Practical Activity 1

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2024-10-30

R Markdown

```r
# 1. Distance between two points
x1 <- 2
y1 <- 5
x2 <- 7
y2 <- 8

distance <- sqrt((x2 - x1)^2 + (y2 - y1)^2)
print(distance)
```

```
## [1] 5.830952
```

```r
# 2. Expression evaluation
x <- 1
expression_result <- 5 + 4 * (x - 2 / x)
print(expression_result)
```

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

```r
# 3. Conditional expression and calculations
x<-7.5
y<-3

  # Arithmetic operations
  sum_xy <- x + y
  product_xy <- x * y

  # Relational comparisons
  x>y
```

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

```r
  is_x_less_than_or_equal_to_y <- x <= y

  # Mathematical functions
  sqrt_x <- sqrt(abs(x))  # Handle negative numbers
  log_x <- log(abs(x))
  exp_x <- exp(x)

  print(sum_xy)
```

```
## [1] 10.5
```

```r
  print(product_xy)
```

```
## [1] 22.5
```

```r
  print(x>y)
```

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

```r
  print(is_x_less_than_or_equal_to_y)
```

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

```r
  print(sqrt_x)
```

```
## [1] 2.738613
```

```r
  print(log_x)
```

```
## [1] 2.014903
```

```r
  print(exp_x)
```

```
## [1] 1808.042
```

```r
# 4. Rep function examples
# (a) Repeating elements with specified times
result_a <- rep(c(2, 3, 5), times = 4:2)
print(result_a)
```

```
## [1] 2 2 2 2 3 3 3 5 5
```

```r
# (b) Repeating each element a fixed number of times
result_b <- rep(c(4, 3, 2), each = 4)
print(result_b)
```

```
##  [1] 4 4 4 4 3 3 3 3 2 2 2 2
```

```r
# (c) Creating a vector of a specific length
result_c <- rep(c(3, 1, 1, 5, 7), length.out = 50)
print(result_c)
```

```
##  [1] 3 1 1 5 7 3 1 1 5 7 3 1 1 5 7 3 1 1 5 7 3 1 1 5 7 3 1 1 5 7 3 1 1 5 7
3 1 1
## [39] 5 7 3 1 1 5 7 3 1 1 5 7
```

```r
# (d) Repeating each element a fixed number of times (alternative method)
result_d <- c(rep(3, 4), rep(1, 4), rep(1, 4), rep(5, 4), rep(7, 4))
print(result_d)
```

```
##  [1] 3 3 3 3 1 1 1 1 1 1 1 1 5 5 5 5 7 7 7 7
```

```r
# 5. Interest calculation
# (a) Interest on $1000 at 7.5% for 5 years
```

```r
interest_7_5 <- 1000 * ((1 + 0.075)^5 - 1)
print(interest_7_5)
```

```
## [1] 435.6293
```

```r
# (b) Interest on $1000 at 3.5% for 5 years
interest_3_5 <- 1000 * ((1 + 0.035)^5 - 1)
print(interest_3_5)
```

```
## [1] 187.6863
```

```r
# (c) Interest for 10 years at 7.5%
interest_seq <- 1000 * ((1 + 0.075)^seq(1, 10) - 1)
print(interest_seq)
```

```
##  [1]   75.0000  155.6250  242.2969  335.4691  435.6293  543.3015  659.0491
##  [8]  783.4778  917.2387 1061.0316
```