

```

# =====

# 9 personas consiguen 9 chupetines

# =====

set.seed(123)

# --- datos iniciales ---

personas <- paste("P", 1:9, sep = "")
tipos <- c("A", "B", "C")

# cada persona empieza con 2 caramelos

inventario <- list(
  c("A", "B"), c("A", "C"), c("B", "C"),
  c("A", "B"), c("A", "C"), c("B", "C"),
  c("A", "B"), c("A", "C"), c("B", "C")
)

chupetines <- rep(0, 9)

paso <- 0

# --- funcion para mostrar el estado ---

ver_estado <- function(paso, inventario, chupetines) {
  cat("\n===== \n")
  cat("paso:", paso, "\n")
  cat("----- \n")
  for (i in 1:9) {
    cat(personas[i], ":", paste(inventario[[i]], collapse = " "),
      " | chupetines:", chupetines[i], "\n")
  }
  cat("----- \n")
  cat("total chupetines:", sum(chupetines), "\n")
}

# --- reglas ---

# r1: (A,B,C) -> 1 chupetin

regla1 <- function(inventario, chupetines) {

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todos <- unlist(inventario)
if (all(c("A", "B", "C") %in% todos)) {
  for (t in c("A", "B", "C")) {
    for (i in 1:9) {
      pos <- match(t, inventario[[i]])
      if (!is.na(pos)) {
        inventario[[i]] <- inventario[[i]][-pos]
        break
      }
    }
  }
  quien <- which.min(chupetines)
  chupetines[quien] <- chupetines[quien] + 1
  cat("\nr1: se combinaron (A,B,C) -> +1 chupetin para", personas[quien], "\n")
}
list(inventario = inventario, chupetines = chupetines)
}

```

r2: (2A,2B,2C) -> +2 chupetines +1 caramelo aleatorio

```

regla2 <- function(inventario, chupetines) {
  todos <- unlist(inventario)
  cuentas <- table(todos)
  if (all(cuentas >= 2)) {
    for (t in c("A", "B", "C")) {
      quitar <- 2
      for (i in 1:9) {
        if (quitar == 0) break
        pos <- match(t, inventario[[i]])
        if (!is.na(pos)) {
          inventario[[i]] <- inventario[[i]][-pos]
          quitar <- quitar - 1
        }
      }
    }
  }
}

```

```

    }
  }
}
for (k in 1:2) {
  quien <- which.min(chupetines)
  chupetines[quien] <- chupetines[quien] + 1
}
nuevo <- sample(c("A", "B", "C"), 1)
i <- sample(1:9, 1)
inventario[[i]] <- c(inventario[[i]], nuevo)
cat("\nr2: se usaron (2A,2B,2C) -> +2 chupetines y +1", nuevo, "para",
personas[i], "\n")
}
list(inventario = inventario, chupetines = chupetines)
}

# r3: devolver 1 chupetin -> +3 caramelos aleatorios
regla3 <- function(inventario, chupetines) {
  i <- which.max(chupetines)
  if (chupetines[i] > 0) {
    chupetines[i] <- chupetines[i] - 1
    nuevos <- sample(c("A", "B", "C"), 3, replace = TRUE)
    inventario[[i]] <- c(inventario[[i]], nuevos)
    cat("\nr3:", personas[i], "devolvio 1 chupetin -> gana caramelos:", paste(nuevos,
collapse = " "), "\n")
  }
  list(inventario = inventario, chupetines = chupetines)
}

# --- simulacion ---
ver_estado(paso, inventario, chupetines)

```

```

while (sum(chupetines) < 9) {
  paso <- paso + 1

  total_caramelos <- sum(sapply(inventario, length))

  if (total_caramelos >= 6 && all(table(unlist(inventario)) >= 2)) {
    res <- regla2(inventario, chupetines)
  } else if (all(c("A", "B", "C") %in% unlist(inventario))) {
    res <- regla1(inventario, chupetines)
  } else if (sum(chupetines) > 0) {
    res <- regla3(inventario, chupetines)
  } else {
    cat("\nno se puede aplicar ninguna regla. fin.\n")
    break
  }

  inventario <- res$inventario
  chupetines <- res$chupetines

  ver_estado(paso, inventario, chupetines)
}

cat("\nresultado final: se consiguieron 9 chupetines en", paso, "pasos\n")

```


paso: 1

```
-----
P1 :   | chupetines: 1
P2 :   | chupetines: 1
P3 : C | chupetines: 0
P4 : A B | chupetines: 0
P5 : A C | chupetines: 0
P6 : B C | chupetines: 0
P7 : A B | chupetines: 0
P8 : A C | chupetines: 0
P9 : B C | chupetines: 0
-----
```

total chupetines: 2

r2: se usaron (2A,2B,2C) -> +2 chupetines y +1 B para P3

=====

paso: 2

```
-----
P1 :   | chupetines: 1
P2 :   | chupetines: 1
P3 : B | chupetines: 1
P4 :   | chupetines: 1
P5 :   | chupetines: 0
P6 : C | chupetines: 0
P7 : A B | chupetines: 0
P8 : A C | chupetines: 0
P9 : B C | chupetines: 0
-----
```

total chupetines: 4

r2: se usaron (2A,2B,2C) -> +2 chupetines y +1 B para P2

=====

paso: 3

```
-----
P1 :   | chupetines: 1
P2 : B | chupetines: 1
P3 :   | chupetines: 1
P4 :   | chupetines: 1
P5 :   | chupetines: 1
P6 :   | chupetines: 1
P7 :   | chupetines: 0
P8 :   | chupetines: 0
P9 : B C | chupetines: 0
-----
```

total chupetines: 6

```

-----
P1 : B B A | chupetines: 0
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B C | chupetines: 0
-----
total chupetines: 5

r1: se combinaron (A,B,C) -> +1 chupetin para P1

=====
paso: 7
-----
P1 : B | chupetines: 1
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 6

r3: P1 devolvio 1 chupetin -> gana caramelos: B C A

=====
paso: 8
-----
P1 : B B C A | chupetines: 0
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 5

```

r1: se combinaron (A,B,C) -> +1 chupetin para P1

=====
paso: 9

P1 : B | chupetines: 1
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B | chupetines: 0

total chupetines: 6

r3: P1 devolvio 1 chupetin -> gana caramelos: C C A

=====
paso: 10

P1 : B C C A | chupetines: 0
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B | chupetines: 0

total chupetines: 5

r1: se combinaron (A,B,C) -> +1 chupetin para P1

=====
paso: 11

P1 : C | chupetines: 1
P2 : B | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0

```
=====
paso: 11
-----
P1 : C | chupetines: 1
P2 : B | chupetines: 1
P3 :   | chupetines: 1
P4 :   | chupetines: 1
P5 :   | chupetines: 1
P6 :   | chupetines: 1
P7 :   | chupetines: 0
P8 :   | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 6

r3: P1 devolvio 1 chupetin -> gana caramelos: A A A
```

```
=====
paso: 12
-----
P1 : C A A A | chupetines: 0
P2 : B | chupetines: 1
P3 :   | chupetines: 1
P4 :   | chupetines: 1
P5 :   | chupetines: 1
P6 :   | chupetines: 1
P7 :   | chupetines: 0
P8 :   | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 5

r1: se combinaron (A,B,C) -> +1 chupetin para P1
```

```
=====
paso: 13
-----
P1 : A A | chupetines: 1
P2 :   | chupetines: 1
P3 :   | chupetines: 1
P4 :   | chupetines: 1
P5 :   | chupetines: 1
P6 :   | chupetines: 1
P7 :   | chupetines: 0
-----
```

```
=====
paso: 14
-----
P1 : A A C B C | chupetines: 0
P2 : | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 0
P8 : | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 5

r2: se usaron (2A,2B,2C) -> +2 chupetines y +1 B para P9

=====
paso: 15
-----
P1 : A C | chupetines: 1
P2 : | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 1
P8 : | chupetines: 0
P9 : B | chupetines: 0
-----
total chupetines: 7

r1: se combinaron (A,B,C) -> +1 chupetin para P8

=====
paso: 16
-----
P1 : | chupetines: 1
P2 : | chupetines: 1
P3 : | chupetines: 1
P4 : | chupetines: 1
P5 : | chupetines: 1
P6 : | chupetines: 1
P7 : | chupetines: 1
P8 : | chupetines: 1
P9 : | chupetines: 0
```