Problem Set 1

Introduction to R | University of Oxford Sociology

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Complete the following questions in R within a Quarto document.

Exercise 1: Assignment, Arithmetic, Logical Expressions

1a

Assign `x` and `y` to take values 3 and 4.

1b

Create a new variable `z` as the product of `x` and `y`.

1c

Calculate the square of 3 and assign it to a variable called `three_squared`.

1d

Write a logical expression to check if `three_squared` is greater than 10. Discuss scenarios where such a filter could be useful.

1e

Write a logical expression to test whether `three_squared` is not greater than 10. Use the negate (`!`) operator.

Exercise 2: Sequencing

2a

Generate vectors containing the numbers 100 to 105 using three different methods (`c()`, `seq()`, `:`). Discuss the convenience of each method.

2b

Generate a sequence of all even numbers between 0 and 100.

2c

Create a descending sequence from 100 to 1 and assign it to a variable.

Exercise 3: Data Generation and Basic Statistical Analysis

3a

Generate a sample of 100 observations from a normal distribution with a mean of 10 and a standard deviation of 2. Use the `rnorm()` function.

3b

Calculate the mean of this generated sample. Relate this to the population mean.

3c

Calculate the difference between the sample mean and the population mean. Discuss the reason for the discrepancy.

3d

Repeat steps 1–3 with a sample size of 10,000. Discuss whether the difference between the sample and population mean decreased and its implications.