```
fichero = read.csv("distancia_universitarios.csv")
fichero
```

```
##    Distancia
## 1       16.5
## 2       34.8
## 3       20.7
## 4        6.2
## 5        4.4
## 6        3.4
## 7       24.0
## 8       24.0
## 9       32.0
## 10      30.0
## 11      33.0
## 12      27.0
## 13      15.0
## 14       9.4
## 15       2.1
## 16      34.0
## 17      24.0
## 18      12.0
## 19       4.4
## 20      28.0
## 21      31.4
## 22      21.6
## 23       3.1
## 24       4.5
## 25       5.1
## 26       4.0
## 27       3.2
## 28      25.0
## 29       4.5
## 30      20.0
## 31      34.0
## 32      12.0
## 33      12.0
## 34      12.0
## 35      12.0
## 36       5.0
## 37      19.0
## 38      30.0
## 39       5.5
## 40      38.0
## 41      25.0
## 42       3.7
## 43       9.0
## 44      30.0
## 45      13.0
## 46      30.0
## 47      30.0
## 48      26.0
## 49      30.0
## 50      30.0
## 51       1.0
## 52      26.0
## 53      22.0
## 54      10.0
## 55       9.7
## 56      11.0
## 57      24.1
## 58      33.0
## 59      17.2
## 60      27.0
## 61      24.0
## 62      27.0
## 63      21.0
## 64      28.0
## 65      30.0
## 66       4.0
## 67      46.0
## 68      29.0
## 69       3.7
## 70       2.7
## 71       8.1
## 72      19.0
## 73      16.0
```

```
len = function(list){
        count = 0
        for (element in list){
                count = count + 1
        }
        count
}

distancias = fichero$Distancia

longitud = len(distancias)
longitud
```

```
## [1] 73
```

```
bubble = function(list, asc = TRUE){
        n = len(list)
        if(asc){
                for (i in 2:n){
                        for (j in 1:(n-1)){
                                if (list[j] > list[j+1]){
                                        temp = list[j]
                                        list[j] = list[j+1]
                                        list[j+1] = temp
                                }
                        }
                }
        }
        else {
                for (i in 2:n){
                        for (j in 1:(n-1)){
                                if (list[j] < list[j+1]){
                                        temp = list[j]
                                        list[j] = list[j+1]
                                        list[j+1] = temp
                                }
                        }
                }
        }
        list
}
distanciasordenadas = bubble(distancias, FALSE)
distanciasordenadas
```

```
##  [1] 46.0 38.0 34.8 34.0 34.0 33.0 33.0 32.0 31.4 30.0 30.0 30.0 30.0 30.0 30.0
## [16] 30.0 30.0 29.0 28.0 28.0 27.0 27.0 27.0 26.0 26.0 25.0 25.0 24.1 24.0 24.0
## [31] 24.0 24.0 22.0 21.6 21.0 20.7 20.0 19.0 19.0 17.2 16.5 16.0 15.0 13.0 12.0
## [46] 12.0 12.0 12.0 12.0 11.0 10.0  9.7  9.4  9.0  8.1  6.2  5.5  5.1  5.0  4.5
## [61]  4.5  4.4  4.4  4.0  4.0  3.7  3.7  3.4  3.2  3.1  2.7  2.1  1.0
```

```
rank = function(list){
        ordered_list = bubble(list)
        ordered_list[len(ordered_list)] - ordered_list[1]
}

rango = rank(distanciasordenadas)
rango
```

```
## [1] 45
```

```
absolute_freq = function(list){
        ordered_list = bubble(list)
        n = len(ordered_list)
        elements = vector()
        frequencies = vector()
        i = 1
        while (i <= n){
                actual_element = ordered_list[i]
                elements = append(elements, actual_element)
                actual_freq = 0
                j = i
                while(j <= n & actual_element == ordered_list[j]){
                        actual_freq = actual_freq + 1
                        j = j+1
                }
                frequencies = append(frequencies, actual_freq)
                i = j
        }
        rbind(elements, frequencies)
}
```

PARTE 2

```
tabla <- matrix(c(1,1,0,1,1, 1,1,1,1,0, 1,1,0,1,0, 1,0,1,1,0, 1,1,0,0,0, 0,0,0,1,0),6,5,

tabla

##         Pan Agua Café Leche Naranjas
## suceso1   1    1    0     1        1
## suceso2   1    1    1     1        0
## suceso3   1    1    0     1        0
## suceso4   1    0    1     1        0
## suceso5   1    1    0     0        0
## suceso6   0    0    0     1        0
```

```
union = function(c1, c2){
        if (len(c1) == 0){
                c2
        }
        else if (is.element(c1[1], c2)){
                union(c1[-1], c2)
        }
        else{
                union(c1[-1], append(c2, c1[1]))
        }
}

unionp = union(c("P","A", "L"), c("P","A", "C", "N"))
unionp

## [1] "P" "A" "C" "N" "L"

intersect = function(c1, c2){
        if (len(c1) == 0){
                c()
        }
        else if (is.element(c1[1], c2)){
                append(intersect(c1[-1], c2), c1[1])
        }
        else{
                intersect(c1[-1], c2)
        }
}

intersectp = intersect(c("P","A", "L"), c("P","A", "C", "N"))
intersectp

## [1] "A" "P"

support = function(table, elements){
        count_support = 0
        for (i in 1:len(table[,1])){
                acum = 1
                for (element in elements){
                        acum = (table[i,element]) & acum
                }
                count_support = count_support + acum
        }
        count_support/len(table[,1])
}

soporte = support(tabla, c("Pan","Agua"))
soporte

## [1] 0.6666667

support_clasif = function(table, ocurrences, s){
        valid_ocurrences = c()
        for (ocurrence in ocurrences){
                support_oc = support(table, ocurrence)
                if (support_oc >= s){
                        valid_ocurrences = append(valid_ocurrences, ocurrence)
                }
        }
        valid_ocurrences
}

possible_valid_occurrences = function(table, elemental_valid_occurences) {
        occurrences = c(elemental_valid_occurences)
        occurrences_ant = elemental_valid_occurences
        k = 1
        while (k <= len(tabla[1])) {
                occurrences_act = c()
                for (i in 1:len(occurrences_ant)) {
                        A = occurrences_ant[i]
                        for (j in (i+1):len(occurrences_ant)) {
                                B = occurrences_ant[j]
                                if (identical(A[1:(len(A)-1)], B[1:(len(B)-1)]) & A[len(
                                        occurrences_act = append(occurrences_act, union(
                                }
                        }
                }
                occurrences = append(occurrences, occurrences_act)
                occurrences_ant = occurrences_act
                k = k+1
        }
        occurrences
}

apriori = function(table) {
        soporte_clasif = support_clasif(tabla, c(c("Pan"), c("Agua") ,c("Leche"), c("Caf
        print(soporte_clasif)
        p_v_o = possible_valid_occurrences(tabla, soporte_clasif)
        p_v_o
}

tabla <- matrix(c(1,1,0,1,1, 1,1,1,1,0, 1,1,0,1,0, 1,0,1,1,0, 1,1,0,0,0, 0,0,0,1,0),6,5,

tabla
```

```
##          Pan Agua Café Leche Naranjas
## suceso1    1    1    0     1        1
## suceso2    1    1    1     1        0
## suceso3   1    1    0     1         0
## suceso4   1    0    1     1         0
## suceso5   1    1    0     0         0
## suceso6   0    0    0     1         0
```

```
apriori(tabla)
```

```
## [1] "Pan"   "Agua"  "Leche"
## [1] "Pan"   "Agua"  "Leche" "Leche"
```

```
A = c("Naranjas, Agua")
B = c("Leche")
A[1:(len(A)-1)]
```

```
## [1] "Naranjas, Agua"
```

```
B[1:(len(B)-1)]
```

```
## [1] "Leche"
```

```
identical(A[1:(len(A)-1)], B[1:(len(B)-1)])
```

```
## [1] FALSE
```

40 de soporte y 90 de confianza