Tipologia-PRAC02

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COMENTARIS PREVIS A LA RESOLUCIÓ DE LA PRÀCTICA

El dataset escollit per a realitzar aquesta segona pràctica no és el resultat de la primera pràctica, com es demanava en aquest enunciat. Això és degut a que quan es va realitzar la primera pràctica no es va tenir en compte que el dataset resultant hauria de tenir certes característiques que el permetéssin fer-ho servir en aquesta pràctica com la neteja de les dades, la creació de diferents models d'aprenentatge (tant supervisats com no supervisats), etc. Per això, i un cop concertat a través del fòrum de l'assignatura amb la professora la possibilitat de fer-ne servir d'altres datasets diferents, hem fet servir el següent conjunt de dades per poder realitzar completament tots els exercicis d'aquesta pràctica:

https://www.askamanager.org/2021/04/how-much-money-do-you-make-4.html

https://docs.google.com/spreadsheets/d/1IPS5dBSGtwYVbjsfbaMCYIWnOuRmJcbequohNxCyGVw/edit?resourcekey=&pli=1&gid=1625408792#gid=1625408792

Pegunta 1.Descripció del dataset.

1. Perquè és important i quina pregunta/problema pretén respondre?
2. Resumeix breument les variables que el formen i el seu tamany.

RESPOSTA:

Descripció del dataset

Aquest dataset conté respostes d'una enquesta salarial amb 28.141 registres i 18 variables. Les dades han estat recollides d'un formulari en línia disponible a *https://www.askamanager.org/2023/04/how-much-money-do-you-make-6.html* i representen informació relacionada amb la situació laboral, experiència, educació i compensació econòmica de professionals arreu del món.

L'enquesta recull informació a través de tres tipus de preguntes:

1. Preguntes de selecció única.
2. Preguntes de selecció múltiple
3. Preguntes de text lliure

No totes les preguntes son obligatòries de contestar.

Importància del dataset Aquest conjunt de dades és important perquè permet:

1. Analitzar diferències salarials segons sector, gènere, ubicació geogràfica, experiència i educació.
2. Identificar desigualtats o tendències en el mercat laboral.

Pregunta central que pretén respondre:

Quins factors influeixen en la variació dels salaris entre professionals de diferents perfils, gènere, raça i educació?

Resum de les variables

Variable original	Descripció
Timestamp	Data i hora de la resposta
How old are you?	Franja d'edat
What industry do you work in?	Sector laboral
Job title	Títol del lloc de treball
If your job title needs additional context	Informació opcional sobre el lloc que ocupa
What is your annual salary?	Salari anual
How much additional monetary compensation	Compensació addicional (bonus, hores extra, etc.)
Please indicate the currency	Moneda
Other currency	Especificació si es marca "Other" a l'anterior
Income context	Context extra sobre el salari (opcional)
What country do you work in?	País de treball
US State	Estat nord-americà (si aplica)
City	Ciutat de treball
Years experience in field	Anys d'experiència en el camp específic
Years experience overall	Anys d'experiència total
Education level	Nivell d'educació
Gender	Gènere
Race	Raça/etnicitat

OBS: En aquest informe només es mostrar el codi i el resultat necessari de les visualitzacions més importants, deixant la resta de comentaris de com s'ha fet dins del Rmarkdown disponible al GitHub del projecte.

Un cop llegit l'arxiu. mirarem el nom de les columnes i dimensions del dataset carregat.

```
## [1] 28141    18
```

```
##  [1] "Timestamp"
##  [2] "How old are you?"
##  [3] "What industry do you work in?"
##  [4] "Job title"
##  [5] "If your job title needs additional context, please clarify here:"
##  [6] "What is your annual salary? (You'll indicate the currency in a later question. If you are part
##  [7] "How much additional monetary compensation do you get, if any (for example, bonuses or overtime
##  [8] "Please indicate the currency"
##  [9] "If \"Other,\" please indicate the currency here:"
## [10] "If your income needs additional context, please provide it here:"
## [11] "What country do you work in?"
## [12] "If you're in the U.S., what state do you work in?"
## [13] "What city do you work in?"
## [14] "How many years of professional work experience do you have overall?"
## [15] "How many years of professional work experience do you have in your field?"
## [16] "What is your highest level of education completed?"
## [17] "What is your gender?"
## [18] "What is your race? (Choose all that apply.)"
```

Per una millor visualització, modifiquem el nom de les columnes (features)

```
#{r canviem nom columnes, echo=FALSE}
nova_capçalera <- c("timestamp", "edat"
                    , "sector",
                    "lloc_feina","comentaris_lloc","salari_temps_complert",
                    "extres","moneda","altres_monedes","comentaris_extres",
                    "pais","US_estat","ciutat","experiencia_general_interval",
                    "experiencia_especifica_interval","nivell_estudis",
```

```
                    "genere","raca")

salaris_df <- rbind(nova_capçalera, salaris_df)
colnames(salaris_df) <- as.character(unlist(salaris_df[1, ]))
salaris_df <- salaris_df[-1, ]
```

```
colnames(salaris_df)
```

```
##  [1] "timestamp"                          "edat"
##  [3] "sector"                             "lloc_feina"
##  [5] "comentaris_lloc"                    "salari_temps_complert"
##  [7] "extres"                             "moneda"
##  [9] "altres_monedes"                     "comentaris_extres"
## [11] "pais"                               "US_estat"
## [13] "ciutat"                             "experiencia_general_interval"
## [15] "experiencia_especifica_interval" "nivell_estudis"
## [17] "genere"                             "raca"
```

Un cop carregat el dataset, farem una primera ullada a les dades per fer-nos una idea. Ho dividirem en 4 taules.

Taula 1

timestamp	edat	sector	lloc_feina
4/27/2021 11:02:10	25-34	Education (Higher Education)	Research and Instruction Librarian
4/27/2021 11:02:22	25-34	Computing or Tech	Change & Internal Communications Manager
4/27/2021 11:02:38	25-34	Accounting, Banking & Finance	Marketing Specialist
4/27/2021 11:02:41	25-34	Nonprofits	Program Manager
4/27/2021 11:02:42	25-34	Accounting, Banking & Finance	Accounting Manager
4/27/2021 11:02:46	25-34	Education (Higher Education)	Scholarly Publishing Librarian

Taula 2

comentaris_lloc	salari_temps_complert	extres	moneda	altres_monedes	comentaris_extres
NA	55000	0	USD	NA	NA
NA	54600	4000	GBP	NA	NA
NA	34000	NA	USD	NA	NA
NA	62000	3000	USD	NA	NA
NA	60000	7000	USD	NA	NA
NA	62000	NA	USD	NA	NA

Taula 3

pais	US_estat	ciutat
United States	Massachusetts	Boston
United Kingdom	NA	Cambridge
US	Tennessee	Chattanooga
USA	Wisconsin	Milwaukee
US	South Carolina	Greenville
USA	New Hampshire	Hanover

Taula 4

experiencia_general_interval	experiencia_especifica_interval	nivell_estudis	genere	raca
5-7 years	5-7 years	Master's degree	Woman	White
8 - 10 years	5-7 years	College degree	Non-binary	White
2 - 4 years	2 - 4 years	College degree	Woman	White
8 - 10 years	5-7 years	College degree	Woman	White
8 - 10 years	5-7 years	College degree	Woman	White
8 - 10 years	2 - 4 years	Master's degree	Man	White

I extreurem un petit resum de les columnes, valors únics, tipus de dades, NAs inicials.

	Num_NAs	Mida_Bytes	Valors_Unics	Tipus_Dada
timestamp	0	2253896	25359	character
edat	0	225584	7	character
sector	77	312792	1134	character
lloc_feina	0	1303608	13452	character
comentaris_lloc	20866	1011232	6963	character
salari_temps_complert	0	430912	3673	character
extres	7333	272952	852	character
moneda	0	225792	11	character
altres_monedes	27921	233616	122	character
comentaris_extres	25083	645672	2975	character
pais	0	246664	324	character
US_estat	5046	235576	137	character
ciutat	25	506544	4269	character
experiencia_general_interval	0	225704	8	character
experiencia_especifica_interval	0	225704	8	character
nivell_estudis	228	225640	6	character
genere	174	225568	5	character
raca	183	232696	51	character

En aquest punt, ja podem veure que el dataset conté molta informació que no és correcte degut a la introducció manual de dades que permet el formulari en moltes preguntes.

Pegunta 2.Integració, selecció de dades d'interés

1. Selecció dades d'interés
2. Mostrar resum variables.

RESPOSTA:

- Integració/fusió de múltiples datasets: No apliquem can fusió ni integració al tenir només una font de dades.
- Selecció de les dades:

El dataset és una enquesta orientada als Estats Units, però és possible que hi hagin altres països presents. Fem una petita exploració inicial, un cop hem passat tot a MAJÚSCULES i sense espais.

```
## # A tibble: 10 x 2
##    pais                    n
##    <chr>               <int>
##  1 UNITED STATES       10035
##  2 USA                  9073
##  3 US                   2782
```

```
##  4 CANADA                    1681
##  5 UK                         692
##  6 UNITED KINGDOM             634
##  7 U.S.                       606
##  8 UNITED STATES OF AMERICA   492
##  9 AUSTRALIA                  390
## 10 GERMANY                    197
```

Com podem veure, la majoria de registres es corresponen als Estats Units, així que farem l'estudi dels salaris dins d'aquest països. Per fer-ho, unificarem el nom del països i eliminarem la resta de registres i eliminarem la variable pais

També eliminarem la variable US_estat, ciutat, moneda (l'estudi serà pel Estats Units), i els camps opcionals de dades del formulari com comentaris_lloc,comentaris_extres,altres_monedes

Ara ens fixarem ara amb la variable sector, que l'agruparem per poder veure els sectors més representats:

```
## # A tibble: 10 x 2
##    sector                                n
##    <chr>                             <int>
##  1 COMPUTING OR TECH                  3730
##  2 NONPROFITS                         2121
##  3 EDUCATION (HIGHER EDUCATION)       2083
##  4 HEALTH CARE                        1627
##  5 ACCOUNTING, BANKING & FINANCE      1475
##  6 ENGINEERING OR MANUFACTURING       1428
##  7 GOVERNMENT AND PUBLIC ADMINISTRATION  1410
##  8 LAW                                 962
##  9 MARKETING, ADVERTISING & PR         919
## 10 EDUCATION (PRIMARY/SECONDARY)       717
```

Decidim quedar-nos amb els 8 més importants

Tornarem a visualitzar la taula de nou:

```
## # A tibble: 8 x 2
##   sector                                n
##   <chr>                             <int>
## 1 COMPUTING OR TECH                  3730
## 2 NONPROFITS                         2121
## 3 EDUCATION (HIGHER EDUCATION)       2083
## 4 HEALTH CARE                        1627
## 5 ACCOUNTING, BANKING & FINANCE      1475
## 6 ENGINEERING OR MANUFACTURING       1428
## 7 GOVERNMENT AND PUBLIC ADMINISTRATION  1410
## 8 LAW                                 962
```

PREGUNTA 3. Neteja de les dades

Avaluar duplicats: Mirem si hi han duplicats de dades:

```
duplicats <- salaris_df[duplicated(salaris_df),]
print (nrow(duplicats))
```

```
## [1] 0
```

Avaluar elements buits(NAs):

Ara busquem si hi han elements buits, dades amb zero valors o altres valors numèrics que indiquin la pèrdua de dades. Per fer-ho, visualitzarem una taula amb tots els NAs i el percentatge que significa dins de les dades

Evaluem els valors NAs del dataset.

	Columna	N_NA	Percentatge
extres	extres	3866	26.06
raca	raca	107	0.72
nivell_estudis	nivell_estudis	99	0.67
genere	genere	98	0.66
timestamp	timestamp	0	0.00
edat	edat	0	0.00

Imputació de valors:

De les dades de la taula, podem observar un nombre molt elevats de extres (26%) No es tracten de valors faltants en sí, sinó que l'enquestat no feia hores extres.

Imputarem el valor de zero a aquests als valors faltants.

Ara passarem a imputar els altres valors amb mètodes probabilístics. En aquest cas, farem servir KNN del paquet VIM.

```
kNN1.salaris_df<-kNN(salaris_df, k=3)
```

Veiem el resultat final

	Columna	N_NA	Percentatge
timestamp	timestamp	0	0
edat	edat	0	0
sector	sector	0	0
lloc_feina	lloc_feina	0	0
salari_temps_complert	salari_temps_complert	0	0
extres	extres	0	0

Eliminem les variables d'imputació (xxx_imp)
que son produïdes per la funció kNN1 (ens indica a quines columnes s'han hagut d'imputar valors).

Eliminem les variables d'imputació (xxx_imp) que son produïdes per la funció kNN1 (ens indica a quines columnes s'han hagut d'imputar valors)

```
kNN1.salaris_df <- kNN1.salaris_df[, !grepl("_imp$", names(kNN1.salaris_df))]
salaris_df<-kNN1.salaris_df[]
rm(kNN1.salaris_df)
```

Variable moneda:

Unifiquem la moneda a EUROS

```
# Factors de conversió a EUR

factor_conversio=0.92
#
# Conversió

# Creem la nova columna amb el salari convertit a euros
salaris_df <- salaris_df %>%
  mutate(salari_temps_complert_euros = as.numeric(salari_temps_complert) * factor_conversio)

salaris_df <- salaris_df %>%
  mutate(extres_euros = as.numeric(extres) * factor_conversio)
```

```
salaris_df <- subset(salaris_df, select = -salari_temps_complert)
salaris_df <- subset(salaris_df, select = -extres)
rm(factor_conversio)
```

- Modifiquem el format variable timestamp: No ens interessa ni el día ni la hora de l'enquesta, només ens quedarem amb el mes i l'any

```
salaris_df$timestamp <- as.POSIXct(salaris_df$timestamp, format = "%m/%d/%Y %H:%M:%S")

salaris_df$mes_any <- as.factor(format(salaris_df$timestamp, "%m/%Y"))
salaris_df <- subset(salaris_df, select = -timestamp)
```

- Passem a factors la resta de variables. Fixarem un màxim de 15 categries per variable

```
library(dplyr)
library(forcats)
library(dplyr)
library(forcats)

salaris_df <- salaris_df %>%
  mutate(across(
    .cols = where(~ !is.numeric(.x)),
    .fns = ~ fct_lump(as.factor(.x), n = 15)
  ))
```

##Valors extrems

Començarem l'estudi de possibles outliers.Per fer-ho, mirarem els quartils de les variables numèriques.

```
#, "salari_eur"

summary(salaris_df[, sapply(salaris_df, is.numeric)])
```

```
##  salari_temps_complert_euros  extres_euros
##  Min.   :      0              Min.   :      0
##  1st Qu.:  55200              1st Qu.:      0
##  Median :  76820              Median :      0
##  Mean   :  89734              Mean   :  10008
##  3rd Qu.: 110400              3rd Qu.:   5520
##  Max.   :2392000              Max.   :1380000
```

Podem veure que:

Salari a temps complet (`salari_temps_complert_euros`)

- **Minim:** 0 Hi ha casos amb salari 0 (pot ser errors o persones sense salari base). Assumirem que l'enquesta tothom té salari, així que els considerarem com errors
- **1r quartil (Q1):** 51.713 € → El **25% més baix** dels registres guanya **menys de 51.713 €**.
- **Mediana (Q2):** 72.023 € → La meitat dels registres tenen un salari **inferior a 72.023 €** i l'altra meitat superior.
- **Mitjana:** 85.176 € → El salari **promig** és 85.176 €, superior a la mediana. Això ens indica que hi han valors alts que estàn afectant a la mitjana (possibles outliers).
- **3r quartil (Q3):** 103.040 € → El **25% més alt** guanya **més de 103.040 €**.
- **Màxim:** 9.200.000 € → Hi ha un salari extremadament alt, que podria ser una dada errònia o corresponent a un alt directiu.

Extres (`extres_euros`)

- **Minim:** 0 Hi ha persones que no tenen extres (el considerem normal)
- **1r quartil (Q1):** 0. El **25% més baix** no té cap extra.
- **Mediana (Q2):** 0 .La meitat dels registres no reben extres. Això vol dir que més de la meitat dels enquestats no reben hores extres
- **Mitjana:** 8.727 € → Tot i que la mediana és **0**, la mitjana és **8.727 €**, indicant que algunes persones tenen extres alts que pugen el promig (seria un cas similar a l'anterior)
- **3r quartil (Q3):** 5.520 € → El **25% superior** rep més de 5.520 € en extres.
- **Màxim:** 1.380.000 € → Existeix un registre massa alt (o un cas especial o una dada incorrecta.)

La distribució dels ingressos extres sembla **molt asimètrica**, amb una **majoria de registres a 0**, però amb alguns casos amb **valors molt alts** que eleven la mitjana. Analitzarem els possibles outliers que puguin distorsionar l'anàlisi.

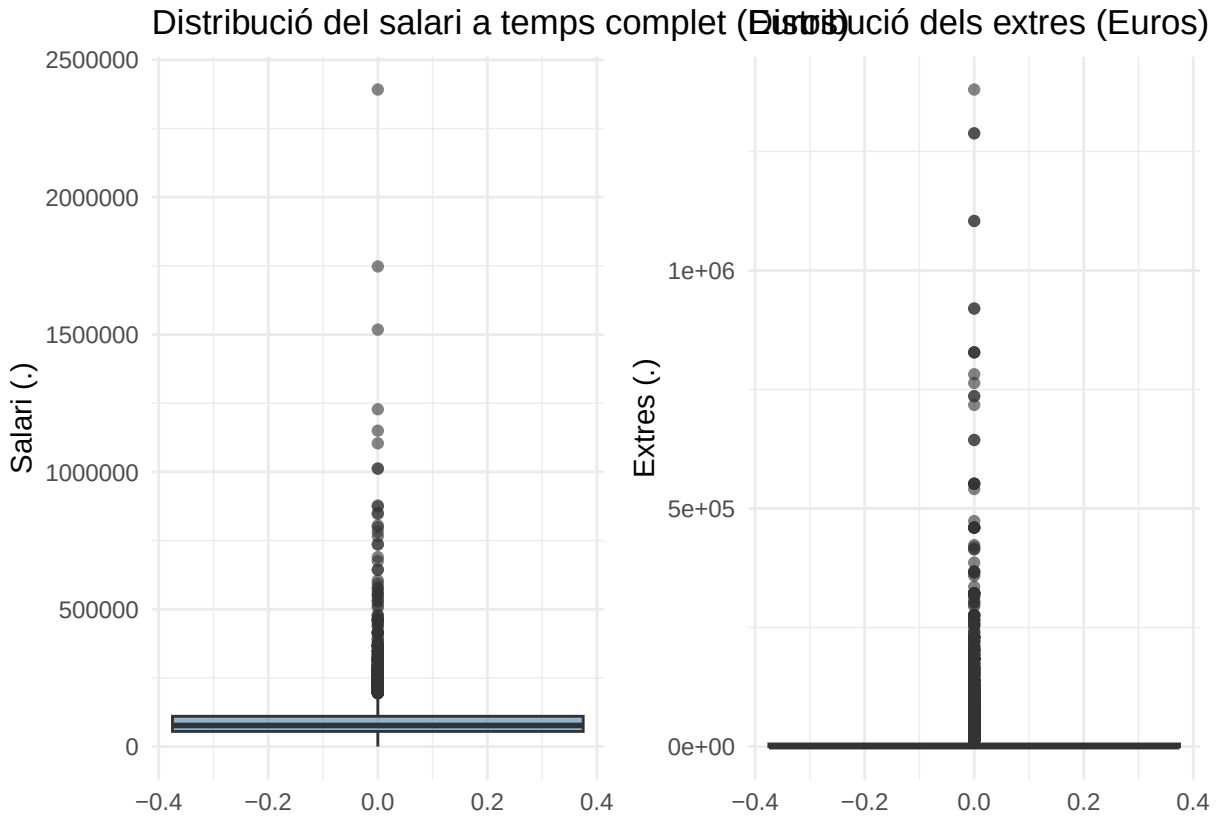
Farem una exploració visual;

```
library(ggplot2)
library(patchwork) # Paquet per combinar gràfics

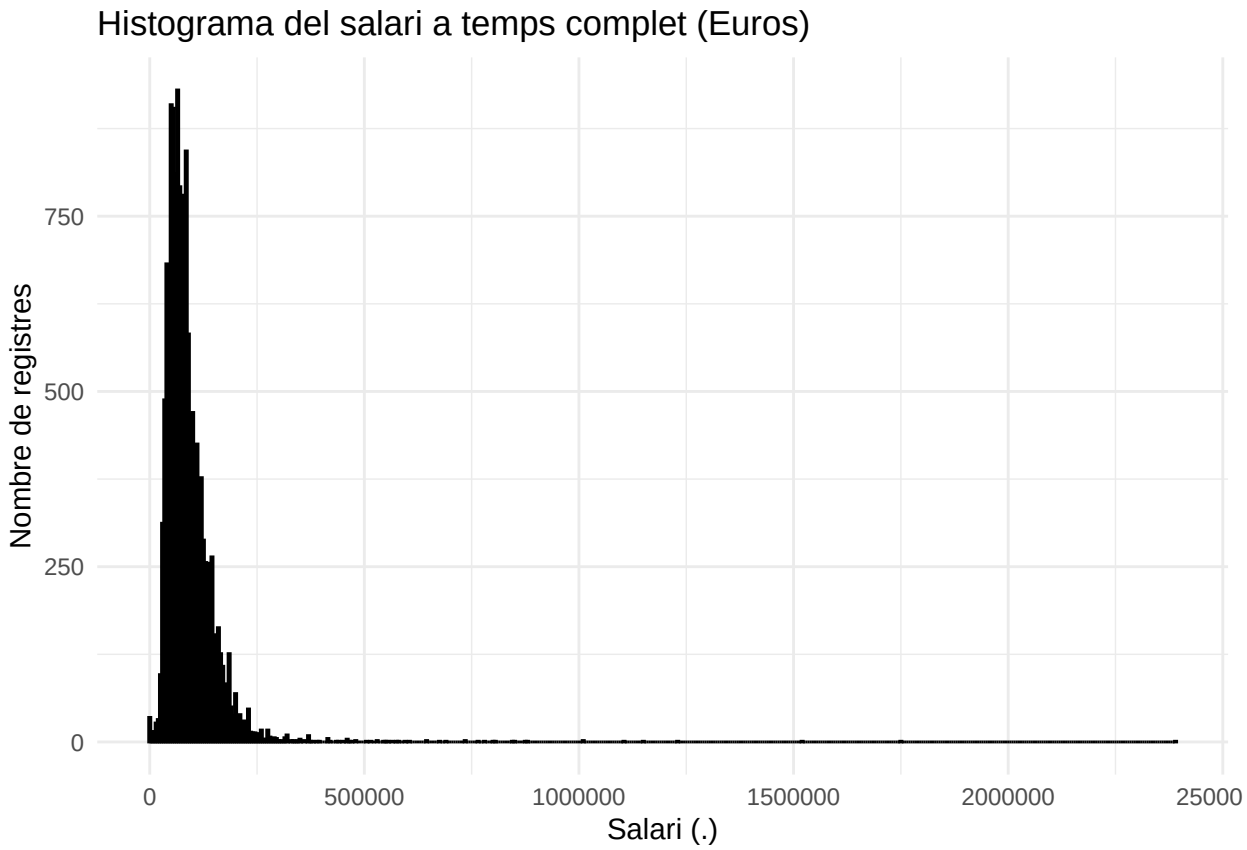
# Creem els dos boxplots
boxplot_salari <- ggplot(salaris_df, aes(y = salari_temps_complert_euros)) +
  geom_boxplot(fill = "steelblue", alpha = 0.6) +
  labs(title = "Distribució del salari a temps complet (Euros)",
       y = "Salari (€)") +
  theme_minimal()

boxplot_extres <- ggplot(salaris_df, aes(y = extres_euros)) +
  geom_boxplot(fill = "tomato", alpha = 0.6) +
  labs(title = "Distribució dels extres (Euros)",
       y = "Extres (€)") +
  theme_minimal()

# Combinar els dos gràfics en una sola figura
boxplot_salari + boxplot_extres
```



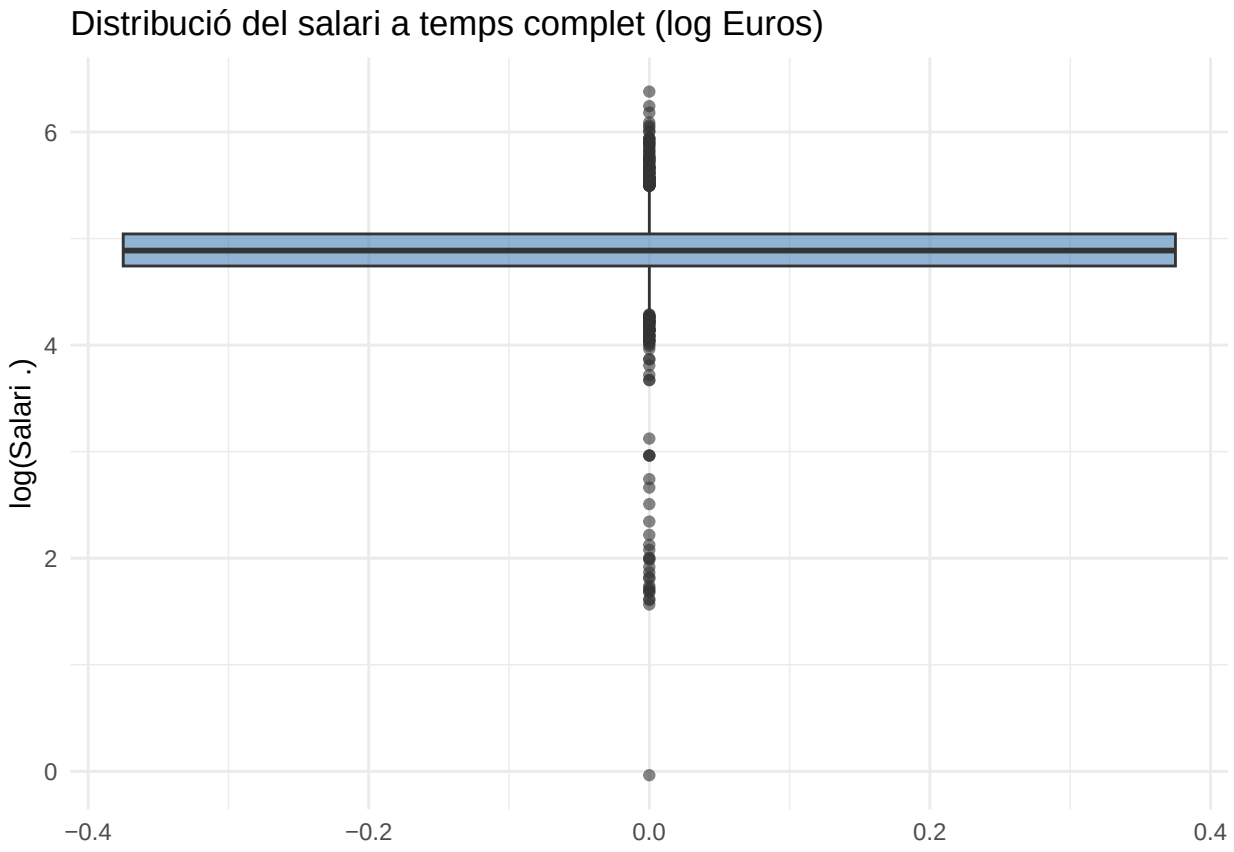

```
ggplot(salaris_df, aes(x = salari_temps_complert_euros)) +
  geom_histogram(binwidth = 5000, fill = "steelblue", color = "black", alpha = 0.7) +
  labs(title = "Histograma del salari a temps complet (Euros)",
       x = "Salari (€)",
       y = "Nombre de registres") +
  theme_minimal()
```



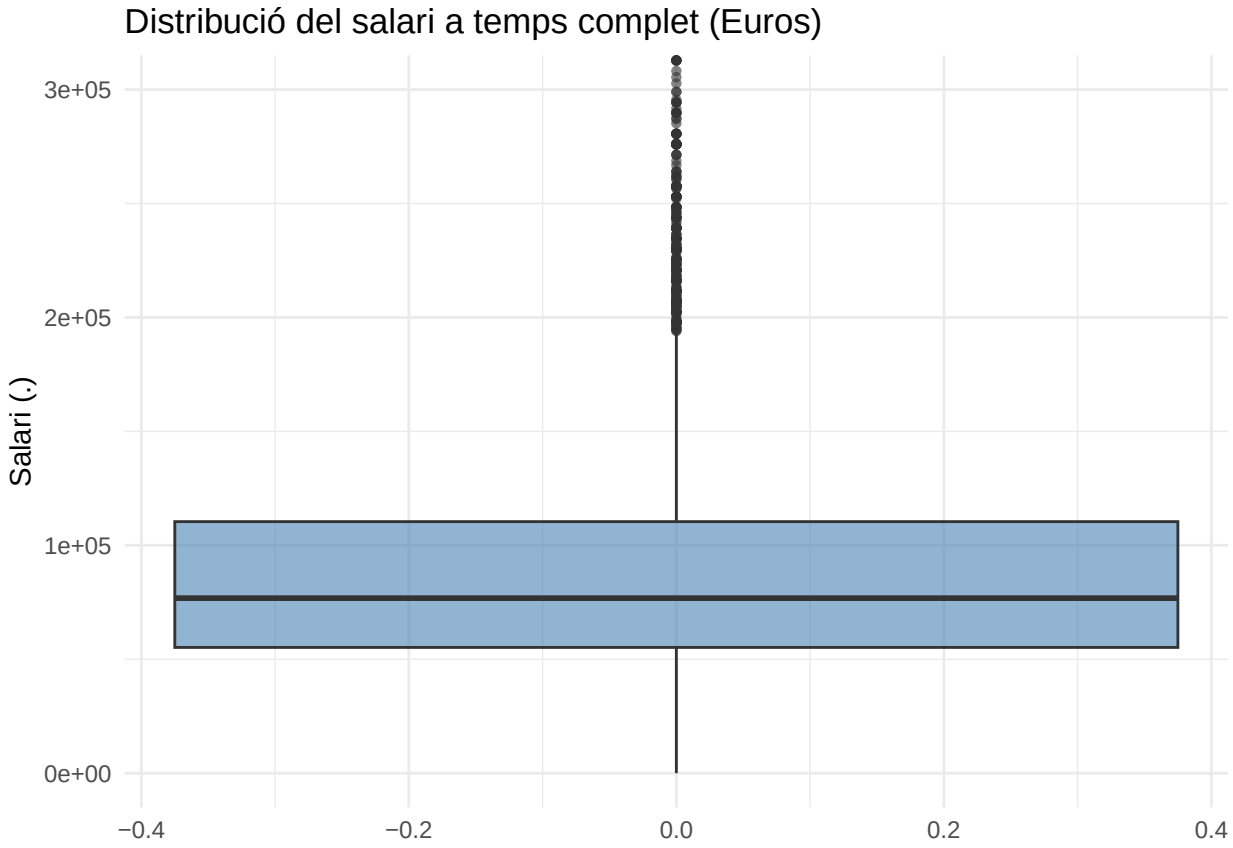
Com podem veure, els boxplots no apareixen correctament dibuixats. Això és degut a l'existència de valors massa grans. Farem una coversió logarítmca de les dades

```
ggplot(salaris_df, aes(y = log10(salari_temps_complert_euros))) +
  geom_boxplot(fill = "steelblue", alpha = 0.6) +
  labs(title = "Distribució del salari a temps complet (log Euros)",
       y = "log(Salari €)") +
  theme_minimal()
```

```
## Warning: Removed 8 rows containing non-finite values (`stat_boxplot()`).
```




```
ggplot(salaris_df, aes(y = salari_temps_complert_euros)) +
  geom_boxplot(fill = "steelblue", alpha = 0.6, outlier.shape = 16) + # Afegim forma als outliers
  coord_cartesian(ylim = c(0, 300000)) + # Ajustem el límit de l'eix Y
  labs(title = "Distribució del salari a temps complet (Euros)",
       y = "Salari (€)") +
  theme_minimal()
```



- Variable salari:

La teva sortida mostra un valor màxim extremadament alt (4.080e+09), cosa que podria indicar la presència d'outliers o fins i tot errors en les dades. Això afecta la mitjana (2.319e+05), que és molt més alta que la mediana (6.808e+04), suggerint que alguns valors extrems estan distorsionant la distribució.

Visualment, podem veure com la representació ens demostra presència outliers.

```
numeric_cols <- sapply(salaris_df, is.numeric)
df_numeric  <- salaris_df[, numeric_cols]

# 2. Aplicar boxplot.stats a cada variable numèrica amb lapply
stats_list <- lapply(df_numeric, boxplot.stats)

# Visualitzar la llista amb els resultats (inclou els outliers per cada variable)
print(stats_list)
```

```
## $salari_temps_complert_euros
## $salari_temps_complert_euros$stats
## [1]      0  55200  76820 110400 193200
##
## $salari_temps_complert_euros$n
## [1] 14836
##
## $salari_temps_complert_euros$conf
## [1] 76103.96 77536.04
##
## $salari_temps_complert_euros$out
##   [1]  211600.0  202400.0  253000.0  644000.0  552000.0  233036.0  204240.0
```

```
##   [8]  358800.0  322000.0  230000.0  205160.0  230000.0  414000.0  202400.0
##  [15]  765440.0  207000.0  207000.0  230000.0  226320.0  575000.0  198129.4
##  [22]  294400.0  331200.0  220800.0  276000.0  197800.0  349600.0  368000.0
##  [29]  287500.0  239200.0  605268.0  207000.0  257600.0  529000.0  216200.0
##  [36]  243800.0  234600.0  239200.0  216200.0  230000.0  287040.0 1012000.0
##  [43]  244950.0  230000.0  243800.0  230000.0  207000.0  224480.0  276000.0
##  [50]  285200.0  211600.0  202400.0  211600.0  194120.0  312800.0  230000.0
##  [57]  225400.0  230000.0  368000.0 1748000.0  211600.0  220800.0  243800.0
##  [64]  196144.0  220800.0  220800.0  202400.0  302680.0  257600.0  257600.0
##  [71]  335800.0  230000.0  230000.0  377200.0  690000.0 1518000.0  230000.0
##  [78]  253000.0  675648.0  349600.0  207000.0  197800.0  230000.0  322000.0
##  [85]  216200.0  230000.0  202400.0  506000.0  207920.0  414000.0  202400.0
##  [92]  225400.0  460000.0  239200.0  211600.0  289800.0  234600.0  202400.0
##  [99]  208945.8  257600.0  312800.0  268640.0  239200.0  644000.0  202400.0
## [106]  230000.0  211600.0  211600.0  334880.0  199640.0 1227999.4  234600.0
## [113]  202400.0  207000.0  213440.0  242880.0  211600.0  216200.0  280600.0
## [120]  211600.0  197800.0  220800.0  276000.0  736000.0  460000.0  230000.0
## [127]  234600.0  202400.0  294400.0  230000.0  230000.0  218960.0  391000.0
## [134]  460000.0  340400.0  207000.0  289800.0  202400.0  220800.0  211600.0
## [141]  197800.0  226320.0  197800.0  248400.0  195040.0  204240.0  253000.0
## [148] 1104000.0  202400.0  220800.0  197800.0  211600.0  207000.0  246560.0
## [155]  248400.0  202400.0  207000.0  805000.0  230000.0  420440.0  252080.0
## [162]  271400.0  230000.0  202400.0  207000.0  220800.0  213440.0  202400.0
## [169]  197800.0  216371.1  216200.0  225400.0  260360.0  322000.0  345000.0
## [176]  197800.0  202400.0  234600.0  207000.0  202400.0  239200.0  202400.0
## [183]  236440.0  257600.0  202400.0  230000.0  211600.0  280600.0  197800.0
## [190]  197800.0  291640.0  207920.0  239200.0  266800.0  564880.0  256680.0
## [197]  220800.0  220800.0  230000.0  478400.0  230000.0  312800.0  312800.0
## [204]  253000.0  202400.0  220800.0  368000.0  209760.0  782000.0  202400.0
## [211]  276000.0  197800.0  195040.0  202400.0  276000.0  464099.5  211600.0
## [218]  243800.0  234600.0  276000.0  736000.0  216200.0  280600.0  225400.0
## [225]  197800.0  220800.0  414000.0  211600.0  207000.0  202400.0  308200.0
## [232]  230000.0 1012000.0  515200.0  218040.0  211600.0  207000.0  207000.0
## [239]  289800.0  215280.0  218040.0  197800.0  229080.0  253000.0  276000.0
## [246]  197800.0  289800.0  197800.0  207920.0  239200.0  276000.0  195040.0
## [253]  395600.0  220800.0  280600.0  276000.0  239200.0  239200.0  368000.0
## [260]  207000.0  197800.0  874000.0  271400.0  271400.0  230000.0  211600.0
## [267]  299000.0  212520.0  414000.0  276000.0  225400.0  554760.0  236440.0
## [274]  253000.0  211600.0  225400.0  441600.0  216200.0  220800.0  261280.0
## [281]  225400.0  257600.0  347760.0  207000.0  261280.0  437000.0  381800.0
## [288]  216200.0  202400.0  220800.0  204240.0  368000.0  223560.0  234600.0
## [295]  257600.0  253000.0  322000.0  246100.0  197800.0  248400.0  197800.0
## [302]  202400.0  197800.0  223100.0  230000.0  239200.0  202400.0  230000.0
## [309]  243800.0  230552.0  276000.0  257600.0  579600.0  216200.0  253000.0
## [316]  211600.0  345000.0  223744.0  220800.0  798560.0  322000.0  230000.0
## [323]  202400.0  216200.0  229080.0  221720.0  207000.0  289800.0  211600.0
## [330]  276000.0  230000.0  262200.0  295550.0  368000.0  230000.0  257600.0
## [337]  230000.0  216200.0  230000.0  245640.0  368000.0  230000.0  248400.0
## [344]  211600.0  211600.0  209760.0  211600.0  202400.0  231840.0  230000.0
## [351]  217620.5  197800.0  243800.0  448960.0  276000.0  202400.0  469200.0
## [358]  230000.0  294400.0  459949.4  211600.0  264040.0  248400.0  478400.0
## [365]  529920.0  216200.0  202400.0  207000.0  222640.0  202400.0  247480.0
## [372]  257600.0  220800.0  223546.2  248400.0  220800.0  220800.0  322000.0
## [379]  202400.0  230920.0  240120.0  236440.0  231840.0  230000.0  218040.0
```

```
## [386]  276000.0  202400.0  211600.0  202400.0  241638.0  220800.0  229080.0
## [393]  846400.0  312800.0  211600.0  202400.0  299000.0  243800.0  216200.0
## [400]  205620.0  202400.0  253000.0  205160.0  253000.0  220800.0  280600.0
## [407]  211600.0  207000.0  276000.0  211600.0  230000.0  877680.0  202400.0
## [414]  211600.0  230000.0  368000.0  207000.0  202400.0  225400.0  234600.0
## [421]  216200.0  322000.0  208380.0  198720.0  223100.0  368000.0  207000.0
## [428]  276000.0  262200.0  216200.0  197800.0  200928.0  197800.0  220800.0
## [435]  207000.0  216200.0  207000.0  360640.0  257600.0  210496.0  305440.0
## [442]  280600.0  211600.0  207000.0  194120.0  205160.0 1150000.0  216200.0
## [449]  239200.0  248400.0  248400.0  280600.0  322000.0  197800.0  294400.0
## [456]  234600.0  211692.0  219420.0  230000.0  230000.0  276000.0  202400.0
## [463]  257600.0  202400.0  347760.0  322000.0  197800.0  216200.0  593400.0
## [470]  198720.0  211600.0  264040.0  195960.0  248400.0  206080.0  414000.0
## [477]  234600.0  851000.0  264040.0  220800.0  329360.0  231840.0  542800.0
## [484]  207000.0  312800.0  322000.0 2392000.0  256680.0
##
##
## $extres_euros
## $extres_euros$stats
## [1]     0     0     0  5520 13800
##
## $extres_euros$n
## [1] 14836
##
## $extres_euros$conf
## [1] -71.60408  71.60408
##
## $extres_euros$out
##    [1]   46000.00   18400.00   36800.00   18400.00   14796.36   18400.00
##    [7]   27600.00   46000.00   50600.00   16146.00   46000.00  173880.00
##   [13]  119600.00   28520.00  161000.00   32200.00   18400.00   28892.60
##   [19]   73600.00   64400.00   25760.00   31280.00   23000.00   16560.00
##   [25]   18400.00   27600.00   92000.00   28119.80   32200.00   23000.00
##   [31]   46000.00   22130.60   18400.00   18400.00   69920.00   78200.00
##   [37]   27600.00   92000.00   18400.00  230000.00   73600.00   36800.00
##   [43]   17664.00  128800.00   27600.00   64400.00   18400.00   14352.00
##   [49]   36800.00   31280.00   55200.00   20700.00  126040.00  101200.00
##   [55]   27600.00   25300.00   92000.00   23000.00   38180.00   15640.00
##   [61]   23000.00  782000.00   16560.00   18400.00   17020.00   92000.00
##   [67]   16560.00   18400.00   16100.00   46000.00   18400.00   41400.00
##   [73]   16560.00   33120.00   27600.00   20240.00   20056.00   18400.00
##   [79]   23000.00   92000.00   20240.00   18400.00   32200.00   46000.00
##   [85]   18768.00   18400.00   23000.00   25760.00   18400.00   46000.00
##   [91]   22080.00   46000.00   18400.00   23000.00   46920.00   46000.00
##   [97]   15640.00   55200.00   14720.00   84640.00   14465.16   18400.00
##  [103]   23920.00   14720.00  418600.00   18400.00   19320.00   18400.00
##  [109]   18400.00   27600.00   48760.00  184000.00   23000.00   18400.00
##  [115]   21160.00   32200.00  202400.00   59800.00   21712.00   16560.00
##  [121]   46000.00   36800.00   18400.00   32200.00   27600.00   18400.00
##  [127]   20681.60   46000.00   55200.00   55200.00   27600.00   73600.00
##  [133]   36800.00   46000.00   14720.00   23000.00   32200.00   92000.00
##  [139]   22149.00   36800.00   50600.00   23000.00   55200.00   23000.00
##  [145]   18400.00   41400.00   55200.00  207000.00   16560.00  128800.00
##  [151]   55200.00   92000.00   18400.00   18400.00   20240.00   41400.00
```

```
##  [157]   82800.00   18400.00   41400.00  115000.00   18400.00  110400.00
##  [163]   69000.00   92000.00   33120.00   15640.00  322000.00   18400.00
##  [169]   18400.00   29440.00   18400.00   14863.52   46000.00   20240.00
##  [175]   27600.00   55200.00   23000.00   32200.00   32200.00   27600.00
##  [181]   23230.00   15180.00   36800.00   18400.00   46000.00  266800.00
##  [187]  358800.00   41952.00  115000.00   36800.00   32200.00   18400.00
##  [193]   23000.00   82800.00   81650.00   23000.00   35880.00  184000.00
##  [199]   36800.00   54280.00   41400.00   59800.00   18400.00   41400.00
##  [205]   18400.00   17940.00   51520.00   34074.04   46000.00  103040.00
##  [211]   23000.00   14720.00   98440.00   32200.00   18400.00   27600.00
##  [217]   15640.00   23000.00   27600.00   18400.00   78200.00   92000.00
##  [223]   50600.00   27600.00   92000.00   64400.00   22540.00   30360.00
##  [229]   34960.00   13860.72   92000.00   46000.00  119600.00   23000.00
##  [235]  222180.00   18400.00   19320.00   18400.00   18400.00   46000.00
##  [241]   27600.00  460000.00   73600.00   23000.00  100280.00   23000.00
##  [247]   40480.00   92000.00   14720.00   79120.00   18400.00   32200.00
##  [253]   18400.00   27600.00   55200.00   23846.40   46000.00   32200.00
##  [259]   18400.00   24840.00   23000.00   36800.00   27600.00   27600.00
##  [265]   23000.00  112240.00   27600.00   33120.00   27600.00   15640.00
##  [271]   18400.00   30360.00   32200.00   17250.00   20976.00   29440.00
##  [277]   21160.00   20700.00   59800.00   18400.00   23000.00   23000.00
##  [283]   22080.00   14260.00  200560.00   18400.00   18400.00   34960.00
##  [289]   27600.00   64400.00   23000.00  151800.00   46000.00   36800.00
##  [295]   20240.00   36800.00   27600.00   31280.00   18400.00   92000.00
##  [301]   18400.00   73600.00   27600.00   18400.00   46000.00   15640.00
##  [307]   17480.00   23000.00   22776.44   92000.00   32200.00   15640.00
##  [313]   23000.00   47840.00   46000.00   23000.00   55200.00   23000.00
##  [319]   18400.00   23000.00   18400.00   21160.00   27600.00   27600.00
##  [325]   14812.00   46000.00   32200.00   23000.00   18400.00   22676.16
##  [331]   23000.00   84640.00   19320.00   14260.00   41400.00  303600.00
##  [337]   14628.00   18400.00   32200.00   46000.00   47840.00   63480.00
##  [343]   34960.00   27600.00  138000.00   14329.92   18400.00  276000.00
##  [349]   32200.00   27600.00   25760.00   18400.00   27600.00   16100.00
##  [355]   46000.00  117300.00   18400.00   14720.00   27600.00   18400.00
##  [361]   18400.00   73600.00  211600.00   17944.60   18400.00   82800.00
##  [367]   55200.00   32200.00   36800.00   39560.00   46000.00   55200.00
##  [373]   27600.00   48760.00   36800.00   23000.00   55200.00   14720.00
##  [379]   23000.00   46000.00   23000.00   23000.00   92000.00  184000.00
##  [385]   92000.00   55200.00  156400.00   71760.00  119600.00   64400.00
##  [391]   23000.00   36800.00   18400.00  106720.00  138000.00   23000.00
##  [397]   73600.00   18400.00   18400.00   92000.00   55200.00   36800.00
##  [403]   95680.00   92000.00  110400.00   15548.00   41400.00   71760.00
##  [409]   41400.00   27600.00   33120.00   14720.00   27600.00   23000.00
##  [415]   23000.00   21160.00   23000.00   24564.00   23000.00   18400.00
##  [421]  101200.00   15525.00   18400.00   32200.00   18400.00   18400.00
##  [427]   41400.00   18400.00   92000.00   23000.00   36800.00   46000.00
##  [433]   55200.00   27600.00  149040.00   36800.00   18400.00   25760.00
##  [439]   27600.00   18400.00   64400.00   62560.00   18400.00   27600.00
##  [445]   18400.00   36800.00  119600.00   18400.00   18400.00  103545.08
##  [451]   41400.00   18400.00   23000.00   18400.00  128800.00   15544.32
##  [457]   69000.00   73600.00   18032.00   16049.40   59800.00   14720.00
##  [463]  230000.00   59800.00   36800.00   18400.00   18400.00   46000.00
##  [469]   22540.00   70840.00   73600.00   64400.00   30360.00   27600.00
##  [475]   36800.00  460000.00   30360.00   46000.00   92000.00   18400.00
```

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##  [481]   25001.00   27600.00   33120.00   69000.00   27600.00   73600.00
##  [487]   55200.00  364320.00   70840.00   23000.00   14720.00   18400.00
##  [493]   69000.00   80960.00   51541.16  184000.00   46000.00   43240.00
##  [499]   18400.00   55200.00   23000.00   19941.00   27600.00   18400.00
##  [505]   23000.00  156400.00   29440.00   59800.00  128800.00  117760.00
##  [511]   55200.00   92000.00   36800.00  220800.00   33580.00   61640.00
##  [517]   46000.00   40480.00   18400.00   16560.00   46000.00   69000.00
##  [523]   36800.00   15180.00   27600.00   18400.00   18400.00   18400.00
##  [529]   23000.00  138000.00  147200.00   23000.00   46000.00   18400.00
##  [535]  115000.00   46000.00   73600.00  473800.00  138000.00   46000.00
##  [541]   96600.00   66700.00   25760.00   38640.00   18400.00   55200.00
##  [547]   36800.00   22080.00   14191.00   46000.00   32200.00   87400.00
##  [553]   15640.00   23000.00   36800.00   46000.00   27600.00  128800.00
##  [559]  317400.00   41400.00   88320.00   73600.00   73600.00  119600.00
##  [565]   27600.00   46000.00   73600.00  184000.00   87400.00   14720.00
##  [571]   31280.00   23000.00  552000.00   23000.00   18400.00  202400.00
##  [577]   46000.00   32200.00   23000.00  147200.00  184000.00   23000.00
##  [583]   15640.00   46000.00   20240.00   14720.00  460000.00   23000.00
##  [589]   36800.00  193200.00   68080.00  147200.00  230000.00   18400.00
##  [595]   27600.00  165600.00   36800.00   46000.00   46000.00   16560.00
##  [601]   23000.00  243800.00   16560.00   46000.00   27600.00   18400.00
##  [607]   27600.00  172040.00   30475.00  138000.00   64400.00   59800.00
##  [613]  220800.00   41400.00  106720.00   55200.00   16560.00   55200.00
##  [619]   18400.00   64400.00   41400.00   23000.00  151800.00   36800.00
##  [625]   17020.00   27600.00   20240.00   17980.48   27600.00   90160.00
##  [631]   27600.00   17020.00   18400.00   32200.00   36800.00   18400.00
##  [637]   36800.00   46000.00   36800.00  322000.00 1104000.00   20240.00
##  [643]   32200.00   81144.00 1104000.00   32200.00  110400.00   49680.00
##  [649]   16560.00   16560.00   55200.00   18400.00   23920.00   18400.00
##  [655]   29440.00  138000.00   21160.00   14260.00   23000.00  184000.00
##  [661]   46920.00  386400.00   27600.00   18400.00   44160.00   27600.00
##  [667]   51520.00   18400.00   23000.00   18400.00   18400.00  257600.00
##  [673]   32200.00   23000.00  138000.00   46000.00   32200.00  138000.00
##  [679]   21160.00   92000.00   69000.00   41400.00  170200.00  138000.00
##  [685]   22080.00  147200.00   41400.00   73600.00   27600.00   32200.00
##  [691]   18400.00   27600.00   23000.00   18400.00   18400.00   27600.00
##  [697]   15640.00   18216.00   23000.00   18400.00   14720.00   44969.60
##  [703]   23000.00   64400.00   59800.00   59800.00   46000.00   41400.00
##  [709]   46000.00   27600.00   41124.00   15640.00   41400.00   32200.00
##  [715]   23000.00   19320.00   30360.00   21160.00   48760.00   36800.00
##  [721]   18400.00   25760.00   47840.00   18400.00   64400.00   22080.00
##  [727]   23460.00  184000.00   36800.00   36800.00   21850.00   27600.00
##  [733]   46000.00   23000.00   36800.00   18400.00   23000.00   35792.60
##  [739]  220800.00   26680.00   67160.00   18400.00   18400.00   15812.04
##  [745]   15364.00   55200.00   34960.00   73600.00   27600.00   17222.40
##  [751]   55200.00   34960.00   55200.00   16560.00   27600.00   18400.00
##  [757]   20240.00   40480.00   27600.00   18400.00   23000.00   46000.00
##  [763]  230000.00   14939.88   46000.00   18400.00   18400.00  184000.00
##  [769]   97520.00   46000.00   23920.00   46000.00   27600.00  128800.00
##  [775]   18400.00   40619.84   85560.00   18400.00   18400.00  101200.00
##  [781]   92000.00   18400.00   18400.00  101200.00   22080.00   24840.00
##  [787]   18400.00   80040.00   18400.00   18400.00   18400.00   46000.00
##  [793]   27600.00   23000.00   27600.00   27600.00  119600.00   92000.00
##  [799]   14720.00   18400.00   34960.00   23000.00   18400.00   16100.00
```

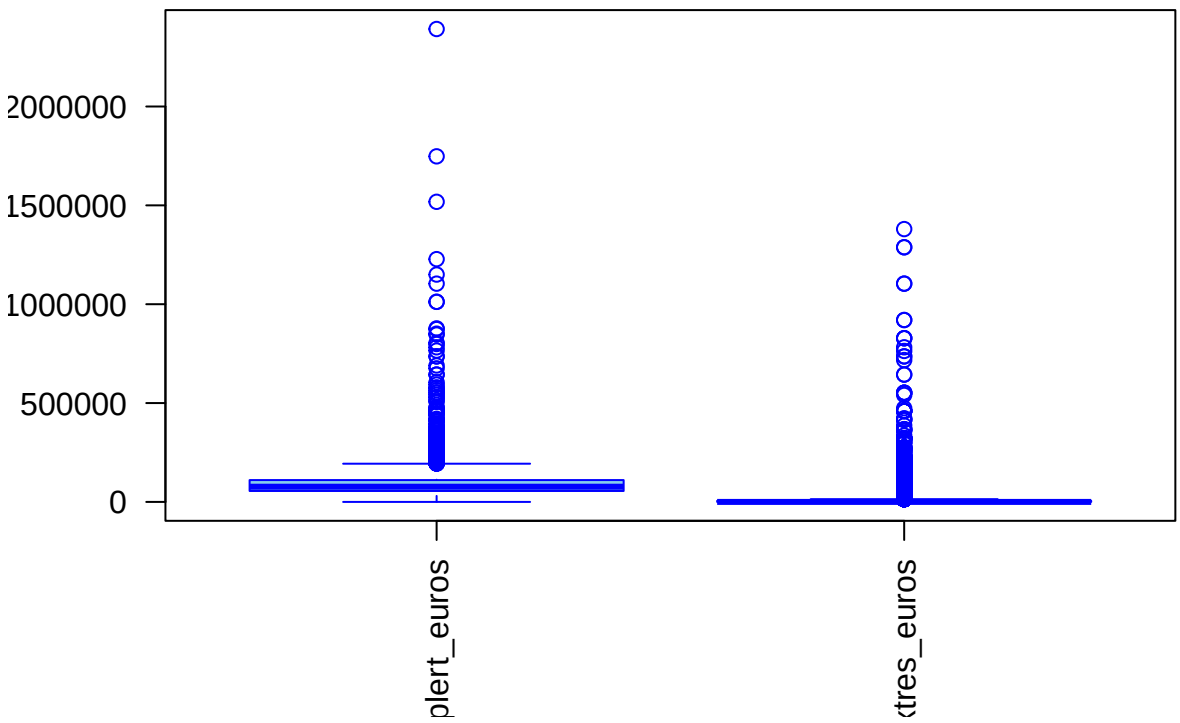
```
##  [805]   65320.00   64400.00   23000.00   16560.00  230000.00   31058.28
##  [811]   53360.00  184000.00   50600.00   46000.00   28980.00  114080.00
##  [817]   27600.00   27600.00   27600.00   18400.00   25760.00   14720.00
##  [823]   38640.00   23000.00   36800.00   92000.00  322000.00   55200.00
##  [829]   27600.00   18400.00   59800.00  142600.00  124200.00   19320.00
##  [835]   36800.00   18400.00   23000.00   18400.00  133400.00   46000.00
##  [841]   27600.00   59340.00   23000.00  128800.00   30360.00   27600.00
##  [847]   25760.00   59800.00   41400.00   32200.00   46000.00   55200.00
##  [853]   46000.00   27600.00   20240.00   82800.00   18400.00   18400.00
##  [859]  124200.00   69000.00   36800.00   25760.00   27600.00   69000.00
##  [865]   92000.00   18400.00   59800.00   92000.00  275080.00  128800.00
##  [871]   15916.00   59800.00   87400.00   46000.00   23000.00   18400.00
##  [877]   17480.00   16560.00   27600.00   46000.00  828000.00   20240.00
##  [883]   33120.00  138000.00   27600.00   18400.00   15870.00   64400.00
##  [889]   27600.00   59800.00   18400.00   73600.00   18400.00   36800.00
##  [895]   46000.00   18400.00   36800.00   92000.00  152720.00   23000.00
##  [901]  140300.00   27600.00   44160.00   46000.00   64400.00   18400.00
##  [907]  109020.00   32200.00   27600.00  138000.00   27600.00   73600.00
##  [913]   69000.00   23000.00   18400.00   23000.00  156400.00   23000.00
##  [919]  143520.00   18400.00   18400.00   29440.00   46000.00   23000.00
##  [925]   67160.00   36800.00   87400.00   44160.00  105800.00   18400.00
##  [931]   92000.00   24840.00   27600.00   21160.00   95680.00   23000.00
##  [937]   46000.00   18400.00   40480.00   69000.00   36800.00  119600.00
##  [943]   96600.00   18400.00  163760.00   14720.00  138000.00   15180.00
##  [949]   18400.00   27600.00   18400.00   14720.00   41400.00   36800.00
##  [955]   18400.00   46000.00   30360.00   32200.00  184000.00   23000.00
##  [961]   19320.00   18400.00   48760.00  276000.00   36800.00   55200.00
##  [967]   50600.00   14720.00   46000.00  119600.00   18400.00   69000.00
##  [973]   18400.00   59800.00   59800.00   19320.00   78200.00   18400.00
##  [979]  213279.00   14720.00  165600.00   18400.00  101200.00  101200.00
##  [985]   18400.00   18400.00   19320.00  335800.00   18400.00   40480.00
##  [991]   55200.00   27600.00   64400.00   46000.00   59800.00   18400.00
##  [997]   18400.00   55200.00   18400.00   82800.00   16187.40  101200.00
## [1003]   14720.00   46000.00   46000.00   32200.00  138000.00   87400.00
## [1009]  414000.00   27600.00   27600.00   55200.00   18400.00   24840.00
## [1015]  322000.00  119600.00   18400.00   47181.28   23000.00   92000.00
## [1021]   18400.00   82800.00   18400.00   92000.00   34040.00   27600.00
## [1027]   27600.00   36800.00   32200.00   55200.00   50600.00   16560.00
## [1033]   18400.00   22080.00   18400.00   23000.00   59800.00   87400.00
## [1039]   21160.00   23000.00  294400.00   18400.00  114080.00   36800.00
## [1045]   32200.00   23000.00   27600.00   18400.00   66240.00   14076.00
## [1051]   18400.00  161000.00  193200.00   15640.00   64400.00   46000.00
## [1057]   18400.00   41400.00   93840.00   94760.00   71760.00   18400.00
## [1063]   18400.00   24840.00   41400.00  230000.00   23000.00  135240.00
## [1069]   31280.00  202400.00   18400.00   41400.00   92000.00   18400.00
## [1075]  179400.00   18400.00   18400.00   16100.00  303600.00  138000.00
## [1081]   73600.00   55200.00   27600.00   18400.00  276000.00   23000.00
## [1087]  136160.00   41400.00   55200.00   55200.00   64400.00   64400.00
## [1093]  110400.00   59800.00  317400.00   73600.00   24840.00  230000.00
## [1099]   62560.00   92000.00  368000.00   78200.00   36800.00   18400.00
## [1105]   18400.00   69000.00   46000.00  138000.00   18400.00  736000.00
## [1111]   21620.00   23000.00   18400.00  138000.00   18400.00  322000.00
## [1117]   41400.00   46000.00   20240.00   22080.00   14720.00   73600.00
## [1123]   18400.00   18400.00   69000.00   36800.00   18400.00   19320.00
```

```
## [1129]   64400.00   32200.00   18400.00   55200.00  239200.00  119600.00
## [1135]  138000.00   32200.00   41216.00   16560.00   73600.00  763600.00
## [1141]  552000.00  174800.00  264960.00   27600.00   35880.00   55200.00
## [1147]   55200.00   16100.00  138000.00   73600.00   18400.00   73600.00
## [1153]  110400.00   17480.00   18400.00   36800.00   27600.00   92000.00
## [1159]  253000.00  119600.00   55200.00   29440.00   18400.00   46000.00
## [1165]   18400.00   23920.00  207000.00   41400.00  828000.00   92000.00
## [1171]   15180.00   18400.00   16100.00 1288000.00   29440.00   18400.00
## [1177]   18400.00  312800.00 1288000.00   23000.00   46000.00   18400.00
## [1183]   55200.00  184000.00  184000.00   15640.00  552000.00  163760.00
## [1189]   41400.00  184920.00   46000.00   46000.00   27600.00  225860.00
## [1195]   27600.00   73600.00  110400.00   23000.00   55200.00  644000.00
## [1201]  174800.00   34960.00  552000.00   15640.00  115000.00   14720.00
## [1207]   46000.00  110400.00   23000.00   20700.00   22632.00   46000.00
## [1213]   23000.00   17940.00   33120.00  299000.00   26680.00   83720.00
## [1219]   21785.60   18400.00   18400.00   36800.00   18400.00  540960.00
## [1225]   18400.00   92000.00  828000.00   51520.00   92000.00   52440.00
## [1231]   92000.00   96600.00   27186.00   57500.00   32200.00   46000.00
## [1237]   29152.04   18400.00   78200.00   23000.00   64400.00   55200.00
## [1243]   40480.00   43589.60  184000.00   92000.00   23000.00   75440.00
## [1249]  202400.00   23000.00  184000.00   17940.00   36800.00   27600.00
## [1255]   69000.00   55200.00   27600.00   14720.00   92000.00  151800.00
## [1261]  211600.00   32200.00  193200.00   36800.00   25760.00   59800.00
## [1267]   18400.00   36800.00   46000.00   33672.00   59800.00   27600.00
## [1273]   46000.00   23000.00  368000.00   92000.00   21160.00   14720.00
## [1279]   16100.00   23000.00   27600.00   27600.00   24840.00   18400.00
## [1285]   55200.00   27600.00   18400.00   23920.00  124200.00   27600.00
## [1291]   64400.00   18400.00   16560.00   18400.00   27600.00   18400.00
## [1297]   27600.00   14720.00  184000.00   23000.00   36800.00   27600.00
## [1303]  133400.00   19320.00  128800.00   15502.00   46000.00   14600.40
## [1309]  460000.00   34960.00   23000.00  174800.00   18400.00  119600.00
## [1315]   73600.00   23000.00   50600.00   64400.00  165600.00   92000.00
## [1321]   18400.00   23000.00   23000.00   23000.00  167440.00  110400.00
## [1327]   24840.00   23000.00   18400.00   77050.00   32200.00   23000.00
## [1333]   23000.00   36800.00  230000.00  110400.00   27600.00   18400.00
## [1339]   27444.52   18400.00   16560.00  423200.00   82800.00   23000.00
## [1345]   22080.00   31280.00   36800.00   36800.00   18400.00   27600.00
## [1351]   73600.00   18400.00   42814.04   18400.00   16560.00   23000.00
## [1357]   18400.00   14720.00   20240.00   27600.00   16560.00   36800.00
## [1363]   33009.60   46000.00   26680.00   23000.00   18400.00   46000.00
## [1369]   18400.00   18400.00   38640.00  366160.00   18400.00   92000.00
## [1375]   46008.28   18400.00   23000.00   18400.00   16560.00   22866.60
## [1381]   18400.00   16560.00   31280.00   73600.00   21160.00   23000.00
## [1387]  239200.00   28520.00   69000.00   20700.00   92000.00  920000.00
## [1393]   31280.00  267720.00   92000.00   16560.00   18400.00   33350.00
## [1399]   20240.00   14720.00   24840.00   27600.00  138000.00  207000.00
## [1405]   46000.00   18400.00   23000.00   46000.00   32200.00   25300.00
## [1411]  717600.00   80960.00   18400.00   22080.00  202400.00  101200.00
## [1417]   20700.00   46000.00   14720.00   18400.00   46000.00   46000.00
## [1423]  101200.00   16560.00   18400.00   23000.00   18400.00   41400.00
## [1429]   27600.00   16100.00   34405.24   55200.00   36800.00  129720.00
## [1435]   19320.00  110400.00   36800.00   16560.00  161000.00   18400.00
## [1441]   47840.00  103040.00   16560.00   24380.00   32200.00   18400.00
## [1447]  460000.00   62560.00   19320.00   18400.00   55200.00   80960.00
```

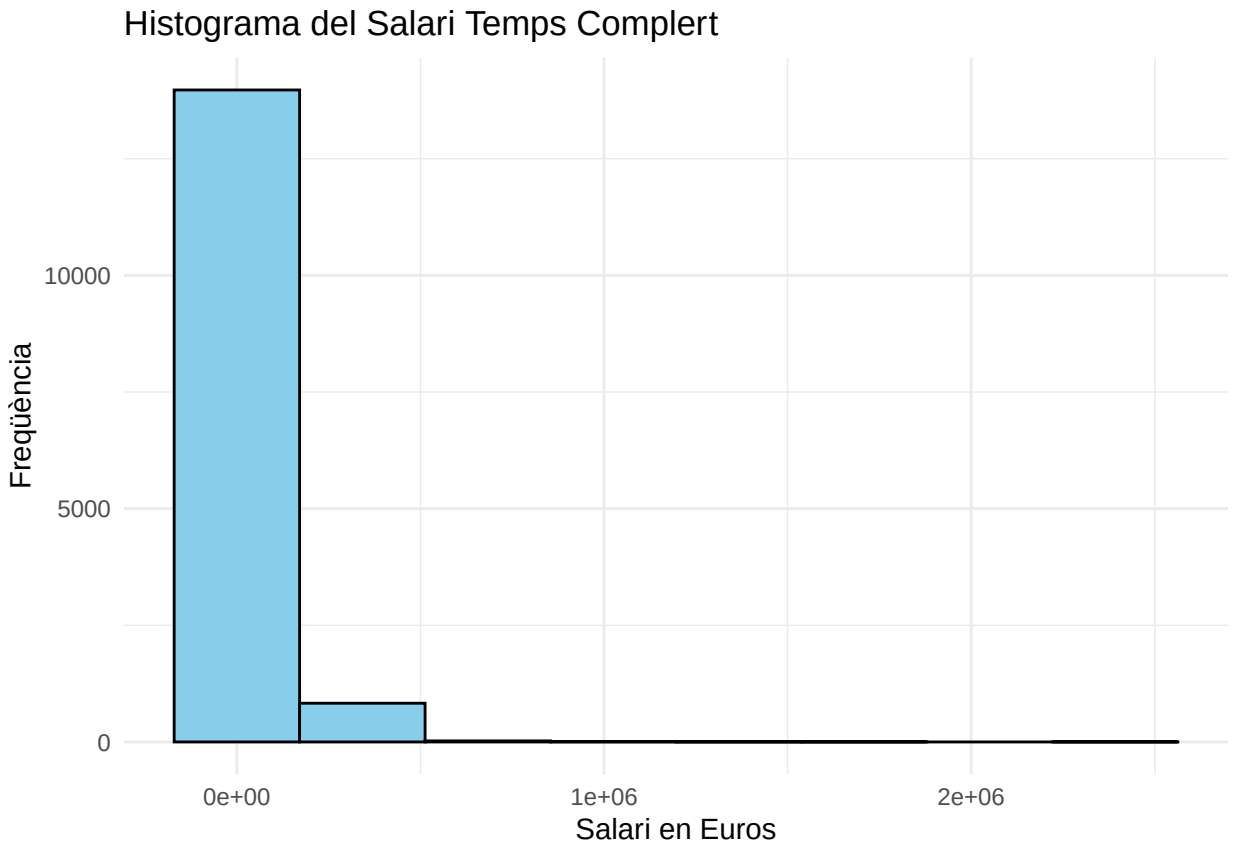
```
## [1453]   58696.00   16560.00   36800.00   23000.00   46000.00   42320.00
## [1459]   20240.00   21942.00   31280.00  184000.00   16100.00   14720.00
## [1465]   18400.00   69000.00   60409.04   46000.00   27600.00   44160.00
## [1471]   46000.00  126960.00   55200.00   77464.00   32200.00  197800.00
## [1477]   18400.00   69000.00   73600.00   14720.00   16560.00   55200.00
## [1483]   14720.00   32200.00   82800.00   36800.00   16560.00   18400.00
## [1489]   32200.00   47840.00  165600.00   36800.00   14720.00   34960.00
## [1495]  151800.00   69000.00  156400.00   32200.00  276000.00   14720.00
## [1501]   24840.00   40480.00   27600.00   14720.00   47840.00   18400.00
## [1507]   27600.00   32200.00   23000.00   18400.00   23000.00   75440.00
## [1513]   64400.00   18400.00   27600.00   27600.00   23000.00   18400.00
## [1519]   39560.00  119600.00   16560.00   27600.00   55200.00  101200.00
## [1525]  156400.00   23920.00  115000.00   47840.00   46000.00   18400.00
## [1531]  105800.00   17940.00   21160.00   41400.00   46000.00   69000.00
## [1537]   36800.00   64400.00   18400.00   59800.00   50600.00   23000.00
## [1543]   17020.00   25760.00   22080.00   18400.00   96600.00   23000.00
## [1549]  322000.00   92000.00  119600.00   73600.00   18400.00   59800.00
## [1555]   36800.00   87400.00   23920.00   59800.00   36800.00   50600.00
## [1561]   27600.00   23000.00   92000.00  184000.00   69000.00  124200.00
## [1567]   73600.00  322000.00   23000.00   36800.00   46000.00  138000.00
## [1573]   16560.00   45080.00   78200.00   92000.00   27600.00   92000.00
## [1579]   27600.00  276000.00   73600.00   73600.00   41400.00   18400.00
## [1585]   46000.00  101200.00   18400.00   23000.00   27600.00   23000.00
## [1591]  460000.00   55200.00   43516.00   46000.00   92000.00   23000.00
## [1597]   27600.00   27600.00   38640.00   27600.00   55200.00   18400.00
## [1603]   92000.00   23000.00   92000.00   23000.00   32200.00   20240.00
## [1609]   36800.00   28520.00   16100.00   18400.00  139840.00   46000.00
## [1615]   18400.00   92000.00   23000.00   32200.00   32200.00  138000.00
## [1621]   23000.00   27600.00   18400.00  920000.00   36800.00   18400.00
## [1627]   23000.00   15787.20   23000.00   23000.00   64400.00   23000.00
## [1633]   36800.00   73600.00   32200.00   22080.00   20240.00   18400.00
## [1639]   46000.00   18400.00   39560.00  125120.00   92000.00   26680.00
## [1645]   26220.00   23000.00   36800.00   24380.00   18400.00   16560.00
## [1651]   27600.00   23000.00   27600.00   33120.00  414736.00   55200.00
## [1657]   36800.00   14720.00  736000.00   16560.00   18400.00   36800.00
## [1663]   82800.00   73600.00  184000.00   18400.00   36800.00   64400.00
## [1669]   37260.00  119600.00   18400.00   16100.00   46000.00   23000.00
## [1675]   32200.00   92000.00   23000.00   18400.00   18400.00   73600.00
## [1681]   14720.00   18400.00   18400.00   69000.00   84640.00   36432.00
## [1687]   46000.00  184000.00   18400.00   18400.00   18400.00   35401.60
## [1693]   41400.00   73600.00   21850.00   18400.00   36800.00   24840.00
## [1699]   27600.00   36800.00   21528.00  138000.00   69000.00   36800.00
## [1705]   18400.00   46000.00   23000.00   59800.00  230000.00  165232.00
## [1711]   31050.00   55200.00   18400.00   16560.00  322000.00   27600.00
## [1717]   25760.00   46000.00   20240.00  257600.00   27600.00  156400.00
## [1723]  110400.00  128800.00   23000.00   27600.00   92000.00   36800.00
## [1729]   18400.00   64400.00   16560.00   23000.00   23000.00   23000.00
## [1735]  184000.00   46000.00  257600.00  193200.00   23000.00   23000.00
## [1741]   15640.00   14720.00   18400.00   49450.00   32200.00   23000.00
## [1747]   36800.00   29440.00   23920.00   14720.00  124200.00  644000.00
## [1753]   18400.00   36800.00   36800.00   18400.00   25760.00   33120.00
## [1759]   23000.00   16560.00   59800.00  253000.00  110400.00   34500.00
## [1765]   27600.00   18400.00   46000.00   18400.00   23000.00   18400.00
## [1771]   36800.00   23000.00   18400.00   23000.00   23000.00   46000.00
```

```
## [1777]   16560.00   69920.00   14204.80   22080.00   32200.00   27600.00
## [1783]   20240.00   23460.00   46000.00   36800.00   27600.00  202400.00
## [1789]   26680.00   92000.00   27600.00   36800.00   16560.00   23000.00
## [1795]   77280.00  138000.00   33120.00  110400.00   18400.00   25760.00
## [1801]   46000.00   46000.00  161000.00   25760.00  184000.00   18400.00
## [1807]   15640.00   23000.00   32200.00   14720.00   15640.00  184000.00
## [1813]   23000.00   64400.00  108560.00   16192.00  124200.00   92000.00
## [1819]   36800.00   27600.00   36800.00   19320.00   18400.00   19320.00
## [1825]   18400.00   17480.00   31280.00   16560.00   22080.00   19913.40
## [1831]   27600.00   43240.00   77280.00   95680.00   23000.00   18400.00
## [1837]   29440.00   23000.00   55200.00   20240.00   81880.00   18400.00
## [1843] 1380000.00   14352.00   55200.00   15640.00   32200.00   27600.00
## [1849]   17940.00   27600.00   27600.00   36800.00   30360.00   27600.00
## [1855]  266800.00   27600.00   18400.00   46000.00   18400.00   20240.00
## [1861]   27600.00  138000.00  189520.00   14260.00   23000.00   15870.00
## [1867]   41400.00   32200.00   18400.00   22245.60   39744.00   78200.00
## [1873]   16560.00   36800.00   18400.00   46000.00  105984.00   32200.00
## [1879]   50600.00   16560.00   16560.00   18400.00   14720.00   46000.00
## [1885]   27600.00   19320.00   29440.00   32200.00  190440.00   34224.00
## [1891]  113620.00   41400.00   36800.00   27600.00   73600.00   93840.00
## [1897]   23000.00   73600.00   23000.00   55200.00   27600.00   82800.00
## [1903]   18400.00   41400.00   23920.00   19136.00   15640.00   18400.00
## [1909]   55200.00   29440.00   18400.00   18400.00   27600.00   36800.00
## [1915]   19320.00   46000.00
```

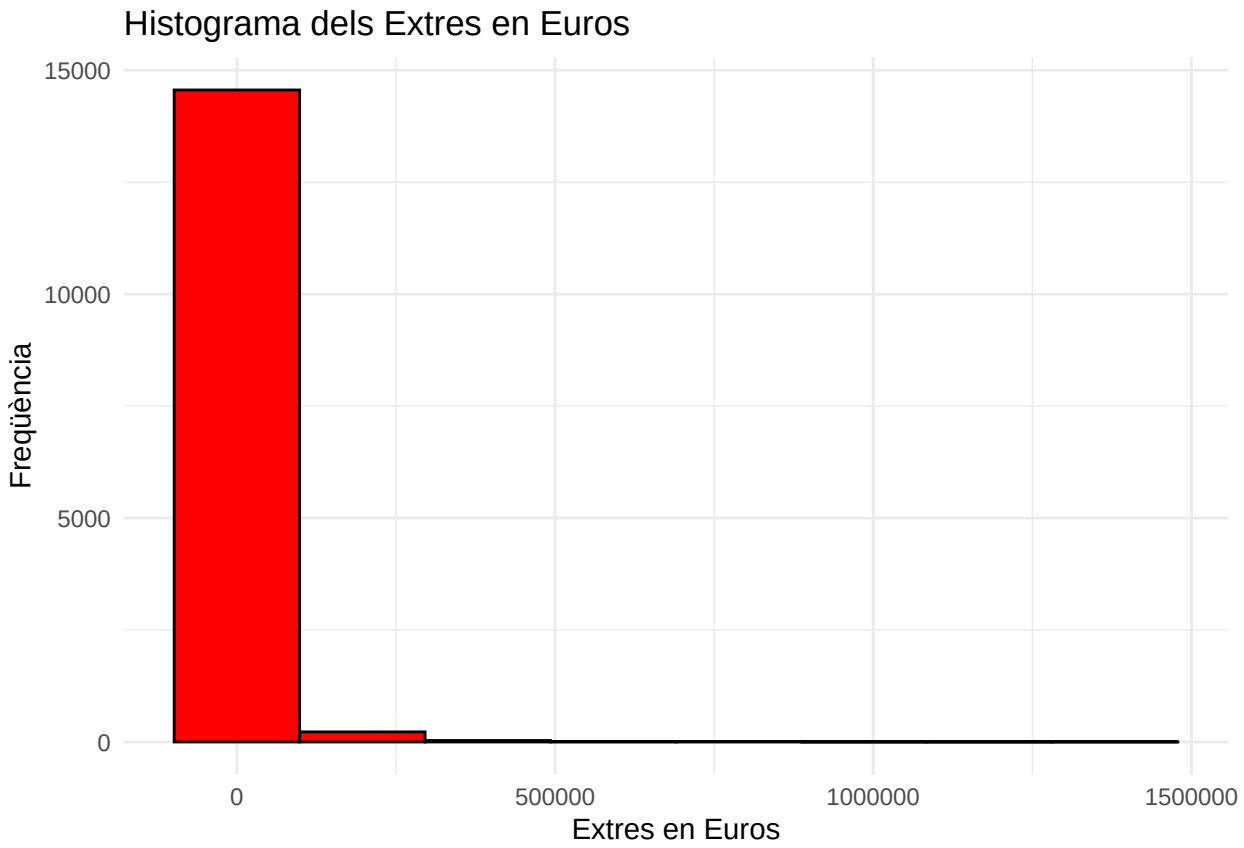
```r
# 3. Dibuixar els boxplots de totes les variables numèriques en una única figura
boxplot(df_numeric,
        main = "Boxplots de les variables numèriques",
        las = 2,           # Rota les etiquetes per millorar la visualització (verticals)
        col = "skyblue",   # Color de les caixes (opcional)
        border = "blue")   # Color dels contorns (opcional)
```




```r
library(ggplot2)

# Histograma del salari temps complet
ggplot(salaris_df, aes(x = salari_temps_complert_euros)) +
  geom_histogram(bins = 8, fill = "skyblue", color = "black") +
  labs(title = "Histograma del Salari Temps Complert",
       x = "Salari en Euros",
       y = "Freqüència") +
  theme_minimal()
```




```
# Histograma dels extres
ggplot(salaris_df, aes(x = extres_euros)) +
  geom_histogram(bins = 8, fill = "red", color = "black") +
  labs(title = "Histograma dels Extres en Euros",
       x = "Extres en Euros",
       y = "Freqüència") +
  theme_minimal()
```



El nostre estudi es centrarà en sous que es considerin "més normals", valors del rang de [15.000,150.000] euros.

```
num_regs_baix_salari <- sum(salaris_df$salari_temps_complert_euros < 15000, na.rm = TRUE)
num_regs_alt_salari <- sum(salaris_df$salari_temps_complert_euros > 150000, na.rm = TRUE)

print(paste("Registres < 15.000 euros:", num_regs_baix_salari))
```

```
## [1] "Registres < 15.000 euros: 70"
```

```
print(paste("Registres > 150.000 euros:", num_regs_alt_salari))
```

```
## [1] "Registres > 150.000 euros: 1492"
```

```
library(dplyr)

salaris_df_filtrat <- salaris_df %>%
  filter(salari_temps_complert_euros >= 15000 & salari_temps_complert_euros <= 150000)
```

Tornem a avaluar els resultats:

```
#, "salari_eur"

summary(salaris_df_filtrat[, sapply(salaris_df_filtrat, is.numeric)])
```

```
##  salari_temps_complert_euros  extres_euros
##  Min.   : 15640              Min.   :      0
##  1st Qu.: 53360              1st Qu.:      0
##  Median : 72680              Median :      0
##  Mean   : 76927              Mean   :   5304
```

```
##  3rd Qu.: 96600              3rd Qu.:   4600
##  Max.   :149960              Max.   :1104000
```

```r
salaris_df<-salaris_df_filtrat[]
rm(salaris_df_filtrat)

numeric_cols <- sapply(salaris_df, is.numeric)
df_numeric  <- salaris_df[, numeric_cols]

# 2. Aplicar boxplot.stats a cada variable numèrica amb lapply
stats_list <- lapply(df_numeric, boxplot.stats)

# Visualitzar la llista amb els resultats (inclou els outliers per cada variable)
print(stats_list)
```

```
## $salari_temps_complert_euros
## $salari_temps_complert_euros$stats
## [1]  15640  53360  72680  96600 149960
##
## $salari_temps_complert_euros$n
## [1] 13274
##
## $salari_temps_complert_euros$conf
## [1] 72087.02 73272.98
##
## $salari_temps_complert_euros$out
## numeric(0)
##
##
## $extres_euros
## $extres_euros$stats
## [1]     0     0     0  4600 11500
##
## $extres_euros$n
## [1] 13274
##
## $extres_euros$conf
## [1] -63.08324  63.08324
##
## $extres_euros$out
##    [1]   13800.00   46000.00   18400.00   11960.00   18400.00   14796.36
##    [7]   13800.00   18400.00   46000.00   50600.00   12880.00   16146.00
##   [13]   46000.00  173880.00   11960.00   13800.00   28520.00   12880.00
##   [19]   32200.00   28892.60   25760.00   23000.00   13800.00   12160.56
##   [25]   16560.00   18400.00   27600.00   12880.00   28119.80   32200.00
##   [31]   23000.00   11960.00   46000.00   22130.60   18400.00   18400.00
##   [37]   69920.00   78200.00   27600.00   13800.00   92000.00   13800.00
##   [43]   12880.00   17664.00  128800.00   18400.00   14352.00   36800.00
##   [49]   20700.00  126040.00   27600.00   25300.00   12880.00   23000.00
##   [55]   38180.00   15640.00   23000.00   16560.00   18400.00   17020.00
##   [61]   92000.00   16560.00   18400.00   16100.00   18400.00   41400.00
##   [67]   16560.00   33120.00   20240.00   12880.00   20056.00   18400.00
##   [73]   23000.00   20240.00   18400.00   12880.00   32200.00   46000.00
##   [79]   18768.00   18400.00   25760.00   18400.00   13800.00   12880.00
##   [85]   18400.00   23000.00   15640.00   13800.00   14720.00   14465.16
```

```
##   [91]   18400.00   23920.00   14720.00  418600.00   13800.00   18400.00
##   [97]   19320.00   18400.00   13800.00   18400.00  184000.00   18400.00
##  [103]   21160.00   13800.00   32200.00  202400.00   59800.00   13800.00
##  [109]   21712.00   16560.00   36800.00   13800.00   32200.00   27600.00
##  [115]   18400.00   11960.00   13800.00   20681.60   46000.00   55200.00
##  [121]   55200.00   27600.00   73600.00   13800.00   13800.00   14720.00
##  [127]   23000.00   32200.00   22149.00   36800.00   23000.00   13800.00
##  [133]   18400.00   13800.00  207000.00   16560.00  128800.00   55200.00
##  [139]   92000.00   12880.00   18400.00   13800.00   20240.00   41400.00
##  [145]   82800.00   18400.00   41400.00  115000.00   11960.00   13110.00
##  [151]   69000.00   33120.00   15640.00   18400.00   18400.00   13800.00
##  [157]   29440.00   18400.00   11960.00   14863.52   20240.00   55200.00
##  [163]   32200.00   27600.00   23230.00   15180.00   18400.00   41952.00
##  [169]   36800.00   32200.00   18400.00   23000.00   82800.00   23000.00
##  [175]   35880.00   11960.00  184000.00   36800.00   41400.00   59800.00
##  [181]   18400.00   41400.00   18400.00   17940.00   13800.00   13800.00
##  [187]   34074.04   23000.00   14720.00   98440.00   11960.00   11960.00
##  [193]   13800.00   13800.00   13800.00   15640.00   13800.00   27600.00
##  [199]   18400.00   13800.00   11684.00   50600.00   64400.00   13800.00
##  [205]   13800.00   13800.00   34960.00   13860.72   46000.00   23000.00
##  [211]   13800.00   12880.00   13800.00   18400.00   19320.00   18400.00
##  [217]   18400.00   13800.00   27600.00   73600.00   23000.00   13800.00
##  [223]   23000.00   40480.00   14720.00   79120.00   13800.00   18400.00
##  [229]   18400.00   27600.00   23846.40   32200.00   18400.00   24840.00
##  [235]   23000.00   27600.00   23000.00  112240.00   33120.00   27600.00
##  [241]   15640.00   13800.00   11992.20   13800.00   17250.00   13800.00
##  [247]   13800.00   20976.00   13800.00   29440.00   21160.00   20700.00
##  [253]   18400.00   23000.00   23000.00   13800.00   22080.00   13800.00
##  [259]   13800.00   14260.00   13800.00   18400.00   13800.00   18400.00
##  [265]   34960.00   64400.00   23000.00   46000.00   20240.00   12254.40
##  [271]   12236.00   18400.00   18400.00   13800.00   27600.00   18400.00
##  [277]   13800.00   46000.00   15640.00   17480.00   23000.00   22776.44
##  [283]   32200.00   15640.00   23000.00   23000.00   12880.00   11960.00
##  [289]   13800.00   18400.00   13800.00   23000.00   21160.00   27600.00
##  [295]   27600.00   14812.00   23000.00   11960.00   18400.00   22676.16
##  [301]   84640.00   19320.00   14260.00   13800.00   14628.00   18400.00
##  [307]   46000.00   47840.00   63480.00   34960.00   27600.00   14329.92
##  [313]   12880.00   18400.00   27600.00   25760.00   46000.00   13800.00
##  [319]   18400.00   14720.00   13800.00   18400.00   73600.00   17944.60
##  [325]   18400.00   82800.00   39560.00   46000.00   27600.00   36800.00
##  [331]   23000.00   14720.00   46000.00   23000.00   13800.00   55200.00
##  [337]   13800.00  119600.00   13800.00   36800.00   18400.00  106720.00
##  [343]   13800.00   13800.00   13800.00   18400.00   18400.00   12420.00
##  [349]   55200.00   36800.00   95680.00   41400.00   41400.00   13800.00
##  [355]   33120.00   14720.00   23000.00   23000.00   21160.00   13800.00
##  [361]   23000.00   18400.00   11960.00   15525.00   18400.00   32200.00
##  [367]   18400.00   18400.00   41400.00   13800.00   18400.00   36800.00
##  [373]   27600.00   13432.00  149040.00   25760.00   18400.00   12880.00
##  [379]   13800.00   18400.00   27600.00   36800.00   18400.00   18400.00
##  [385]  103545.08   12880.00   41400.00   18400.00  128800.00   18032.00
##  [391]   16049.40   59800.00   14720.00   13800.00   36800.00   18400.00
##  [397]   18400.00   46000.00   22540.00   13800.00   13800.00   30360.00
##  [403]   13800.00   27600.00   30360.00   12880.00   25001.00   27600.00
##  [409]   13800.00   27600.00   13800.00   70840.00   23000.00   14720.00
```

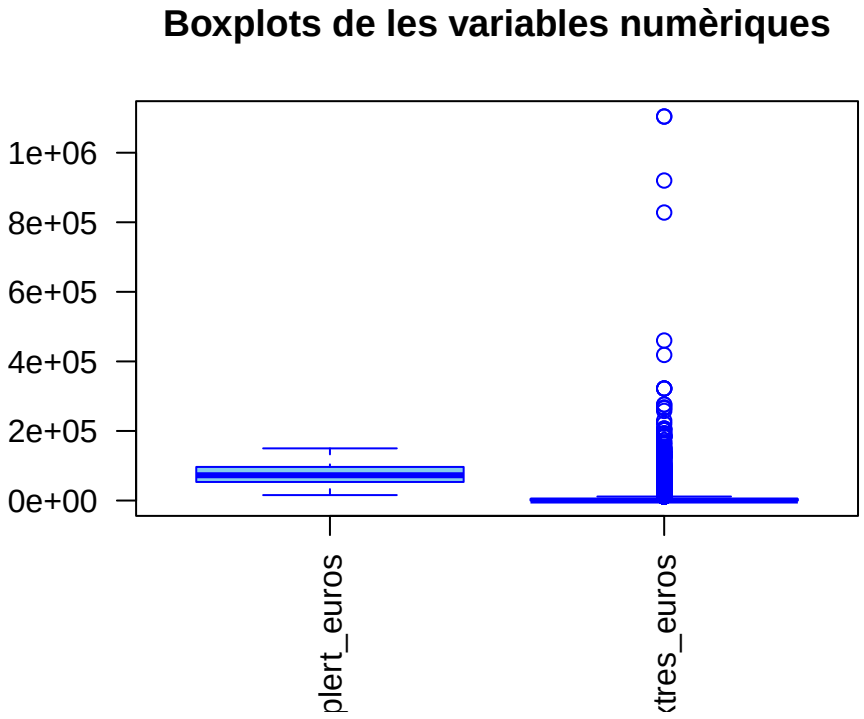
```
##  [415]   12880.00   18400.00   43240.00   18400.00   55200.00   11960.00
##  [421]   19941.00   11960.00   11960.00   18400.00   12328.00   29440.00
##  [427]   13800.00   59800.00  128800.00   55200.00   36800.00  220800.00
##  [433]   33580.00   13800.00   61640.00   40480.00   18400.00   16560.00
##  [439]   46000.00   69000.00   15180.00   27600.00   18400.00   13800.00
##  [445]   23000.00  138000.00  147200.00   46000.00   18400.00   12880.00
##  [451]  138000.00   96600.00   13800.00   66700.00   25760.00   13800.00
##  [457]   11960.00   38640.00   18400.00   13800.00   22080.00   13800.00
##  [463]   14191.00   46000.00   13800.00   13248.00   87400.00   15640.00
##  [469]   23000.00   36800.00   27600.00   41400.00   27600.00   73600.00
##  [475]   87400.00   14720.00   23000.00   12880.00   18400.00   13800.00
##  [481]   13800.00   23000.00   12880.00   46000.00   14720.00   13800.00
##  [487]   13800.00   68080.00   13800.00   13800.00   18400.00   27600.00
##  [493]   46000.00   27600.00   27600.00   30475.00   12880.00  138000.00
##  [499]   13800.00   64400.00   13570.00  106720.00   55200.00   55200.00
##  [505]   13340.00   18400.00   64400.00   13800.00   23000.00  151800.00
##  [511]   27600.00   20240.00   90160.00   17020.00   18400.00   32200.00
##  [517]   18400.00   36800.00   12880.00 1104000.00   20240.00   32200.00
##  [523]   81144.00 1104000.00   32200.00   11960.00   49680.00   16560.00
##  [529]   12880.00   16560.00   12880.00   18400.00   23920.00   18400.00
##  [535]   13800.00   29440.00   21160.00   14260.00   13340.00   27600.00
##  [541]   18400.00   23000.00   18400.00   18400.00   13800.00   11960.00
##  [547]   32200.00   23000.00   21160.00   13800.00   12972.92   12880.00
##  [553]   13800.00  138000.00   22080.00  147200.00   41400.00   32200.00
##  [559]   18400.00   27600.00   23000.00   18400.00   18400.00   27600.00
##  [565]   13800.00   15640.00   18216.00   23000.00   13800.00   11960.00
##  [571]   18400.00   13800.00   14720.00   44969.60   23000.00   64400.00
##  [577]   11960.00   46000.00   13800.00   41124.00   15640.00   23000.00
##  [583]   21160.00   48760.00   36800.00   25760.00   18400.00   12880.00
##  [589]   13800.00   22080.00   36800.00   11960.00   21850.00   27600.00
##  [595]   46000.00   23000.00   18400.00   26680.00   67160.00   18400.00
##  [601]   18400.00   12880.00   15812.04   11960.00   34960.00   13800.00
##  [607]   27600.00   17222.40   34960.00   16560.00   20240.00   27600.00
##  [613]   18400.00   14939.88   13800.00   18400.00   18400.00   97520.00
##  [619]   23920.00   46000.00   11960.00   27600.00   18400.00   40619.84
##  [625]   85560.00   18400.00   13800.00   18400.00   22080.00   24840.00
##  [631]   12880.00   18400.00   18400.00   18400.00   18400.00   27600.00
##  [637]   23000.00   27600.00   27600.00   12880.00   13800.00   12880.00
##  [643]   14720.00   34960.00   23000.00   18400.00   65320.00   64400.00
##  [649]   23000.00   13800.00   31058.28   11960.00   50600.00   27600.00
##  [655]   27600.00   18400.00   11536.80   13800.00   25760.00   14720.00
##  [661]   13800.00   23000.00   13800.00  322000.00   18400.00  142600.00
##  [667]  124200.00   36800.00   23000.00   18400.00  133400.00   12880.00
##  [673]   46000.00   27600.00   23000.00   30360.00   25760.00   59800.00
##  [679]   41400.00   32200.00   46000.00   46000.00   27600.00   18400.00
##  [685]   13800.00   18400.00   69000.00   27600.00   92000.00   13800.00
##  [691]   18400.00   13800.00   12420.00   13800.00  128800.00   59800.00
##  [697]   46000.00   13800.00   23000.00   18400.00   17480.00   16560.00
##  [703]   27600.00  828000.00   27600.00   15870.00   64400.00   27600.00
##  [709]   59800.00   18400.00   18400.00   46000.00   13800.00  152720.00
##  [715]   27600.00   46000.00   18400.00   13248.00   27600.00   73600.00
##  [721]   69000.00   13800.00   23000.00   18400.00   23000.00   23000.00
##  [727]   11960.00  143520.00   18400.00   18400.00   13800.00   23000.00
##  [733]   67160.00   36800.00   87400.00   44160.00   18400.00   13800.00
```

```
##  [739]   24840.00   27600.00   13800.00   36800.00  119600.00   13800.00
##  [745]   14720.00   15180.00   18400.00   27600.00   18400.00   14720.00
##  [751]   18400.00   12880.00   13800.00   46000.00   13800.00   23000.00
##  [757]   11960.00   48760.00   13800.00   55200.00   12938.88   18400.00
##  [763]   18400.00   59800.00   59800.00   19320.00   11960.00   78200.00
##  [769]   18400.00   14720.00   13800.00   12328.00  101200.00   11960.00
##  [775]   18400.00   19320.00   13800.00   11960.00   18400.00   40480.00
##  [781]   64400.00   46000.00   59800.00   18400.00   13800.00   18400.00
##  [787]   16187.40  101200.00   14720.00   46000.00   32200.00   11592.00
##  [793]   87400.00   27600.00   27600.00   24840.00  322000.00   18400.00
##  [799]   47181.28   23000.00   18400.00   18400.00   34040.00   27600.00
##  [805]   36800.00   13800.00   13800.00   55200.00   13800.00   16560.00
##  [811]   18400.00   22080.00   23000.00   59800.00   13800.00   21160.00
##  [817]   23000.00   18400.00   36800.00   18400.00   18400.00   13800.00
##  [823]  161000.00  193200.00   15640.00   64400.00   18400.00   41400.00
##  [829]   93840.00   13800.00   94760.00   11960.00   13800.00   13800.00
##  [835]   18400.00   13455.00  135240.00   31280.00  202400.00   18400.00
##  [841]   18400.00   18400.00  138000.00   73600.00   55200.00   27600.00
##  [847]   18400.00  276000.00   41400.00   55200.00   24840.00   62560.00
##  [853]   18400.00   69000.00   13800.00   11960.00   21620.00   23000.00
##  [859]   13800.00   18400.00  322000.00   20240.00   12880.00   13800.00
##  [865]   22080.00   13800.00   14720.00   73600.00   18400.00   69000.00
##  [871]   36800.00   19320.00   64400.00   18400.00   55200.00   41216.00
##  [877]   16560.00   73600.00   13800.00  264960.00   27600.00   13800.00
##  [883]   13800.00   35880.00   55200.00   18400.00   11960.00   17480.00
##  [889]   18400.00   36800.00   27600.00   13800.00   55200.00   29440.00
##  [895]   18400.00   46000.00   18400.00   23920.00  207000.00   92000.00
##  [901]   18400.00   18400.00   18400.00   13800.00   23000.00   18400.00
##  [907]  184000.00   15640.00  163760.00   41400.00  184920.00   13800.00
##  [913]   27600.00   73600.00  110400.00   23000.00   55200.00   13800.00
##  [919]   14720.00   13800.00   20700.00   46000.00   17940.00   26680.00
##  [925]   21785.60   18400.00   18400.00   18400.00   13800.00   32200.00
##  [931]   46000.00   12880.00   23000.00   40480.00  184000.00   75440.00
##  [937]   23000.00   36800.00   12880.00   14720.00  151800.00   32200.00
##  [943]  193200.00   59800.00   18400.00   33672.00   12880.00   27600.00
##  [949]   13800.00   13800.00   12880.00   21160.00   14720.00   27600.00
##  [955]   13800.00   13800.00   18400.00   13800.00  124200.00   13800.00
##  [961]   27600.00   18400.00   16560.00   18400.00   18400.00   13800.00
##  [967]   23000.00   27600.00   13800.00   19320.00   12420.00   14600.40
##  [973]   23000.00   18400.00   23000.00   12052.00   11960.00   92000.00
##  [979]   13800.00   23000.00   23000.00   23000.00   13800.00  167440.00
##  [985]   24840.00   23000.00   18400.00   77050.00   32200.00   36800.00
##  [991]  230000.00  110400.00   18400.00   16560.00   22080.00   13800.00
##  [997]   18400.00   27600.00   73600.00   18400.00   18400.00   23000.00
## [1003]   18400.00   14720.00   20240.00   13800.00   16560.00   36800.00
## [1009]   33009.60   26680.00   18400.00   18400.00   38640.00   13800.00
## [1015]   18400.00   18400.00   23000.00   18400.00   16560.00   18400.00
## [1021]   31280.00   23000.00   13800.00   28520.00   69000.00   20700.00
## [1027]   11776.00  267720.00   13800.00   12512.00   18400.00   33350.00
## [1033]   20240.00   14720.00   24840.00   27600.00   46000.00   18400.00
## [1039]   13800.00   13800.00   23000.00   13800.00   12438.40   13800.00
## [1045]   13800.00   11960.00   25300.00   80960.00   13800.00   20700.00
## [1051]   14720.00   13800.00   13800.00   13800.00   46000.00  101200.00
## [1057]   16560.00   23000.00   16100.00   55200.00   36800.00   19320.00
```

```
## [1063]   16560.00   13800.00   13156.00   13800.00   13800.00   16560.00
## [1069]   24380.00   32200.00   18400.00  460000.00   19320.00   18400.00
## [1075]   13800.00   80960.00   36800.00   23000.00   46000.00   20240.00
## [1081]   21942.00   31280.00   16100.00   14720.00   18400.00   13800.00
## [1087]   13800.00   27600.00   13800.00   13800.00   46000.00   13800.00
## [1093]  126960.00   77464.00   32200.00   18400.00   13800.00   14720.00
## [1099]   16560.00   14720.00   11960.00   36800.00   16560.00   18400.00
## [1105]   32200.00   47840.00   36800.00   13800.00   14720.00   69000.00
## [1111]   13800.00   32200.00   13800.00  276000.00   14720.00   24840.00
## [1117]   40480.00   14720.00   13800.00   47840.00   18400.00   27600.00
## [1123]   23000.00   18400.00   23000.00   64400.00   18400.00   27600.00
## [1129]   23000.00   18400.00   39560.00  119600.00   16560.00   13800.00
## [1135]  101200.00   23920.00   13800.00   12880.00   47840.00   46000.00
## [1141]   13800.00   18400.00   17940.00   13800.00   21160.00   41400.00
## [1147]   69000.00   13800.00   18400.00   59800.00   50600.00   23000.00
## [1153]   12880.00   96600.00   23000.00  322000.00   73600.00   18400.00
## [1159]   59800.00   87400.00   23920.00   36800.00   50600.00   23000.00
## [1165]  184000.00   69000.00   13340.00   13800.00   23000.00   36800.00
## [1171]   13800.00   16560.00   78200.00   27600.00   27600.00   13800.00
## [1177]   41400.00   13800.00   18400.00   27600.00   13800.00   23000.00
## [1183]   55200.00   43516.00   23000.00   27600.00   38640.00   13800.00
## [1189]   13800.00   18400.00   23000.00   13800.00   23000.00   32200.00
## [1195]   20240.00   36800.00   28520.00   13800.00   16100.00   18400.00
## [1201]   46000.00   12880.00   18400.00   32200.00   32200.00  138000.00
## [1207]   13800.00   13800.00   23000.00   13800.00  920000.00   36800.00
## [1213]   18400.00   23000.00   15787.20   23000.00   23000.00   22080.00
## [1219]   20240.00   18400.00   39560.00   12880.00  125120.00   26680.00
## [1225]   26220.00   23000.00   24380.00   12880.00   16560.00   23000.00
## [1231]   27600.00   33120.00   55200.00   36800.00   14720.00   13800.00
## [1237]   16560.00   18400.00   36800.00   13800.00   82800.00  184000.00
## [1243]   18400.00   36800.00   37260.00   18400.00   46000.00   23000.00
## [1249]   23000.00   11960.00   12880.00   18400.00   18400.00   73600.00
## [1255]   14720.00   18400.00   18400.00   69000.00   84640.00   36432.00
## [1261]   46000.00   13800.00   18400.00   12880.00   35401.60   13800.00
## [1267]   41400.00   21850.00   18400.00   36800.00   21528.00   69000.00
## [1273]   11960.00   46000.00   23000.00   31050.00   13800.00   18400.00
## [1279]   13800.00   16560.00   27600.00   46000.00   20240.00   27600.00
## [1285]   11960.00   13800.00   36800.00   64400.00   13800.00   16560.00
## [1291]   23000.00   23000.00   23000.00   13800.00   13800.00  257600.00
## [1297]   23000.00   15640.00   14720.00   18400.00   13800.00   32200.00
## [1303]   23000.00   36800.00   29440.00   23920.00   14720.00   18400.00
## [1309]   36800.00   36800.00   18400.00   25760.00   11960.00   13800.00
## [1315]   11684.00   23000.00   16560.00   12144.00   13800.00   11960.00
## [1321]   18400.00   18400.00   23000.00   13800.00   18400.00   36800.00
## [1327]   23000.00   13800.00   11960.00   46000.00   16560.00   14204.80
## [1333]   32200.00   27600.00   20240.00   36800.00   27600.00   26680.00
## [1339]   13800.00   27600.00   16560.00   23000.00   12052.00   13800.00
## [1345]   77280.00   33120.00   13800.00   18400.00   25760.00   11960.00
## [1351]   18400.00   15640.00   23000.00   13800.00   11776.00   13800.00
## [1357]   14720.00   13800.00   13800.00   12420.00  124200.00   27600.00
## [1363]   36800.00   19320.00   18400.00   19320.00   18400.00   17480.00
## [1369]   31280.00   22080.00   11960.00   27600.00   43240.00   13800.00
## [1375]   23000.00   18400.00   29440.00   23000.00   13800.00   12420.00
## [1381]   55200.00   20240.00   81880.00   18400.00   14352.00   15640.00
```

```
## [1387]   17940.00   27600.00   27600.00   13800.00   13800.00   36800.00
## [1393]   30360.00   27600.00   27600.00   18400.00   13800.00   18400.00
## [1399]   20240.00   27600.00  138000.00   14260.00   23000.00   13800.00
## [1405]   15870.00   13800.00   18400.00   22245.60   78200.00   16560.00
## [1411]   36800.00   18400.00   46000.00  105984.00   13800.00   50600.00
## [1417]   16560.00   16560.00   18400.00   14720.00   13800.00   46000.00
## [1423]   27600.00   19320.00   13800.00  190440.00   34224.00   41400.00
## [1429]   73600.00   13800.00   13800.00   12880.00   23000.00   55200.00
## [1435]   18400.00   12788.00   15640.00   18400.00   13800.00   55200.00
## [1441]   29440.00   13800.00   18400.00   27600.00   13800.00   13800.00
## [1447]   13800.00   36800.00   19320.00   46000.00
```

```r
# 3. Dibuixar els boxplots de totes les variables numèriques en una única figura
boxplot(df_numeric,
        main = "Boxplots de les variables numèriques",
        las = 2,           # Rota les etiquetes per millorar la visualització (verticals)
        col = "skyblue",   # Color de les caixes (opcional)
        border = "blue")   # Color dels contorns (opcional)
```



Eliminems el outliers

```r
library(dplyr)

# Calcular Q1, Q3 i IQR per a cada columna
Q1_salari <- quantile(salaris_df$salari_temps_complert_euros, 0.25, na.rm = TRUE)
Q3_salari <- quantile(salaris_df$salari_temps_complert_euros, 0.75, na.rm = TRUE)
IQR_salari <- Q3_salari - Q1_salari

Q1_extres <- quantile(salaris_df$extres_euros, 0.25, na.rm = TRUE)
Q3_extres <- quantile(salaris_df$extres_euros, 0.75, na.rm = TRUE)
IQR_extres <- Q3_extres - Q1_extres

# Definir límits
lim_inf_salari <- max(0, Q1_salari - 1.5 * IQR_salari)
```

```r
lim_sup_salari <- Q3_salari + 1.5 * IQR_salari

lim_inf_extres <- max(0, Q1_extres - 1.5 * IQR_extres)
lim_sup_extres <- Q3_extres + 1.5 * IQR_extres

# Filtrar el dataframe eliminant *outliers* en les dues columnes
salaris_df_clean <- salaris_df %>%
  filter(salari_temps_complert_euros >= lim_inf_salari & salari_temps_complert_euros <= lim_sup_salari,
         extres_euros >= lim_inf_extres & extres_euros <= lim_sup_extres)

# Comprovar la distribució després de la neteja
summary(salaris_df_clean[, c("salari_temps_complert_euros", "extres_euros")])
```

```
##  salari_temps_complert_euros  extres_euros
##  Min.   : 15640              Min.   :    0
##  1st Qu.: 51520              1st Qu.:    0
##  Median : 69000              Median :    0
##  Mean   : 72761              Mean   : 1505
##  3rd Qu.: 90160              3rd Qu.: 1840
##  Max.   :149960              Max.   :11500
```

```r
salaris_df<-salaris_df_clean[]
rm(salaris_df_clean)
```

Finalment, construim una nova variable amb el salari total. Ens servirà com a variable objectiu en posteriors anàlisis.

```r
salaris_df <- salaris_df %>%
  mutate(sou_total = salari_temps_complert_euros + extres_euros)

# Calcular Q1, Q3 i IQR per a cada columna
Q1_salari <- quantile(salaris_df$sou_total, 0.25, na.rm = TRUE)
Q3_salari <- quantile(salaris_df$sou_total, 0.75, na.rm = TRUE)
IQR_salari <- Q3_salari - Q1_salari


# Definir límits
lim_inf_salari <- max(0, Q1_salari - 1.5 * IQR_salari)
lim_sup_salari <- Q3_salari + 1.5 * IQR_salari

# Filtrar el dataframe eliminant *outliers* en les dues columnes
salaris_df_clean <- salaris_df %>%
  filter(sou_total >= lim_inf_salari & sou_total <= lim_sup_salari)
```

```r
# Comprovar la distribució després de la neteja
summary(salaris_df_clean[, c("sou_total")])
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   15640   52440   69662   74082   92000  151156
```

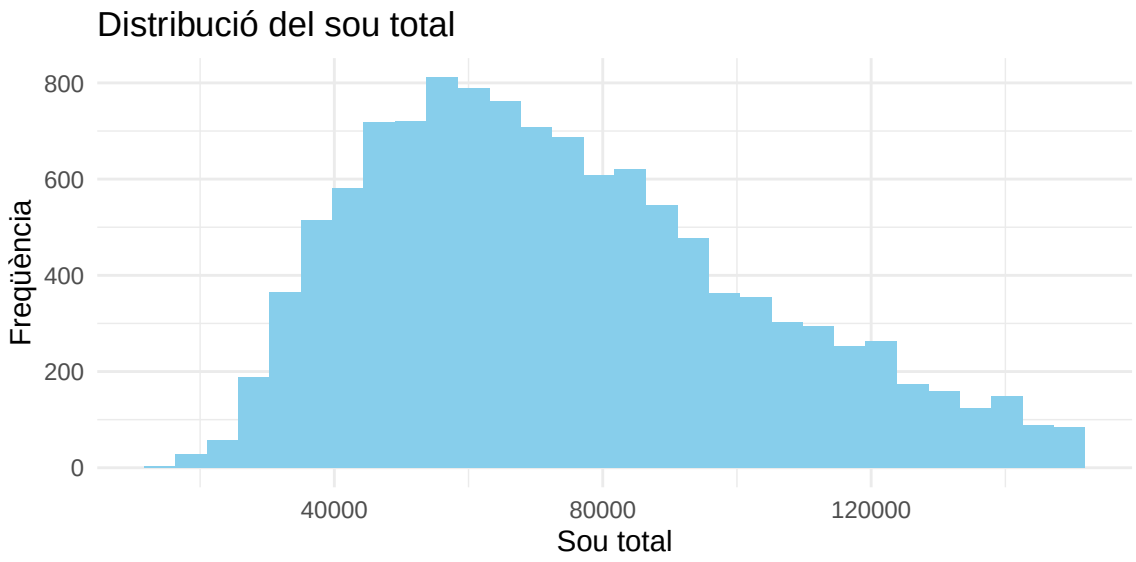
```r
salaris_df<-salaris_df_clean[]


salaris_df <- salaris_df_clean[]
rm(salaris_df_clean)
```

```r
## Eliminem aquelles columnes que s'han fet servir per construir la variable
## sou total

salaris_df<-salaris_df %>% select(-salari_temps_complert_euros,-extres_euros)

## Farem un dataset específic per cada part de la pràctica

salaris_df_no_sup <- salaris_df[]
salaris_df_supt <- salaris_df[]
salaris_df_hipotesis <- salaris_df[]
```

##PREGUNTA 4: MODEL REGRESSIÓ LINEAL

##4.1. Presentació visual de la variable objectiu

```r
ggplot(salaris_df, aes(x = sou_total)) +
  geom_histogram(fill = "skyblue", bins = 30) +
  labs(title = "Distribució del sou total", x = "Sou total", y = "Freqüència") +
  theme_minimal()
```



##4.2 conversió de variables categòriques a numèriques

Això és necesssari per poder-se processar pel model de regressió lineal

```r
salaris_df_ml <- salaris_df %>%
  mutate(across(where(is.factor), as.numeric))

salaris_df_ml$sou_total_log <- log(salaris_df_ml$sou_total + 1)

## Eliminem moneda i pais perque no ens aporta al model

salaris_df_reduit <- salaris_df_ml %>%
  select(-mes_any, -sou_total)

# Crear el nou model de regressió lineal
model_reduit <- lm(sou_total_log ~ ., data = salaris_df_reduit)

# Resum del nou model
```

```r
summary(model_reduit)
```

```
##
## Call:
## lm(formula = sou_total_log ~ ., data = salaris_df_reduit)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.81156 -0.25604  0.02073  0.28288  0.90872
##
## Coefficients:
##                                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     11.2203571  0.0300546 373.333  < 2e-16 ***
## edat                             0.0644376  0.0041231  15.629  < 2e-16 ***
## sector                          -0.0228730  0.0015468 -14.788  < 2e-16 ***
## lloc_feina                       0.0006447  0.0012810   0.503    0.615
## experiencia_general_interval    -0.0076299  0.0015906  -4.797 1.63e-06 ***
## experiencia_especifica_interval  0.0112710  0.0015311   7.361 1.94e-13 ***
## nivell_estudis                   0.0140380  0.0023428   5.992 2.13e-09 ***
## genere                          -0.0381789  0.0031808 -12.003  < 2e-16 ***
## raca                            -0.0067198  0.0010093  -6.658 2.90e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3848 on 11788 degrees of freedom
## Multiple R-squared:  0.06688,    Adjusted R-squared:  0.06624
## F-statistic: 105.6 on 8 and 11788 DF,  p-value: < 2.2e-16
```