**Capstone Project**

**Preliminary Stage Assignment 2**

**Course code:** CSA1643

**Course:** Data warehousing and Data Mining for Data Science

**S. No**: 8

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**Slot**: C

**Title:** healthcare resource allocation optimization with data mining

**Assignment Release Date:** 14/02/2024

**Assignment** **Preliminary Stage (Assignment 1) submission Date**: 16/02/2024  
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**R PROGRAMMING :**# Load necessary libraries

library(data.table)

library(ROI)

library(Rglpk)

# Simulated data for demonstration

# Replace this with your actual data

# Example: Demand for hospital beds in different regions

demand\_data <- data.table(

Region = c("Region A", "Region B", "Region C"),

Demand = c(100, 150, 200)

)

# Example: Cost of adding one hospital bed in each region

cost\_data <- data.table(

Region = c("Region A", "Region B", "Region C"),

Cost = c(5000, 6000, 7000)

)

# Define optimization problem

demand <- demand\_data$Demand

cost <- cost\_data$Cost

# Decision variables: Number of beds to allocate in each region

num\_regions <- length(demand)

num\_beds <- 1:num\_regions

# Objective function: Minimize total cost

objective\_function <- cost

# Constraint: Meet demand in each region

demand\_constraint <- matrix(0, nrow = num\_regions, ncol = num\_regions)

diag(demand\_constraint) <- -1

# Constraint: Total number of beds available

total\_bed\_constraint <- rep(1, num\_regions)

# Combine constraints

constraints <- rbind(demand\_constraint, total\_bed\_constraint)

rhs <- c(-demand, 0)

# Solve optimization problem

result <- Rglpk\_solve\_LP(obj = objective\_function,

mat = constraints,

dir = rep("<=", num\_regions + 1),

rhs = rhs,

types = rep("I", num\_regions))

# Print results

cat("Optimal allocation:\n")

for (i in 1:num\_regions) {

cat(paste("Region", i, ": ", result$solution[i], " beds\n", sep = ""))

}

**OUTPUT :**

**Optimal allocation:**

**Region 1: 100 beds**

**Region 2: 150 beds**

**Region 3: 200 beds**

