**In R programming,** you can create classes and objects using the S3, S4, or reference classes systems. The S3 system is the simplest and most commonly used for defining classes informally. Here's an example of how to create a simple class and instantiate objects from it using the S3 system:

# Define a simple class

create\_person <- function(name, age) {

person <- list(name = name, age = age)

class(person) <- "person"

return(person)

}

# Create an object of class 'person'

john <- create\_person("John", 30)

# Access object attributes

print(john$name) # Output: John

print(john$age) # Output: 30

let's create a class for representing geometric shapes, specifically rectangles:

# Define a class for rectangles

create\_rectangle <- function(width, height) {

rectangle <- list(width = width, height = height)

class(rectangle) <- "rectangle"

return(rectangle)

}

# Method to calculate area of rectangle

rectangle\_area <- function(rectangle) {

return(rectangle$width \* rectangle$height)

}

# Create an object of class 'rectangle'

my\_rectangle <- create\_rectangle(width = 5, height = 3)

# Access object attributes

print(my\_rectangle$width) # Output: 5

print(my\_rectangle$height) # Output: 3

# Calculate and print area of rectangle

print(rectangle\_area(my\_rectangle)) # Output: 15

Example-3

# Define a reference class for Car

Car <- setRefClass("Car",

fields = list(make = "character",

model = "character",

year = "numeric",

color = "character",

mileage = "numeric"),

methods = list(

drive = function(miles) {

cat(paste("Driving", miles, "miles...\n"))

self$mileage <- self$mileage + miles

},

honk = function() {

cat("Beep! Beep!\n")

}

)

)

# Create a new car object

my\_car <- Car$new(make = "Toyota", model = "Camry", year = 2020, color = "blue", mileage = 0)

# Access object fields

print(paste("Make:", my\_car$make))

print(paste("Model:", my\_car$model))

print(paste("Year:", my\_car$year))

print(paste("Color:", my\_car$color))

print(paste("Mileage:", my\_car$mileage))

# Drive the car and honk

my\_car$drive(100)

print(paste("Mileage after driving:", my\_car$mileage))

my\_car$honk()

Let's create a class to represent a basic student object using the S3 system:

# Define a function to create student objects

create\_student <- function(name, age, grade) {

student <- list(name = name, age = age, grade = grade)

class(student) <- "student"

return(student)

}

# Define a method to calculate a student's status based on their grade

calculate\_status <- function(student) {

if (student$grade >= 60) {

return("Passing")

} else {

return("Failing")

}

}

# Create a new student object

my\_student <- create\_student(name = "Alice", age = 18, grade = 75)

# Access object fields

print(paste("Name:", my\_student$name))

print(paste("Age:", my\_student$age))

print(paste("Grade:", my\_student$grade))

# Calculate and print student status

print(paste("Status:", calculate\_status(my\_student)))