Challenge-5

Deng Chunxi

2023-09-13

Questions

Question-1: Local Variable Shadowing

Create an R function that defines a global variable called `x` with a value of 5. Inside the function, declare a local variable also named `x` with a value of 10. Print the value of `x` both inside and outside the function to demonstrate shadowing.

Solutions:

```
# Enter code here
x <- 5

shadowing_example <- function() {
x <- 10
  print(paste("Inside function: x =", x))
}
shadowing_example()
```

```
## [1] "Inside function: x = 10"
```

```
print(paste("Outside function: x =", x))
```

```
## [1] "Outside function: x = 5"
```

Question-2: Modify Global Variable

Create an R function that takes an argument and adds it to a global variable called `total`. Call the function multiple times with different arguments to accumulate the values in `total`.

Solutions:

```
# Enter code here
'total' <-0
add_to_total <- function(value) {
  total <<- total + value
}
add_to_total(5)
add_to_total(10)
add_to_total(7)
print(total)
```

```
## [1] 22
```

Question-3: Global and Local Interaction

Write an R program that includes a global variable `total` with an initial value of 100. Create a function that takes an argument, adds it to `total`, and returns the updated `total`. Demonstrate how this function interacts with the global variable.

Solutions:

```
# Enter code here
'total' <- 100
add_to_total_and_return <- function(value) {
  total <<- total + value
  return(total)
}
print(paste("Initial 'total' value:", total))
```

```
## [1] "Initial 'total' value: 100"
```

```
new_total <- add_to_total_and_return(20)
print(paste("After adding 20:", new_total))
```

```
## [1] "After adding 20: 120"
```

```
new_total <- add_to_total_and_return(30)
print(paste("After adding 30:", new_total))
```

```
## [1] "After adding 30: 150"
```

```
new_total <- add_to_total_and_return(-10)
print(paste("After subtracting 10:", new_total))
```

```
## [1] "After subtracting 10: 140"
```

Question-4: Nested Functions

Define a function `outer_function` that declares a local variable `x` with a value of 5. Inside `outer_function`, define another function `inner_function` that prints the value of `x`. Call both functions to show how the inner function accesses the variable from the outer function's scope.

Solutions:

```
# Enter code here
outer_function <- function() {
  x <- 5
  inner_function <- function() {
    print(paste("Value of 'x' inside inner_function:", x))
  }
  inner_function()
}

outer_function()
```

```
## [1] "Value of 'x' inside inner_function: 5"
```

Question-5: Meme Generator Function

Create a function that takes a text input and generates a humorous meme with the text overlaid on an image of your choice. You can use the `magick` package for image manipulation. You can find more details about the commands offered by the package, with some examples of annotating images here: https://cran.r-project.org/web/packages/magick/vignettes/intro.html (https://cran.r-project.org/web/packages/magick/vignettes/intro.html)

Solutions:

```
# Enter code here
library(magick)
create_meme <- function(path, text) {
  think <- image_read(path)
  image_annotate(think, text, size = 100, color = "red")
}

create_meme("https://assets.entrepreneur.com/content/3x2/2000/20180703190744-rollsafe-meme.jpeg?format=pjeg&auto=webp&crop=16:9&width=675&height=380", "Wanna take NM2207? Think again.")
```

Question-6: Text Analysis Game

Develop a text analysis game in which the user inputs a sentence, and the R function provides statistics like the number of words, characters, and average word length. Reward the user with a “communication skill level” based on their input.

Solutions:

```
# Enter code here

text_analysis_game <- function() {

  sentence <- readline("Enter a sentence: ")

  words <- strsplit(sentence, "\\s+")
  num_words <- length(words[[1]])

  num_chars <- nchar(sentence)

  avg_word_length <- num_chars / num_words

  skill_level <- ifelse(
    avg_word_length > 6,
    "Excellent communicator",
    ifelse(
      avg_word_length > 4,
      "Good communicator",
      "Needs improvement"
    )
  )

  cat("Statistics:\n")
  cat("Number of words:", num_words, "\n")
  cat("Number of characters:", num_chars, "\n")
  cat("Average word length:", avg_word_length, "\n")
  cat("Communication skill level:", skill_level, "\n")
}

text_analysis_game()
```

```
## Enter a sentence:
## Statistics:
## Number of words: 0
## Number of characters: 0
## Average word length: NaN
## Communication skill level: NA
```