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:

```
x <- 5

xoo <- function(x) {
  x<-10
}

print(xoo())
```

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

```
print(x)
```

```
## [1] 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:

```
total <- 0
add_to_total <- function(x) {
  total <<- x+total
  return(total)
}

add_to_total(4)
```

```
## [1] 4
```

```
add_to_total(8)
```

```
## [1] 12
```

```
add_to_total(5)
```

```
## [1] 17
```

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:

```
total <- 100
add_to_total <- function(x) {
  total <<- x+total
  return(total)
}
add_to_total(50)
```

```
## [1] 150
```

```
add_to_total(3)
```

```
## [1] 153
```

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:

```
outer_function <-function(){
  x <- 5

  inner_function <- function() {
    cat("Value of x from inner_function:", x, "\n")
  }
  inner_function()
  cat("Value of x from outer_function:", x, "\n")
}

outer_function()
```

```
## Value of x from inner_function: 5
## Value of x from outer_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:

```
library(magick)
```

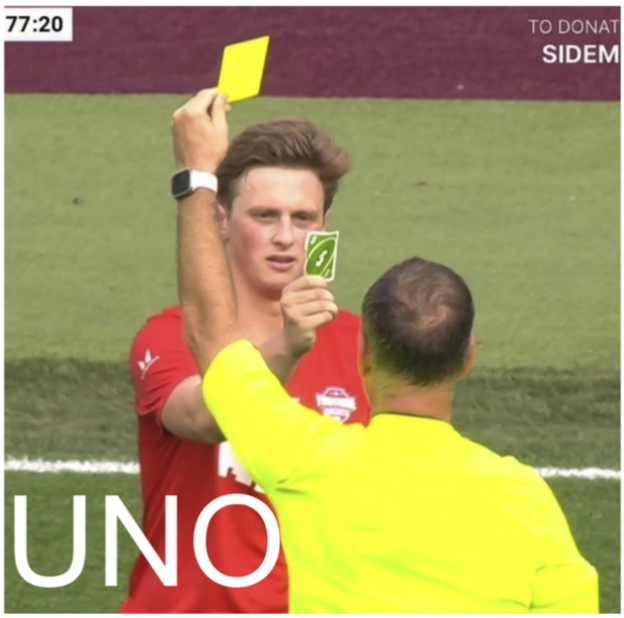
```
## Linking to ImageMagick 6.9.12.3
## Enabled features: cairo, fontconfig, freetype, heic, lcms, pango, raw, rsvg, webp
## Disabled features: fftw, ghostscript, x11
```

```
generate_meme <- function(text, image_path) {
  image<-image_read("IMG_0006.jpg") %>%

  image_annotate(text, size = 170, gravity = "southwest", color = "white")

  plot(image)
}

generate_meme("UNO")
```



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:

```
communication_game <- function() {
  sentence <- readline("")

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

  num_chars <- nchar(sentence)

  words <- strsplit(sentence, "\\s+")
  avg_word_length <- num_chars / nchar(words)

  cat("Number of words:", num_words, "\n")
  cat("Number of characters:", num_chars, "\n")
  cat("Average word length:", avg_word_length, "\n")

  skill_level <- ifelse(avg_word_length < 3, "beginner level",
                        ifelse(avg_word_length < 5, "average level", "expert level"))
  cat("Communication skill level:", skill_level, "\n")
}

communication_game()
```

```
##
## Number of words: 0
## Number of characters: 0
## Average word length: 0
## Communication skill level: beginner level
```