

Lab 4 Assignment (HW)

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1. Read chapter 5 from “Advanced R, 2nd ed.” H. Wickham (available online).

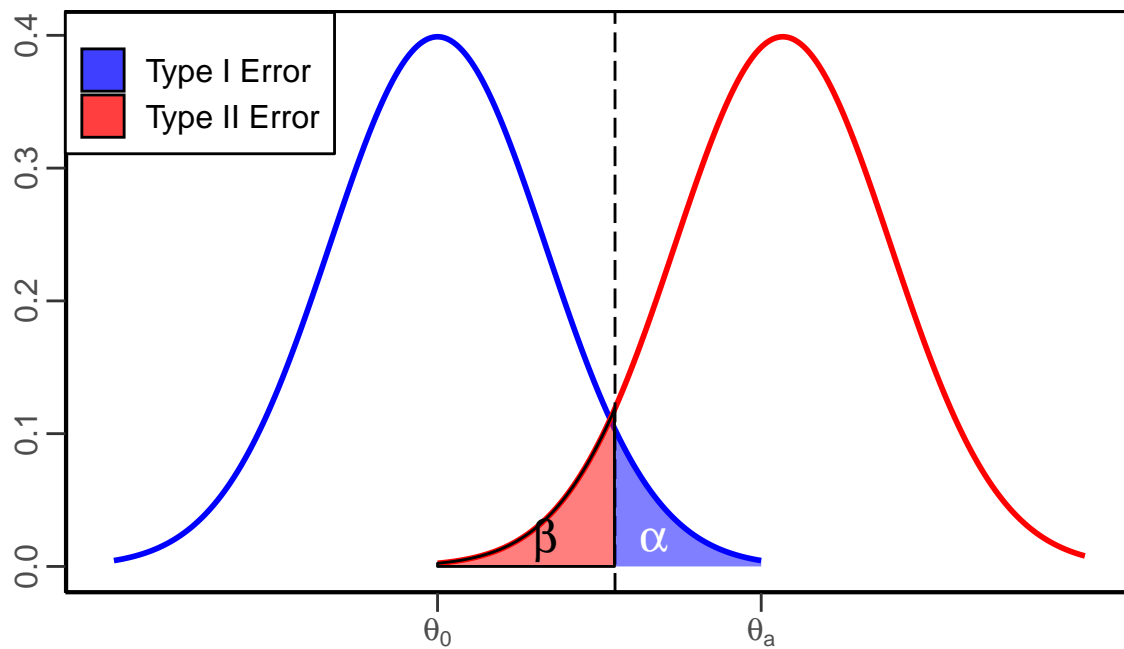
Completed!

2. Create a Github repository Lab4 (files with R code for the assignment should be added to this repository)
3. Write the R code using ggplot function to recreate the graph from Lecture 8 notes

```
x <- seq(-3,3, by = 0.01)
df<- as.data.frame(x)
df1 <-mutate(df, y = dnorm(x))

x2 <- seq(0,6, by = 0.01)
dfa <- as.data.frame(x2)
df2<- mutate(dfa, y2 = dnorm(x2, mean = 3.2))

ggplot() +
  geom_line(data = df1, aes(x = x, y = y),color = "blue",
            size = 1) +
  geom_line(data = df2, aes(x = x2, y = y2),
            color = "red", size = 1) +
  geom_vline(aes(xintercept = qnorm(0.95)),
            linetype = "longdash") +
  geom_ribbon(data = df1[df1$x > qnorm(0.95), ],
            aes(x, ymax = y, ymin = 0,
                fill = "blue"), alpha=0.5) +
  geom_ribbon(data = df2[df2$x2 < qnorm(0.95), ],
            aes(x2, ymax = y2, ymin = 0,
                fill = "red"), color = "black",
            alpha=0.5) +
  annotate("text", label = "beta", parse =TRUE,
            size = 6, x = 1, y = 0.02) +
  annotate("text", label = "alpha", parse =TRUE,
            size = 6, x = 2, y = 0.02, color = "white") +
  scale_x_continuous(breaks = c(0,3),
                    labels = c(expression(theta["0"]), expression(theta["a"]))) +
  theme_classic() +
  labs(x=NULL, y=NULL) +
  theme(legend.position = c(0.126, 0.875),
        legend.background = element_rect(color = "black"),
        panel.background = element_rect(colour = "black",
                                          size=1)) +
  scale_fill_manual(values = c("blue", "red"),
                    labels = c("Type I Error", "Type II Error")) +
  guides(fill=guide_legend(title=NULL)) +
  theme(text = element_text(size=15)) +
  theme(axis.text.y= element_text(angle = 90, hjust = .5)) +
  theme(axis.ticks.length = unit(0.25, "cm"))
```



4. Implement a function that will check if a given positive integer is a prime number.

```
prime.check <- function(n) {
  if (n <= 1) {
    return(FALSE)
  } else if (n <= 3) {
    return(TRUE)
  } else if (n >= 4) {
    for(i in 2:(n-1)) {
      if (n %% i == 0) {
        return(FALSE)
      }
    }
    return(TRUE)
  }
}
```

```
prime.check(1)
```

```
## [1] FALSE
```

```
prime.check(2)
```

```
## [1] TRUE
```

```
prime.check(3)
```

```
## [1] TRUE
```

```
prime.check(24)
```

```
## [1] FALSE
```

```
prime.check(57)
```

```
## [1] TRUE
```