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set.seed(29010719)
names <- c(LETTERS, letters)
n <- length(names)
aff <- sapply(names, function(x){paste("U", x, sep = "")})

a <- as.character(sample(aff, n, replace = TRUE))
b <- as.character(c(sample(aff, n - 8, replace = TRUE), rep(NA, 8)))
c <- as.character(c(sample(aff, n - 20, replace = TRUE), rep(NA, 20)))

data <- data.frame(names, a, b, c)

for (i in 1:32) {
  if (data[i,1] == data[i,2] | data[i,1] == data[i,3] | data[i,2] == data[i,3]) {
    print(i)
  }
}

## [1] 11

for (i in 1:44) {
  if (data[i,1] == data[i,2]) {
    print(i)
  }
}

data[11, 3] = "UZ"
data <- data[sample(1:n), ]

AutoAff <- function(X, aff1, aff2, aff3) {
  mat <- as.matrix(X[, c(aff1, aff2, aff3)])
  aff <- na.exclude(unique(as.character(as.vector(t(mat)))))
  n.aff <- length(aff)
  aff <- aff[1:n.aff]

  for (i in 1:dim(X)[1]) {
    aa <- which(aff == mat[i, 1])
    bb <- which(aff == mat[i, 2])
    cc <- which(aff == mat[i, 3])
    if (length(bb) != 0){
      if (length(cc) == 0) {
        mat[i, 1] <- aff[min(c(aa, bb))]
        mat[i, 2] <- aff[max(c(aa, bb))]
      }
      if (length(cc) != 0) {
        order <- sort(c(aa, bb, cc))
      }
    }
  }
}

```

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        mat[i, 1] <- aff[order[1]]
        mat[i, 2] <- aff[order[2]]
        mat[i, 3] <- aff[order[3]]
    }
}

data[, aff1] <- mat[, 1]
data[, aff2] <- mat[, 2]
data[, aff3] <- mat[, 3]

return(list(affiliations = aff, count = n.aff, data = data))
}

result <- AutoAff(data, "a", "b", "c")
data <- result$data

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j1, 2, , h3, 4, , t5, , , M6, 7, 8, , r9, 10, , U7, 9, 11, , b12, 13, 14, , F15, 16, 17, , v10, , ,
a6, 14, 18, , E8, 18, 19, , O8, 12, 20, , Z21, 22, 23, , p15, 19, , V10, 24, 25, , B1, 21, 26, , d27, 28, 29, ,
e10, 26, 30, , f4, 10, 19, , W1, 19, 28, , N7, 9, 10, , S9, 12, 31, , q27, 32, , w4, , , G7, 22, 33, , c14, 21, 30, ,
n14, 20, , g2, 23, , R7, 24, 26, , k17, 34, , X19, 34, 35, , Q12, 17, 36, , y37, , , D13, 17, 24, , x4, , ,
s38, , , m22, 38, , z39, , , A10, 40, 41, , L10, 12, 42, , o27, 43, , l1, 44, , I8, 21, 45, , u7, , ,
Y15, 32, 46, , H15, 34, 35, , i5, 32, , C1, 2, 18, , T12, 18, 33, , J3, 16, 16, , K9, 28, 38, , P7, 18, 25, ,
NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' ,
NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' ,
NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' , NA' ,

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