Lecture Notes on Conditional Statements in R Programming

Introduction

Conditional statements in R are used to execute different blocks of code based on certain conditions. These statements allow for decision-making in R scripts and functions.

Types of Conditional Statements

R provides the following conditional statements:

1. if statement
2. if...else statement
3. if...else if...else statement
4. switch statement

1. if Statement

The if statement executes a block of code only if a specified condition is TRUE.

Syntax:

```
if (condition) {
  # Code to execute if condition is TRUE
}
```

Example:

```
x <- 10
if (x > 5) {
  print("x is greater than 5")
}
```

2. if...else Statement

The if...else statement provides an alternative block of code to execute when the condition is FALSE.

Syntax:

```
if (condition) {
  # Code to execute if condition is TRUE
} else {
  # Code to execute if condition is FALSE
}
```

Example:

```
x <- 3
if (x > 5) {
  print("x is greater than 5")
} else {
```

```
  print("x is not greater than 5")
}
```

3. if...else if...else Statement

This statement is used when multiple conditions need to be checked sequentially.

Syntax:

```
if (condition1) {
  # Code to execute if condition1 is TRUE
} else if (condition2) {
  # Code to execute if condition2 is TRUE
} else {
  # Code to execute if all conditions are FALSE
}
```

Example:

```
x <- 10
if (x < 0) {
  print("x is negative")
} else if (x == 0) {
  print("x is zero")
} else {
  print("x is positive")
}
```

Logical Operators in Conditional Statements

Logical operators are often used in conditions to combine multiple conditions:

- && (AND)
- || (OR)
- ! (NOT)

Example:

```
x <- 10
y <- 20
if (x > 5 && y > 15) {
  print("Both conditions are TRUE")
}
```

Practice Problems

1. Write an R script that checks if a number is even or odd.

2. Create an if...else if...else statement to categorize numbers as negative, zero, or positive.
3. Write an R script that takes an input temperature in Celsius and prints whether it is "Cold" (below 10), "Moderate" (10-25), or "Hot" (above 25).
4. Create an R script that asks for a user's age and determines if they are a minor (under 18), an adult (18-60), or a senior (above 60).
5. Implement a program using if...else to check whether a given year is a leap year.
6. Develop a script where the user enters a grade (A, B, C, D, F), and the script prints the corresponding remark (Excellent, Good, Average, Poor, Fail).