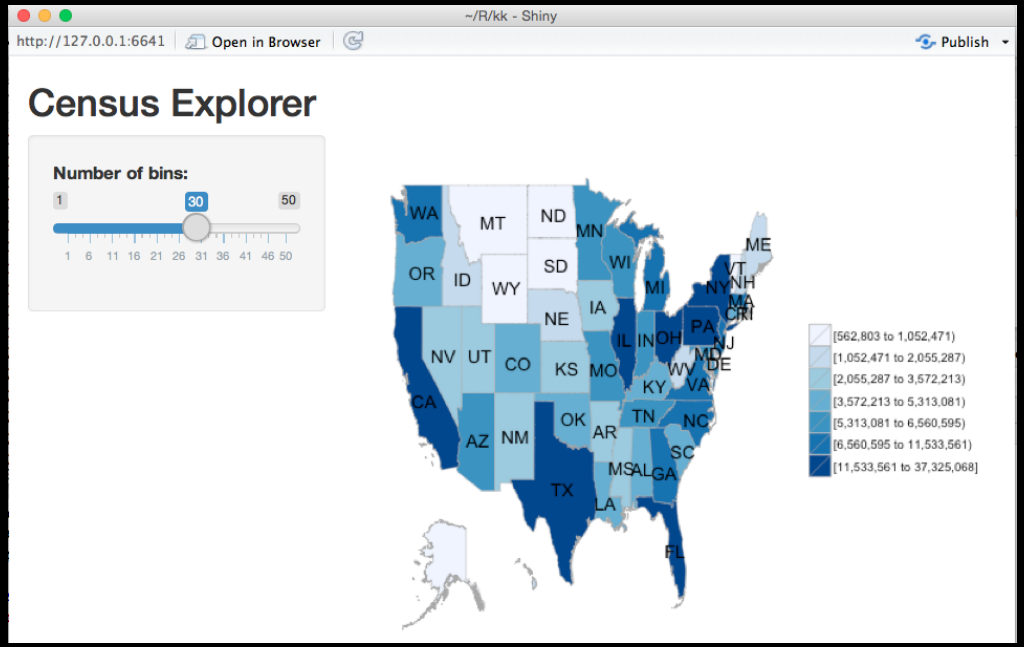


Population Map - Shiny



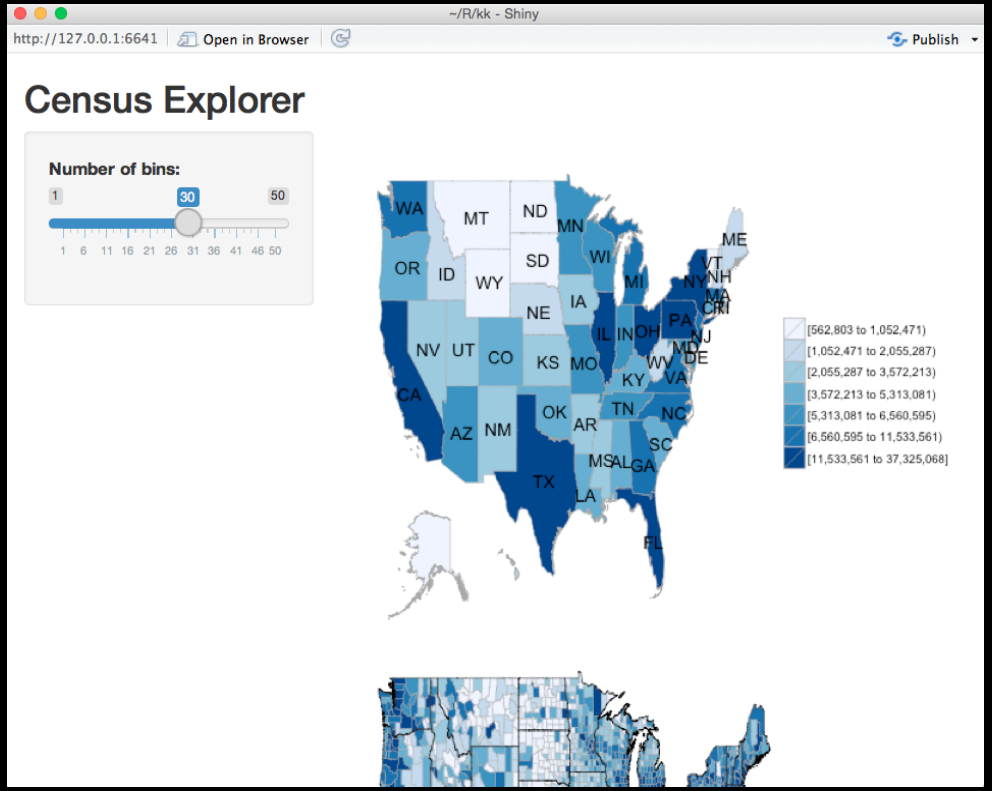
Exercise: Change the App's title

Hint: is this in ui.R or server.R?



Exercise: Add a County Map!

```
data(df_pop_county)
county_choropleth(df_pop_county)
```



My Solution

ui.R

```
26      mainPanel(
27        plotOutput("distPlot"),
28        plotOutput("county")
```

server.R

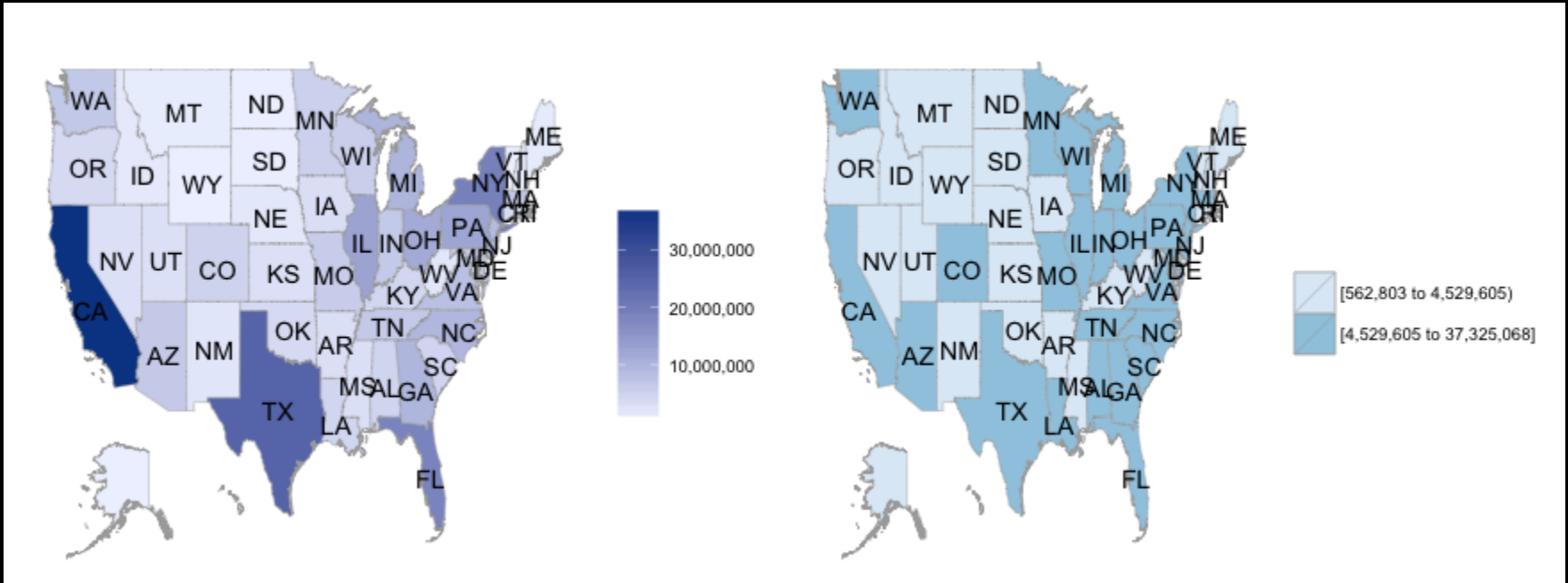
```
11  shinyServer(function(input, output) {
12
13    output$distPlot <- renderPlot({
14
15      data(df_pop_state)
16      state_choropleth(df_pop_state)
17
18    })
19
20    output$county = renderPlot({
21      data(df_pop_county)
22      county_choropleth(df_pop_county)
23    })
24
25  })
```

Part 3

Basic Interaction

num_colors=1, num_colors=2, ...

state_choropleth(df_pop_state, num_colors=1)



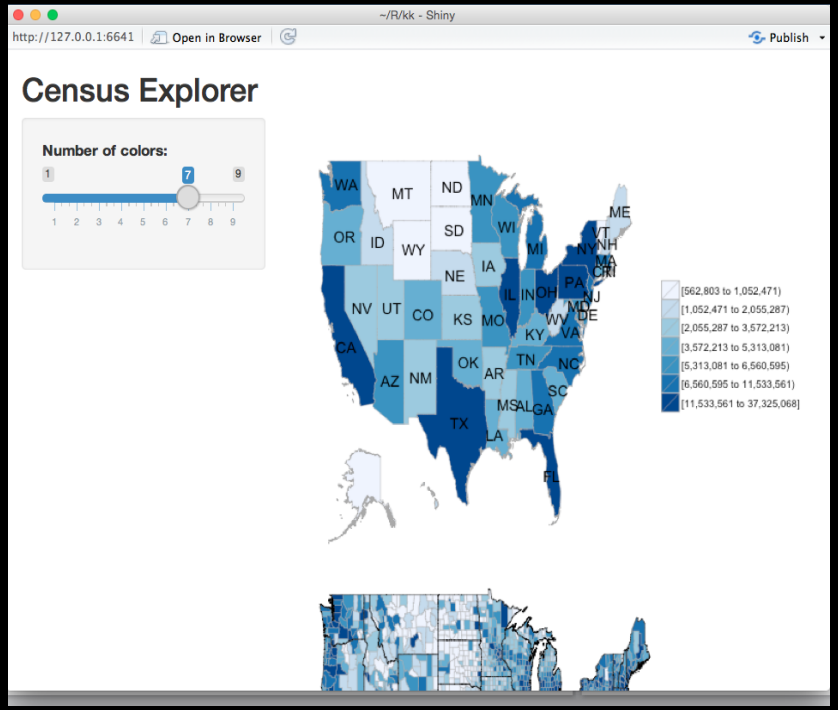
ui.R Code for Slider

ui.R | server.R

Run App

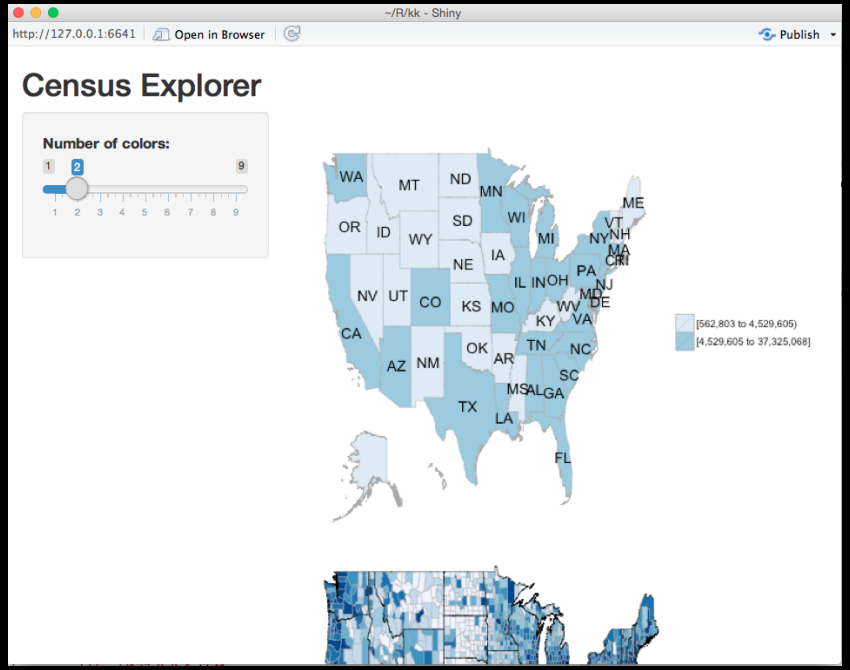
```
9
10  shinyUI(fluidPage(
11
12    # Application title
13    titlePanel("Census Explorer"),
14
15    # Sidebar with a slider input for number of colors
16    sidebarLayout(
17      sidebarPanel(
18        sliderInput("num_colors",
19                    "Number of colors:",
20                    min = 1,
21                    max = 9,
22                    value = 7)
23      ),
24
```

18:1 (Top Level) R Script

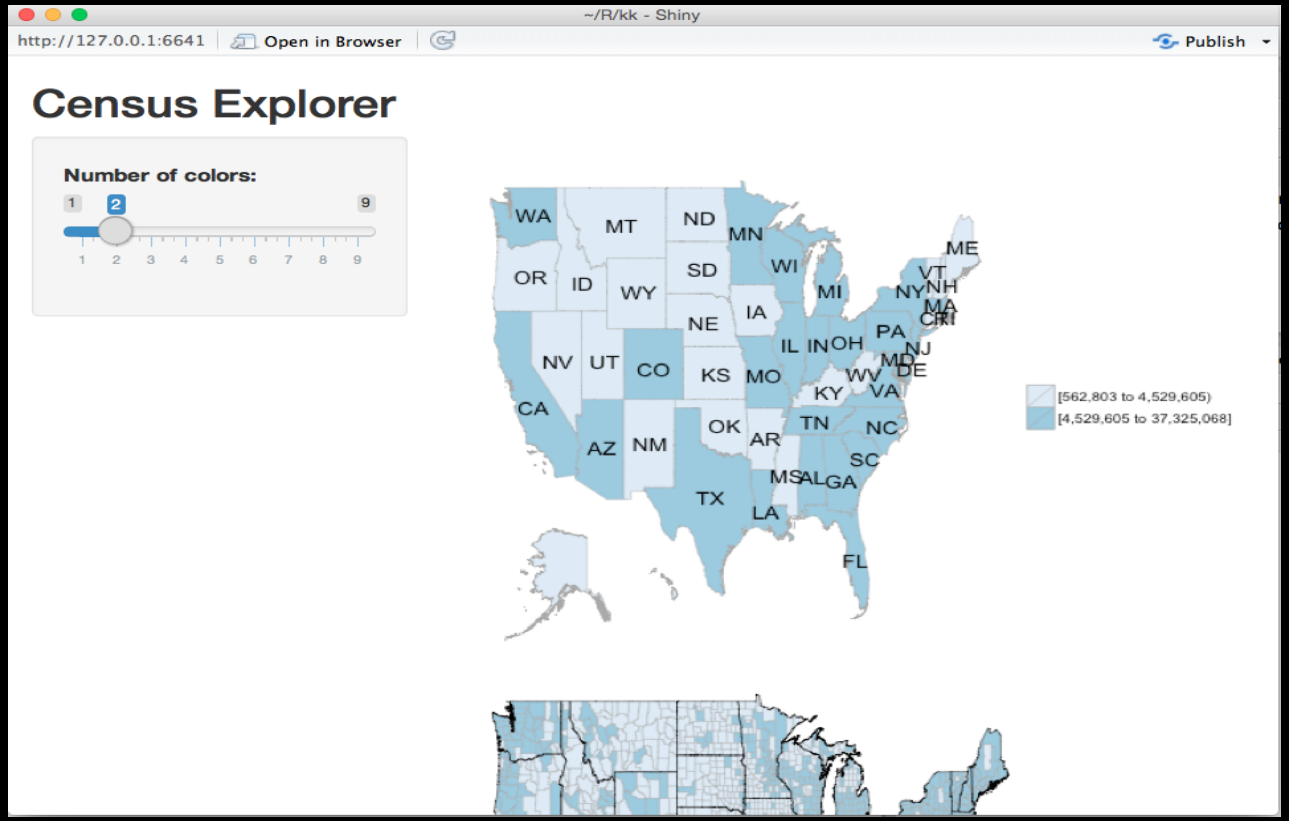


server.R Code for Slider

```
shinyServer(function(input, output) {

  output$distPlot <- renderPlot({

    data(df_pop_state)
    state_choropleth(df_pop_state, num_colors = input$num_colors)

  })
```



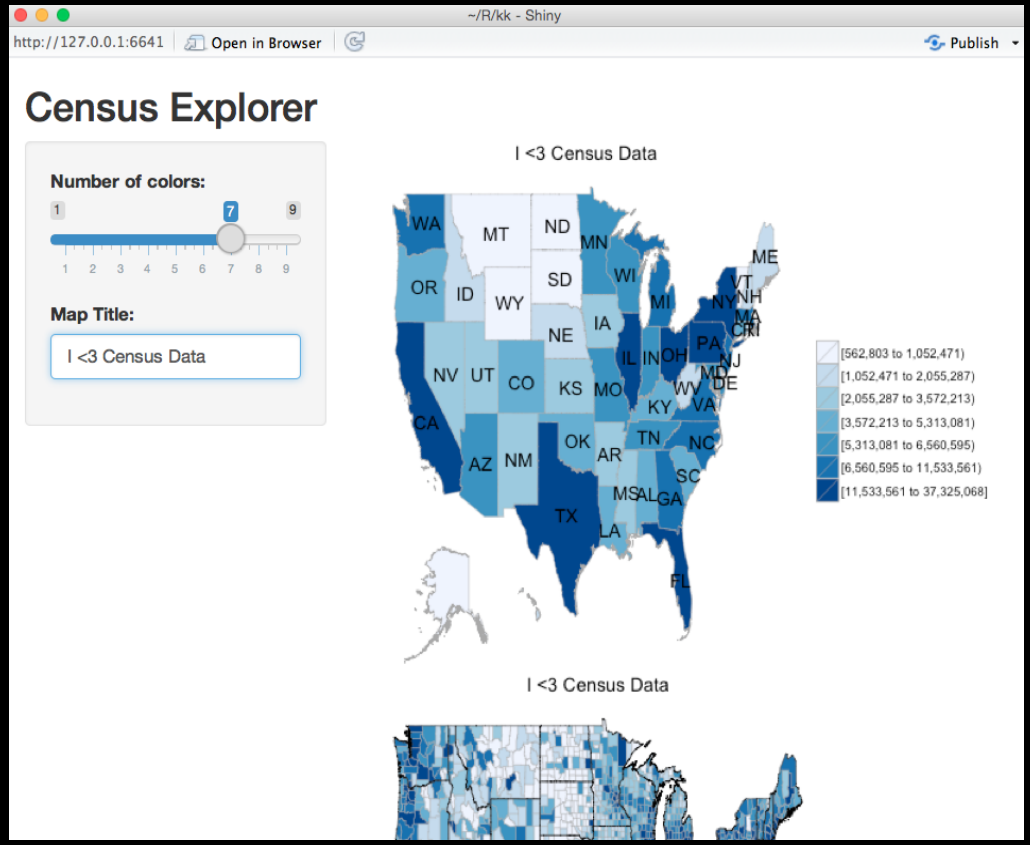
Exercise: Slider for County Map



Exercise: Let users add a title

UI hint: ?textInput

Server hint: ?state_choropleth



My Solution

ui.R

```
# Sidebar with a slider input for number of colors
sidebarLayout(
  sidebarPanel(
    sliderInput("num_colors",
                "Number of colors:",
                min = 1,
                max = 9,
                value = 7),
    textInput("title",
              "Map Title:")
```

server.R

```
11 shinyServer(function(input, output) {
12
13   output$distPlot <- renderPlot({
14
15     data(df_pop_state)
16     state_choropleth(df_pop_state,
17                      num_colors = input$num_colors,
18                      title      = input$title)
19
20   })
```

Part 4

Multiple Demographics

Demographic Data

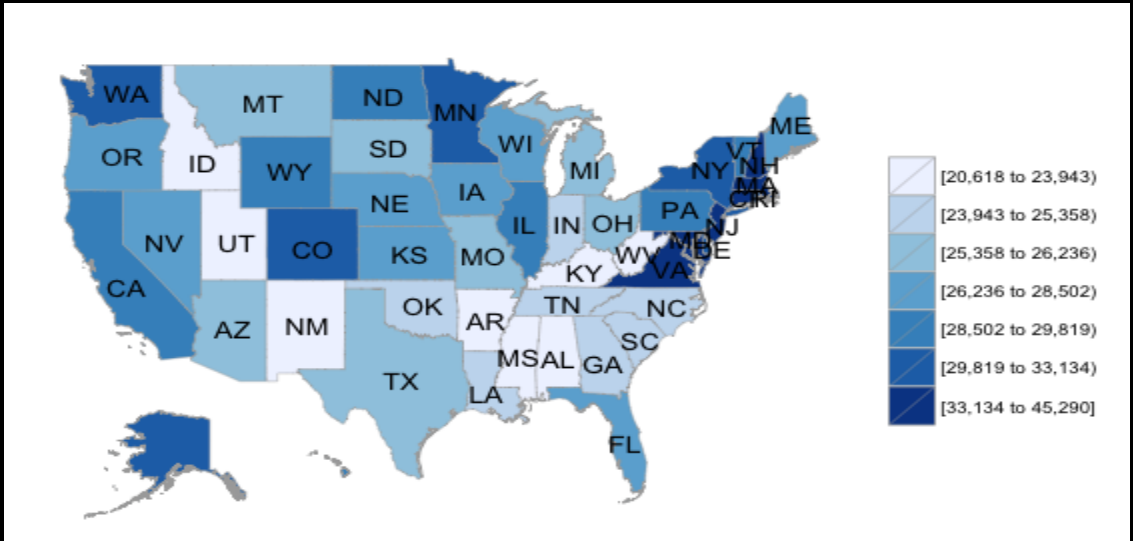
```
> data(df_state_demographics)
```

```
> colnames(df_state_demographics)
[1] "region" "total_population" "percent_white" "percent_black"
"percent_asian" "percent_hispanic" "per_capita_income" "median_rent"
"median_age"
```

```
> df_state_demographics[1:4, 1:4]
    region total_population percent_white percent_black
1  alabama          4799277            67           26
2   alaska           720316            63            3
3  arizona          6479703            57            4
4 arkansas          2933369            74           15
```

Demographic Maps

```
df_state_demographics$value =
    df_state_demographics$per_capita_income
state_choropleth(df_state_demographics)
```

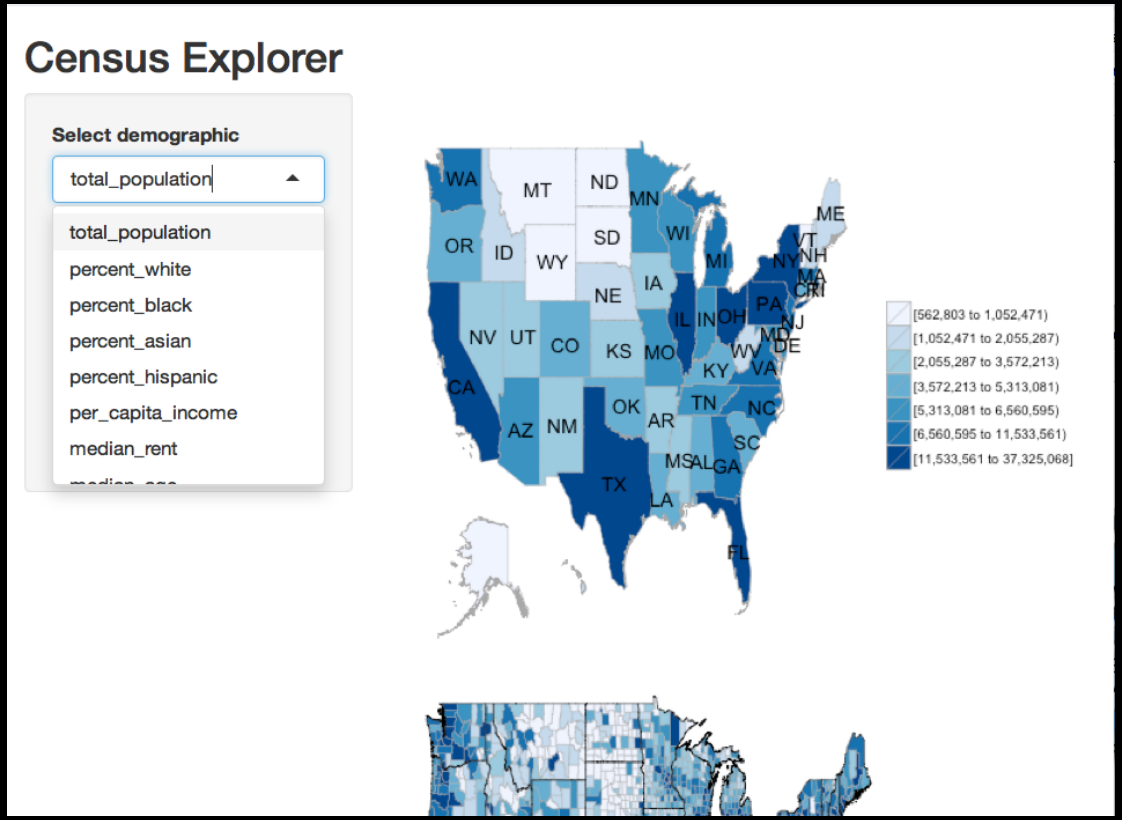


ui.R - Dropdown

```
4  data(df_state_demographics, package="choroplethr")
5  demographic_choices = colnames(df_state_demographics)[2:ncol(df_state_demographics)]
```

```
12   sidebarLayout(
13     sidebarPanel(
14       selectInput("demographic",
15                   label = "Select demographic",
16                   choices = demographic_choices,
17                   selected = "total_population"),
```

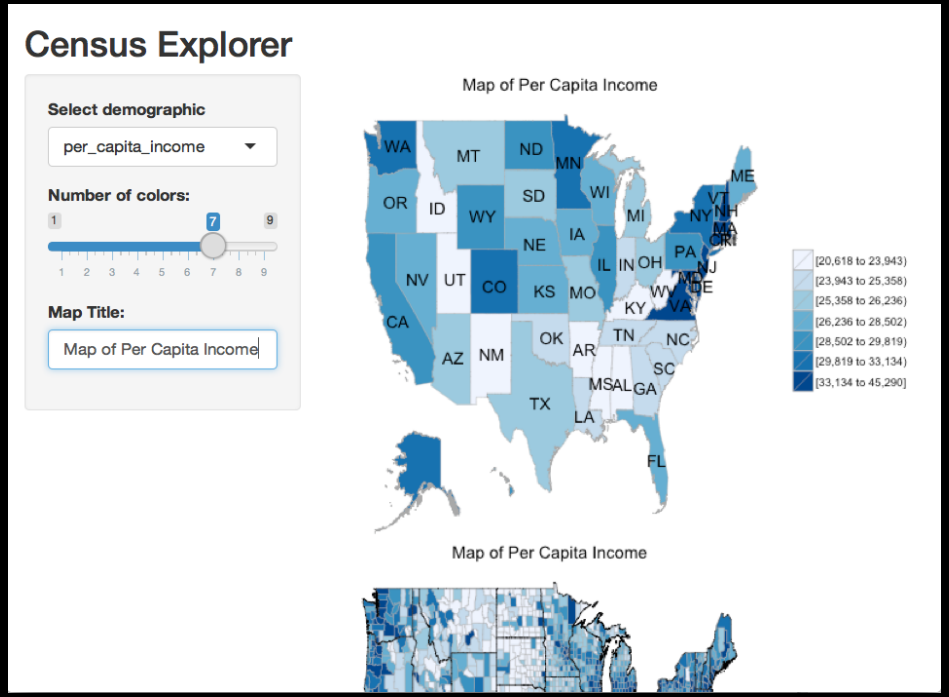
Result


Census Explorer
Select demographic
total_population
total_population
percent_white
percent_black
percent_asian
percent_hispanic
per_capita_income
median_rent
WA
MT
ND
MN
OR
ID
WY
SD
WI
MI
NY
VT
NH
ME
MA
RI
NE
IA
PA
NJ
NV
UT
CO
KS
MO
IL
IN
OH
MD
DE
WV
KY
VA
CA
AZ
NM
OK
AR
TN
NC
SC
MS
AL
GA
TX
LA
FL
[562,803 to 1,052,471)
[1,052,471 to 2,055,287)
[2,055,287 to 3,572,213)
[3,572,213 to 5,313,081)
[5,313,081 to 6,560,595)
[6,560,595 to 11,533,561)
[11,533,561 to 37,325,068]

server.R

```
shinyServer(function(input, output) {

  output$distPlot <- renderPlot({

    data(df_state_demographics)
    df_state_demographics$value  = df_state_demographics[, input$demographic]
    state_choropleth(df_state_demographics,
                     num_colors = input$num_colors,
                     title      = input$title)
  })
```

Result


Census Explorer
Select demographic
per_capita_income
Number of colors:
1
7
9
1 2 3 4 5 6 7 8 9
Map Title:
Map of Per Capita Income
Map of Per Capita Income
WA
MT
ND
MN
OR
ID
WY
SD
WI
MI
NY
VT
ME
NH
NE
IA
IL
IN
OH
PA
NJ
NV
UT
CO
KS
MO
KY
WV
MD
DE
VA
CA
OK
TN
NC
AZ
NM
AR
SC
MS
AL
GA
TX
LA
FL
[20,618 to 23,943)
[23,943 to 25,358)
[25,358 to 26,236)
[26,236 to 28,502)
[28,502 to 29,819)
[29,819 to 33,134)
[33,134 to 45,290]
Map of Per Capita Income

Exercise

Multiple demographics for County Map

Part 5

Publish

Press the Blue Button

Requires an account on ShinyApps.io (free)