R version 4.4.2 (2024-10-31 ucrt) -- "Pile of Leaves"

Copyright (C) 2024 The R Foundation for Statistical Computing

Platform: x86\_64-w64-mingw32/x64

> x1 <- c(10, 15, 20, 21, 24, 14, 20, 19)

> is.vector(x1)

[1] TRUE

> is.data.frame(x1)

[1] FALSE

> set.seed(123)

> x2 <- sample(1:100, 10)

> x2

[1] 31 79 51 14 67 42 50 43 97 25

> x2

[1] 31 79 51 14 67 42 50 43 97 25

> x2 <- sample(1:100, 10)

> x2

[1] 90 91 69 99 57 92 9 93 72 26

> x3 <- runif(10)

> x3

[1] 0.28915974 0.14711365 0.96302423 0.90229905

[5] 0.69070528 0.79546742 0.02461368 0.47779597

[9] 0.75845954 0.21640794

> set.seed(123)

> x2 <- sample(1:100, 10)

> x2

[1] 31 79 51 14 67 42 50 43 97 25

> set.seed(1234)

> x2 <- sample(1:100, 10)

> x2

[1] 28 80 22 9 5 38 16 4 86 90

> set.seed(1234)

> x9 <- sample(1:100, 10)

> x9

[1] 28 80 22 9 5 38 16 4 86 90

> summary(x2)

Min. 1st Qu. Median Mean 3rd Qu. Max.

4.00 10.75 25.00 37.80 69.50 90.00

> sample(1:10, 8)

[1] 6 4 10 8 7 9 5 1

> sample(1:10, 8)

[1] 8 4 10 3 9 5 2 1

> sample(1:10, 8)

[1] 2 8 3 4 7 9 5 1

> sample(1:10, 8, replace=TRUE)

[1] 3 6 4 8 10 2 5 6

> table(sample(1:10, 8, replace=TRUE))

1 3 6 8 9

3 1 2 1 1

> sample(1:10, 8, replace=TRUE)

[1] 8 10 1 8 10 6 3 9

> table(sample(1:10, 8, replace=TRUE))

3 6 7 8 9 10

1 2 1 1 2 1

> sample(1:10, 8, replace=TRUE)

[1] 3 3 2 5 8 10 7 6

> table(sample(1:10, 8, replace=TRUE))

1 3 4 5 6 7 8 9

1 1 1 1 1 1 1 1

> sample(c("Apple", "Banana", "Mnago"), 2)

[1] "Mnago" "Banana"

> sample(c("Apple", "Banana", "Manago"), 2)

[1] "Manago" "Apple"

> sample(c("Apple", "Banana", "Mango"), 2)

[1] "Banana" "Mango"

> x3 <- runif(10)

> x3

[1] 0.9423607 0.4861354 0.2834595 0.2515457

[5] 0.5032552 0.4969662 0.3184458 0.9622228

[9] 0.6340994 0.1274334

> x3 <- runif(10)

> x3

[1] 0.4230470 0.9143169 0.4677923 0.9081691

[5] 0.5977433 0.6317428 0.8691583 0.5027498

[9] 0.9836351 0.3243860

> x3 <- runif(10)

> x3

[1] 0.48137495 0.35698708 0.62747768 0.74160019

[5] 0.56596682 0.98078651 0.57681274 0.43904205

[9] 0.22859970 0.08215807

> set.seed(0)

> x8 <-runif(10)

> x8

[1] 0.8966972 0.2655087 0.3721239 0.5728534

[5] 0.9082078 0.2016819 0.8983897 0.9446753

[9] 0.6607978 0.6291140

> set.seed(0)

> x8 <-runif(10)

> x8

[1] 0.8966972 0.2655087 0.3721239 0.5728534

[5] 0.9082078 0.2016819 0.8983897 0.9446753

[9] 0.6607978 0.6291140

> set.seed(0)

> x8 <-runif(10)

> x8

[1] 0.8966972 0.2655087 0.3721239 0.5728534

[5] 0.9082078 0.2016819 0.8983897 0.9446753

[9] 0.6607978 0.6291140

> help(sample)

> sample(x=c("Apple", "Banana", "Mango"), size= 2, prob=c(0.5,0.5, 0.0, 0.0))

Error in sample.int(length(x), size, replace, prob) :

incorrect number of probabilities

> sample(x=c("Apple", "Banana", "Mango"), size= 2, prob=c(0.5,0.5, 0.4, 0.2))

Error in sample.int(length(x), size, replace, prob) :

incorrect number of probabilities

> sample(x=c("Apple", "Banana", "Mango"), size= 2, prob=c(0.5,0.4, 0.1, 0.0))

Error in sample.int(length(x), size, replace, prob) :

incorrect number of probabilities

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Banana"

> x3 <- runif(10)

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Mango"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1))

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Banana" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Banana" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=TRUE)

[1] "Banana" "Banana"

> sample(1:10, 8, replace=TRUE)

[1] 4 10 9 7 6 9 8 9

> sample(1:10, 8, replace=TRUE)

[1] 7 8 6 10 7 3 10 6

> sample(1:10, 8, replace=TRUE)

[1] 8 2 2 6 6 1 3 3

> sample(1:10, 8, replace=TRUE)

[1] 8 6 7 6 8 7 1 4

> sample(1:10, 8, replace=TRUE)

[1] 8 9 9 7 4 7 6 1

> sample(1:10, 8, replace=TRUE)

[1] 5 6 1 9 7 7 3 6

> sample(1:10, 8, replace=TRUE)

[1] 2 10 10 7 3 2 10 1

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Mango" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Mango" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Apple" "Banana"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.5, 0.4, 0.1), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

Error in sample.int(length(x), size, replace, prob) :

incorrect number of probabilities

> sample(x = c("Apple", "Banana", "Mango"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

Error in sample.int(length(x), size, replace, prob) :

incorrect number of probabilities

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Banana" "Apple"

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Lichi" "Mango"

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Mango" "Lichi"

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Lichi" "Banana"

> sample(x = c("Apple", "Banana", "Mango", "Lichi"), size = 2, prob = c(0.25, 0.25, 0.25,0.25), replace=FALSE)

[1] "Lichi" "Banana"

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 25000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 40000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 25000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 10000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 25000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 10000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 25000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 10000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 40000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 25000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 25000 40000

> income=c(10000, 25000, 40000, 25000)

> household=c(10,5,2,4)

> sample(income, size=2, prob=household)

[1] 10000 25000

> source("D:/RProgramming/Class3/Class3(inClass).R")

> household/sum(household)

[1] 0.4761905 0.2380952 0.0952381 0.1904762

> x6 <- 10:1

> x6

[1] 10 9 8 7 6 5 4 3 2 1

> x4 <- seq(from=1, to=11, by=2)

> x4

[1] 1 3 5 7 9 11

> x5 <- seq(from =1, to=11, length.out=5)

> x5

[1] 1.0 3.5 6.0 8.5 11.0

> ??"random"

> seq\_len(10)

[1] 1 2 3 4 5 6 7 8 9 10

> ## Selection

> x1>19

[1] FALSE FALSE TRUE TRUE TRUE FALSE TRUE

[8] FALSE

> x1[c(FALSE, FALSE, TRUE, TRUE,TRUE,FALSE,TRUE,FALSE)]

[1] 20 21 24 20

> x1[c(3,4,5,7)]

[1] 20 21 24 20

> x1[x1>19]

[1] 20 21 24 20

> x1[x1 > 14 & x1 < 20]

[1] 15 19

> which(x1[x1 > 14 & x1 < 20])

Error in which(x1[x1 > 14 & x1 < 20]) :

argument to 'which' is not logical

> which(x1 > 14 & x1 < 20)

[1] 2 8

> ## replace

> replace(x1, x1>19, 15)

[1] 10 15 15 15 15 14 15 19

> x1[x1>19] <- 15

> x1

[1] 10 15 15 15 15 14 15 19

> replace(x1, which(x1>19), 15)

[1] 10 15 15 15 15 14 15 19

> x1[x1>19] <- 15

> x1

[1] 10 15 15 15 15 14 15 19

> source("D:/RProgramming/Class3/Class3(inClass).R")

> x1[x1==0] <-15

> x1

[1] 10 15 15 15 15 14 15 19

> x1 <- c(10, 15, 20, 21, 24, 14, 20, 19)

> replace(x1, x1>19, NA)

[1] 10 15 NA NA NA 14 NA 19

> x1 <- replace(x1, which(x1>19), 15)

> mean(x1, n.rm=TRUE)

[1] 14.75

> mean

function (x, ...)

UseMethod("mean")

<bytecode: 0x000001d1159c6e28>

<environment: namespace:base>

> # replace(x1, x1>19, NA)

> # x1 <- replace(x1, which(x1>19), 15)

> # mean(x1, n.rm=TRUE)

> # mean

>

> # Replace elements greater than 19 with NA

> x1 <- replace(x1, x1 > 19, NA)

>

> # Replace elements greater than 19 with 15

> x1 <- replace(x1, which(x1 > 19), 15)

>

> # Calculate the mean of x1, ignoring NA values

> mean\_x1 <- mean(x1, na.rm = TRUE)

>

> # Print the mean value

> print(mean\_x1)

[1] 14.75

> x1 <- replace(x1, x1 > 19, NA)

>

> x1 <- replace(x1, which(x1 > 19), 15)

>

> mean\_x1 <- mean(x1, na.rm = TRUE)

>

> print(mean\_x1)

[1] 14.75

>

>

>

>

>

>

>

>

>

>

>

>

>

> ?matrix

> # Matrix ---------

> mat1 <- matrix(c(1,2,3,4), ncol=2, nrow=2, byrow=TRUE)

> mat1

[,1] [,2]

[1,] 1 2

[2,] 3 4

> is.matrix(mat1)

[1] TRUE

> is.matrix(matrix(c(0,10, 2), ncol=3))

[1] TRUE

> is.matrix(c(0,10,2))

[1] FALSE

> mat1[,]

[,1] [,2]

[1,] 1 2

[2,] 3 4

> mat[1,]

Error: object 'mat' not found

> # Creating the first matrix

> matrix1 <- matrix(c(1, 2, 3, 4, 5, 6), nrow = 2, ncol = 3)

> print(matrix1)

[,1] [,2] [,3]

[1,] 1 3 5

[2,] 2 4 6

>

> # Creating the second matrix

> matrix2 <- matrix(c(7, 8, 9, 10, 11, 12), nrow = 2, ncol = 3)

> print(matrix2)

[,1] [,2] [,3]

[1,] 7 9 11

[2,] 8 10 12

> mat1 %\*% mat2

Error: object 'mat2' not found

> matrix1 %\*% matrix2

Error in matrix1 %\*% matrix2 : non-conformable arguments

> ## Matrix multiplication

>

> # Creating the first matrix

> matrix1 <- matrix(c(1, 2, 3, 4, 5, 6), nrow = 2, ncol = 3)

> print(matrix1)

[,1] [,2] [,3]

[1,] 1 3 5

[2,] 2 4 6

>

> # Creating the second matrix

> matrix2 <- matrix(c(7, 8, 9, 10, 11, 12), nrow = 3, ncol = 2)

> print(matrix2)

[,1] [,2]

[1,] 7 10

[2,] 8 11

[3,] 9 12

>

> # Multiplying the two matrices

> result <- matrix1 %\*% matrix2

> print(result)

[,1] [,2]

[1,] 76 103

[2,] 100 136

> # Checking the dimensions of the first matrix

> dim\_matrix1 <- dim(matrix1)

> print(dim\_matrix1)

[1] 2 3

>

> # Checking the dimensions of the second matrix

> dim\_matrix2 <- dim(matrix2)

> print(dim\_matrix2)

[1] 3 2

> # Computing the Kronecker product

> kronecker\_product <- kronecker(matrix1, matrix2)

> print(kronecker\_product)

[,1] [,2] [,3] [,4] [,5] [,6]

[1,] 7 10 21 30 35 50

[2,] 8 11 24 33 40 55

[3,] 9 12 27 36 45 60

[4,] 14 20 28 40 42 60

[5,] 16 22 32 44 48 66

[6,] 18 24 36 48 54 72

> source("D:/RProgramming/Class3/Class3(inClass).R")

Error in eval(ei, envir) : object 'mat' not found

> # Creating vectors

> names <- c("Alice", "Bob", "Charlie")

> ages <- c(25, 30, 35)

> genders <- c("Female", "Male", "Male")

>

> # Creating a DataFrame

> df <- data.frame(Name = names, Age = ages, Gender = genders)

>

> # Printing the DataFrame

> print(df)

Name Age Gender

1 Alice 25 Female

2 Bob 30 Male

3 Charlie 35 Male

> df1 <- data.frame(id = c(1,2,3),

+ age= c(24, 23, 19),

+ gender = c("F", "M", "F"), stringAsFactors=TRUE)

> df1

id age gender stringAsFactors

1 1 24 F TRUE

2 2 23 M TRUE

3 3 19 F TRUE

> is.data.frame(df1)

[1] TRUE

> summary(df1)

id age

Min. :1.0 Min. :19.0

1st Qu.:1.5 1st Qu.:21.0

Median :2.0 Median :23.0

Mean :2.0 Mean :22.0

3rd Qu.:2.5 3rd Qu.:23.5

Max. :3.0 Max. :24.0

gender stringAsFactors

Length:3 Mode:logical

Class :character TRUE:3

Mode :character