

Building a Body Mass Index (BMI) Calculator in R

- This project involves building a BMI calculator; again using the Shiny Web App framework
- BMI?
 - This is computed by -> **BMI = Weight(kg) / Height (m squared)**
 - Some BMI background info.:

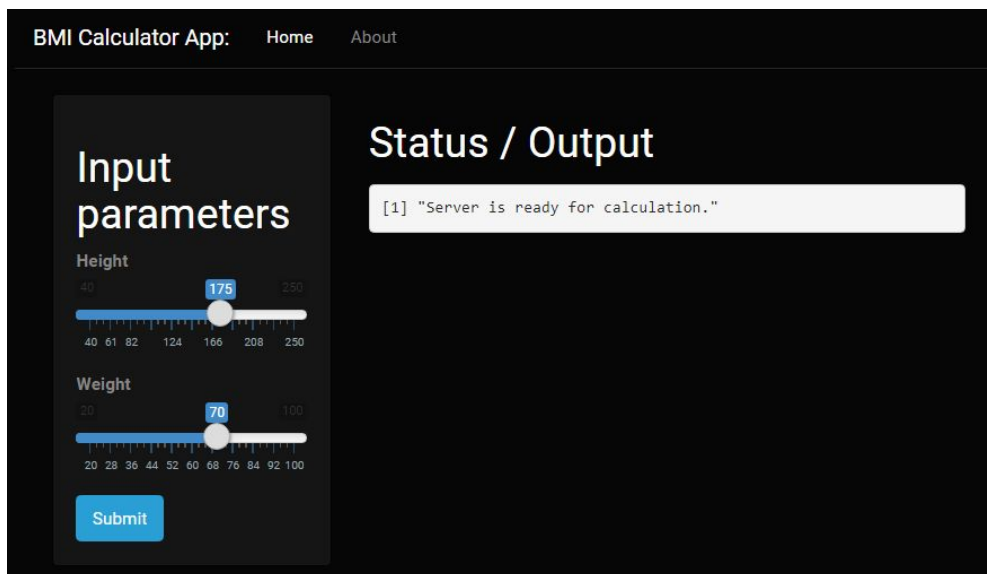
BMI	Weight Status
Below 18.5	Underweight
18.5 - 24.9	Normal or Healthy Weight
25 - 29.9	Overweight
30.0 and Above	Obese

- For more background info. regarding BMI, look at the references on the last page
- This web application will take height and weight as inputs towards the calculation of BMI
 - Specifically for those aged 20 and above

*** **Note:** Ensure that all files are located within the same directory / folder

- Specifically the code and about file should be within the same location; this will prevent error when the code / app is run

View of the BMI Calculator App

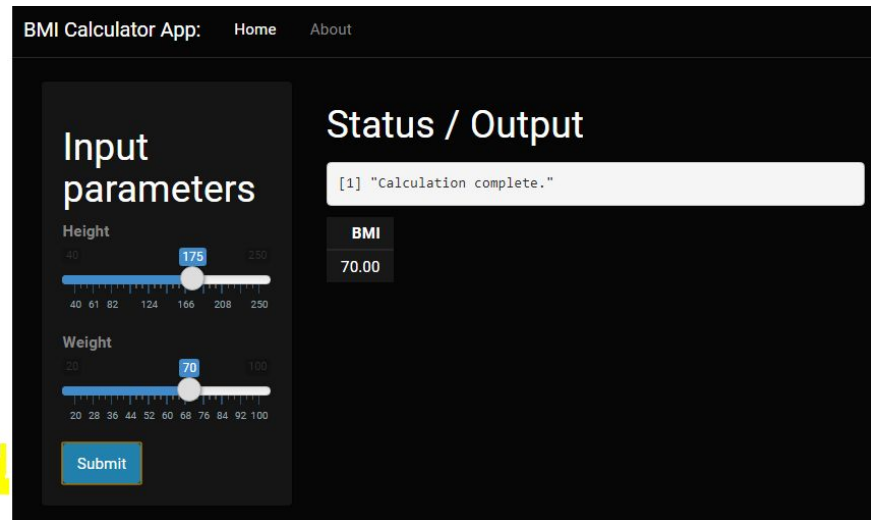


- **Note:** this is a BMI calculator for individuals aged 20 and above

- See the references within the 'About' tab for calculation regarding the BMI for those aged below 20 years old

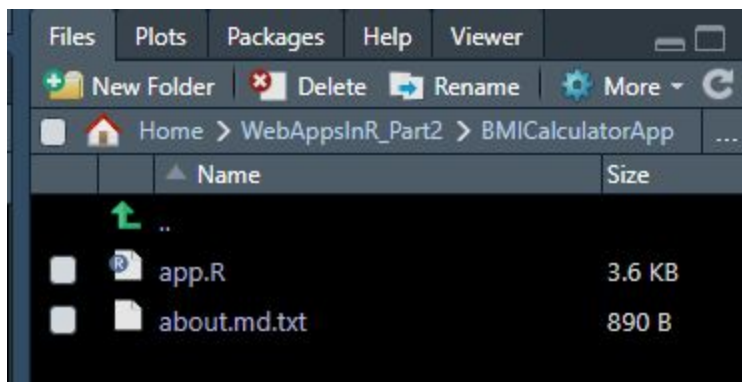
- The rough draft / initial draft of the 'About' tab is linked to a *txt* file ('*about.md.txt*')
 -

- This 'about' file can also be saved as an R markdown file; (doesn't really matter; i.e. can save this file as an *r markdown* file or *txt* file)
- Main syntax characters used:
 - ****Body Mass Index (BMI)**** = 2 asterisks; bolds text
 - **#### About this BMI Calculator** = four hashtags; level 4 header font / boldness / recall h4 tag in HTML (<h4>...</h4>)
 - **> BMI = kg/m^2** = greater than symbol; light grey bar to the left; indicates there is an equation
 - ***BMI Calculator*** = one asterisk; character will be in italics
 - **[Body Mass Index (BMI)]** = brackets; text you want to replace a link with when shown on the app; IOW text that will direct you to a certain link
 - **(https://www.cdc.gov/healthyweight/assessing/bmi/index.html)** = parenthesis / round brackets; the actual link / URL
- View of app after clicking on 'Submit' to calculate the BMI



- See the uploaded images for more

BMI App Code (File: BMIapp.r)



- **Recall:** slider input with lowercase letter is the ID

```

60     mainPanel(
61       tags$label(h3('Status / Output')), # Panel to the right.
62       # Status / Output text box.
63       verbatimTextOutput('contents'),
64       # Contains the contents ID; This is from the output.
65       tableOutput('tabledata') # Results Table.
66     ) # mainPanel()
67

```

- The 'contents' is the ID from the server function

```

103 # Status / Output Text Box.
104 output$contents <- renderPrint({
105   if (input$submitbutton > 0) {
106     isolate("Calculation complete.")
107   } else {
108     return("Server is ready for calculation.")
109   }
110 })
111

```

```

60 mainPanel(
61   tags$label(h3('Status / Output')), # Panel to the right.
62   # Status / Output text box.
63   verbatimTextOutput('contents'),
64   # Contains the contents ID; This is from the output.
65   tableOutput('tabledata') # Results Table.
66 ) # mainPanel()
67

```

- Similarly, 'tabledata' is the ID from the server function as well

```

114 # Prediction results table.
115 output$tabledata <- renderTable({
116   if (input$submitbutton > 0) {
117     isolate(datasetInput())
118   }
119 })
120
121 }
122

```

- Recap of the input data flow

- We have "height" and "weight" as input parameters
 - Thus, we have `input$height` and `input$weight`

```

94 # Input data.
95 datasetInput <- reactive({
96
97   bmi <- input$weight / (input$height/100) * (input$height/100)
98   bmi <- data.frame(bmi)
99   names(bmi) <- "BMI"
100   print(bmi)
101
102 })
103
104

```

- So, after changing the slider values to the values of your preference, and `input$height` and `input$weight` values will then go to the server function
 - (shown above)
- Calculation of the BMI
 - Reason for / 100 is due to cm to m conversion
 - **Note:** Want squared height value

- Recall the equation stated in the beginning; will divide weight by height in order to get the BMI value

```

94     # Input data.
95     datasetInput <- reactive({
96
97         bmi <- input$weight / (input$height/100) * (input$height/100)
98         bmi <- data.frame(bmi)
99         names(bmi) <- "BMI"
100        print(bmi)
101
102
103    })
104

```

- Will also encapsulate the 'bmi' value inside a dataframe, so that we can display it in the final output below in the 'output\$contents'

```

105     # Status / Output Text Box.
106     output$contents <- renderPrint({
107         if (input$submitbutton > 0) {
108             isolate("Calculation complete.")
109         } else {
110             return("Server is ready for calculation.")
111         }
112     })
113

```

- **output\$contents** displays the calculation status
- It will show 1 of 2 status statements shown above
- This will be modified by the 'Submit' button; IOW the status that will be shown is dependent on the button itself; whether or not it will be selected
- **output\$tabledata** displays the calculated BMI

```

114     # Prediction results table.
115     output$tabledata <- renderTable({
116         if (input$submitbutton > 0) {
117             isolate(datasetInput())
118         }
119     })
120
121 }
122

```

- The result from the 'datasetInput()' will be the computed BMI value

```

94 # Input data.
95 datasetInput <- reactive({
96
97     bmi <- input$weight / (input$height/100) * (input$height/100)
98     bmi <- data.frame(bmi)
99     names(bmi) <- "BMI"
100     print(bmi)
101
102
103 })
104

```

- Specifically `print(bmi)`

Summary:

- This web app will take 2 input parameters (height and weight).
 - `input$height` & `input$weight`
- And upon clicking on the 'Submit' button, it will be sent to the *server* function; into the `bmi` calculator function
 - This will return the BMI value
 - Then we put the BMI value into a dataframe and print it out
 - This BMI value being printed out is part of the `datasetInput` variable
 - And this is called within the `renderTable` function of the `output$tabledata`
 - This `output$tabledata` will go to the mainPanel to be displayed in the `tableOutput`

References

<https://www.youtube.com/watch?v=9EQ6cwBQpvo>

<https://rstudio.github.io/shinythemes/>

https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm

https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html