R Code

```r

############ Relational operators ########################

# Example 1
a <- 10
b <- 20

print(a > b)
print(a < b)
print(a == b)
print(a != b)

#example 2

10 > 5

3 < 2

6 >= 6

4 <= 7

# example 3

x <- c(2, 5, 8, 10)

x > 6

# example 4
x <- c(3, 7, 12, 15)

x <= 10


###############Logical Operators#############################

# And (&)
#1
x <- 8

x > 5 & x < 10

#2
x <- 15
x < 10 & x > 20

#3
x <- 10
y <- 20

```

```r
(x == 10) & (y == 20)

#4
x <- 1:6
(x > 2) & (x < 5)


# OR (|)

#1
x <- 8

x > 10 | x == 8

#2
x <- 1:6
(x > 2) | (x < 5)


# NOT (!)

x <- 8

!(x == 8)

x <- 10
!(x > 5)

x <- c(5, 12, 18, 3, 25)

!(x > 10)


# Missing data handling in R
# In R missing values are represnted by "NA"


#Identify missing values

x <- c(10, 20, NA, 40, NA, 60)
is.na(x)

# Count missing values
x <- c(10, 20, NA, 40, NA, 60)
sum(is.na(x))

#Remove missing values
x <- c(10, 20, NA, 40, NA, 60)
na.omit(x)

#Replace missing values with mean
x <- c(10, 20, NA, 40, NA, 60)

x[is.na(x)] <- mean(x, na.rm = TRUE)
```

```r
x


############Conditional Execution #################

# if condition

# Example 1
#1
x <- 5

if(x > 0){
  print("Positive number")
}

# if-else conditional execution
#1
x <- -8

if(x > 0){
  print("Positive")
} else {
  print("Negative or Zero")
}

#2
x <- 5
if(x == 3) {
  x <- x - 1
} else {
  x <- 2 * x
}
x

#3
n<-11
if(n %% 2 == 0){
  print("Even number")
} else {
  print("Odd number")
}


# Conditional execution using ifelse()

#1
x <- 1:10
print(x)

result <- ifelse(x < 6, x^2, x + 1)
print(result)


#2
```

```r
x <- c(-5, 10, 0, -2, 8)

ifelse(x > 0, "Positive", "Non-Positive")

#3

x <- 1:10

ifelse(x %% 2 == 0, "Even", "Odd")

#4
amount <- c(500, 1200, 800, 2500)

discount <- ifelse(amount >= 1000, 0.10 * amount, 0)
discount

#5

x <- c(10, NA, 30, NA, 50)

ifelse(is.na(x), 0, x)


########################Practice Questions#################################

########################Practice Set 1#####################################

#Missing Data + Relational + Logical Operators

#Q1
x <- c(12, NA, 25, 18, NA, 30, 10, NA)
Tasks:

#Display x
#Find which elements are NA
#Count total missing values
#Remove missing values
#Replace missing values with mean of available values
#Replace missing values with 0
#Print the updated vector after replacement

#Q2

v <- c(5, 12, 18, 3, 25, 8, 15)
#Find values greater than 10
#Find values less than 10
#Find values between 10 and 20 (inclusive)
#Find positions where values are greater than 10
#Find positions where values are even

#Q3
x <- 10
y <- 20
#Evaluate: (x == 10) & (y == 20)
```

```r
#Evaluate: (x == 5) & (y == 20)
#Evaluate: (x == 10) | (y == 5)
#Evaluate: (x > 5) & (y < 10)
#Evaluate: !(x == 10)
#Evaluate: !(y == 10)

#Q4
z <- c(2, 6, 9, 12, 15, 18, 21, 25)
#Find values greater than 10 AND divisible by 3
#Find values less than 10 OR divisible by 5
#Find values NOT divisible by 2
#Count how many values are greater than 15
```