

# Exercise 5: Functions and Loops

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```
national_0 <- read.csv("/Users/katrinaqiyaowang/Desktop/R1/Week_5_Materials/national.csv")
```

## Functions

1. Create a function for the mean, median, and standard deviation.

```
stats<- function(x, na.rm=FALSE){  
  n <- length(x)  
  mean <- (1/n)*sum(x)  
  sd <-sqrt(sum((x - mean)^2) / (n - 1))  
  meansd <- c(mean,sd)  
  return(meansd)  
}
```

```
median <- function(x, na.rm=FALSE){  
  s <- sort(x)  
  n <- length(x)  
  md <- ifelse(n%%2==1,s[(n+1)/2],mean(s[n/2+0:1]))  
  return(md)  
}
```

2. Create a function that finds the mean and excludes the lowest and highest value.

```
meanrange <- function(x, na.rm=FALSE){  
  n <- length(x)  
  meanr <- (1/n)*(sum(x)-max(x)-min(x))  
  return(meanr)  
}
```

3. Apply the functions to the Christianity variables.

```
chris <- national_0[c(4:9)]  
lapply(chris,stats)  
lapply(chris,median)  
lapply(chris,meanrange)
```

4. Write a function that lists all the unique years with more than 300,000 Christians in total.

```
library(dplyr)  
yearchris <- national_0[c(1,9)]  
year <- function(x){  
  yr1 <- ifelse(x>300000,yearchris$year[x],NA)  
  yr2 <- unique(yr1)  
  return(yr2)  
}
```

```
}  
lapply(yearchris$christianity_all,year)
```

## Loops/apply

1. Write a loop to find how many variables there are per observation.
2. Write a loop to find the mean number of Protestant Christians in each country (i.e., the state column). Then use an apply family function to do the same.

?

3. Check the column type for each variable.

```
type <- function(x){  
  types <- typeof(x)  
  return(types)  
}  
lapply(national_0,type)
```