Challenge-5

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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
sprintf("The value assigned to x outside the function is %d",x)
```

```
## [1] "The value assigned to x outside the function is 5"
```

```
foo <- function(x = 10) {
x <- 3
 return(x+7)
}
foo(x = 4)
```

```
## [1] 10
```

```
sprintf("The final value of x after reassigning it to a different value inside the fu
nction is %d", x)
```

```
## [1] "The final value of x after reassigning it to a different value inside the fun
ction is 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(x) {
total <<- total + x
}
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 <- function(x) {
  total <<- total + x
  return(total)
}
result1 <- add_to_total(5)
result2 <- add_to_total(10)
print(result1)
```

```
## [1] 105
```

```
print(result2)
```

```
## [1] 115
```

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)
```

```
## Linking to ImageMagick 6.9.12.3
## Enabled features: cairo, fontconfig, freetype, heic, lcms, pango, raw, rsvg, webp
## Disabled features: fftw, ghostscript, x11
```

```
create_meme <- function(path, text) {

  tiger <- image_read(path)
  tiger <- image_scale(tiger, '400')

  image_annotate(tiger,
    text,
    size = 20,
    color = "black",
    font = "Arial",
    location = "+20+20"
  )
}

create_meme("tiger.png", "i like big tigers")
```

i like big tigers

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:

```
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
```