EXERCISES OF EXCEL

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Índice

1.   Introduction to Excel

1. The following data table contains the population of several cities by years (in thousands of inhabitants):

City	2001	2006	2011	2014
Madrid	2957	3129	3265	3165
Barcelona	1505	1606	1615	1602
Valencia	750	805	798	786
Zaragoza	611	649	675	666

It is asked:

   a) Enter the population data in an Excel worksheet with the same table structure.

   b) Enter the population data of year 1996 in a new column before the column of year 2001.

City	1996
Madrid	2867
Barcelona	1509
Valencia	747
Zaragoza	602

   c) Enter the population data of the Sevilla city in a new row below the Valencia row.

Year	1996	2001	2006	2011	2014
Sevilla	697	684	704	703	697

   d) Save the workbook in a file with name population.xlxs.

   e) Copy the row of Barcelona and paste it in row 10.

   f) Copy the column of year 2014 and paste it in column H.

   g) Copy the range with the population of Madrid and Barcelona in years 2001, 2006 and 2011 in range F8:H9.

   h) Save the modified workbook in another file with name modified-population.xlxs

2. Open the Excel workbook basic-edition.xlsx and do the following operations:

   a) Enter the word Excel in the cell B8.

   b) Enter the current year in cell C8.

   c) Copy the content of cell A2 in cell C10.

   d) Copy the content of range B8:C8 to range D12:E12.

   e) Remove the content of cell A5.

3. Open the Excel workbook basic-autofill.xlsx and do the following operations:

   a) Replicate the content of cell A6 to A12.

   b) Auto fill the content of cells D6 to J6 with the days of the week.

   c) Auto fill the content of cells B6 to B12 with the next dates to the date in B6.

   d) Auto fill the content of cells C6 to C12 with the numbers of series that starts with numbers in cells C6 and C7.

4. The Excel workbook basic-formatting.xlsx contains the expenses of an academy for several months. Open it and do the following operations:

   a) Rename Sheet1 as Expenses.

   b) Insert a new row before row 1 and enter the text "CEU Academy: 1st quarter expenses" in cell A1.

    c) Merge and center cells A1 to E1.

    d) Format cell A1 with 18 pt boldface Arial font family and blue colour.

    e) Increase the height of row 1 to 50 pt.

    f) Align vertically text of cell A1 to the top.

    g) Adjust the width of column A to the content of its cells.

    h) Wrap text of cell E2.

    i) Center content of cells A2:E2.

    j) Format numeric cells to display values in currency format with 2 decimal places.

    k) Format cells E3:E9 with boldface font.

    l) Apply a thick top border to cells A2:E2.

    m) Apply a thin top and thick bottom borders to cells A9:E9.

    n) Apply a dark blue lighter 60 % colour background to cells A2:E2 and A9:E9.

    ñ) Insert the text "GRAND TOTAL" in cell C12.

    o) Copy value of cell E9 and paste it to cell E12.

    p) Copy format of cell E9 to cell E12.

    q) Format cells C12:E12 with 14 pt font.

    r) Save the file as a new file named **ceu-academy-expenses**.xlsx.

5. Create an Excel worksheet with an invoice template like the one in the file invoice.pdf and save it in a file with name invoice.xlsx.

6. The csv file ibex-august-2015.csv contains the IBEX values during August 2015. Do the following operations.

    a) Import the csv file with Excel. Observe that fields are separated by semicolons that have to be changed by commas in order to Excel recognize the fields.
   Hint: Use a plain text processor to change semicolons by commas.

    b) Insert a new row before row 1 and enter the text "IBEX evolution August 2015" in cell A1.

    c) Merge and center cells A1 to E1.

    d) Format cell A1 with 18 pt boldface Arial font family and red colour.

    e) Format the range B2:E23 with 12 pt Calibri font family and one decimal place.

    f) Format range B2:E2 with white boldface font and green background colour.

    g) Apply a 2-Color Scale conditional format to the Opening values (range B3:B23).

    h) Apply an Arrow Icon Set (red, yellow and green) conditional format to the Maximum values (range C3:C23).

    i) Apply a red colour to Minimum values (range D3:D23) under 10,000 points.

    j) Apply a green colour to Closing values above the average.

    k) Adjust the width of columns A to E.

    l) Save the workbook.

2.   Formulas

7. The following data table contains the income of a company by quarters:

1st Quarter	2nd quarter	3rd quarter	4th quarter
€480.000,00	€560.000,00	€320.000,00	€720.000,00

Open the Excel workbook income-by-quarters.xlsx and do the following operations:

a) Use a formula to calculate the commissions in range B5:E5. The amount of fixed commissions appears in cell B14.

b) Use a formula to calculate the variable commissions in range B6:E6. The percentage of variable commissions appears in cell B15.

c) Use a formula to calculate the Earnings Before Taxes (EBT), subtracting commissions to income, in range B7:E7.

d) Use a formula to calculate taxes in range B9:E9. The percentage of taxes appears in cell B16 and should be applied to EBT.

e) Use a formula to calculate Profit After Taxes (PAT), subtracting taxes to EBT.

f) Use a formula to calculate the annual income, fixed commissions, variable commissions, EBT, taxes and PAT.

g) Save the workbook.

8. Open the Excel workbook invoice.xlsx with the invoice template of exercise 5 an do the following operations:

a) Use a formula to calculate te amount of every product in range E10:E19.

b) Use a formula to calculate the net amount in cell E20.

c) Use a formula to calculate the VAT in cell E21.

d) Use a formula to calculate the total in cell E22.

e) Use a formula to copy the total in cell E7.

f) Use a formula to calculate the due date in cell E6. The due date is the sum of the invoice date and the days in the payment terms field.

9. A company has had annual sales of €1.200.000 in 2015. The sales increase forecast for next years appears in the next table.

2016	2017	2018	2019	2020
10%	12%	14%	16%	18%

A 30% of expenses is assumed every year.

Open the Excel workbook sales-forecast.xlsx and do the following operations:

a) Use a formula to calculate the sales forecast for every year in cells C4:G4 according to the sales increase percentage of cells C12:G12.

b) Use a formula to calculate the expenses for every year assuming the constant percentage over sales of cell C14.

c) Use a formula to calculate the profit for every year.

d) Use a formula to calculate the average annual sales, expenses and profit for years from 2015 to 2020.

e) Save the workbook.

10. A company has done several works in the last month. The number of worked hours, the materials expenses and the amount budgeted appear in the table below.

Work	Worked hours	Materials	Budget
Sevilla	450	€550,000	€950,000
Barcelona	275	€375,000	€625,000
Valencia	300	€450,000	€750,000
Madrid	725	€600,000	€1,050,000

Open the Excel workbook work-cost-analysis.xlsx and do the following operations:

a) Assuming that the unit cost per hour is in cell B11, use a formula to calculate the total cost for every work in range D3:D6.

b) Use a formula to calculate the difference between the total cost and the budgeted in range F3:F6.

c) Use a formula to calculate the minimum worked hours, material expenses and total cost in range B7:D7.

d) Use a formula to calculate the maximum worked hours, material expenses and total cost in range B8:D8.

e) Use a formula to calculate the average worked hours, material expenses and total cost in range B9:D9.

f) Apply a conditional formatting to the range A3:A6 to show the name of the work with the highest cost in red and that with the lowest cost in green.

g) Save the workbook.

11. The table below contains the total tax due and the amounts invested in donations and primary residence of the income tax declaration of three contributors.

	Luis	Ramón	Ana
Total tax due	€19.500	€3.400	€31.500
Donations	€1.500	€800	€1.200
Primary residence	€12.000	€18.000	€15.000

Open the Excel workbook income-tax-declaration.xlsx and do the following operations:

a) Use a formula to calculate the tax deduction for donations in range B9-D9. According to IRPF law, tax deduction for donations is 15 %.

b) Use a formula to calculate the tax deduction for primary residence in range B10-D10. According to IRPF law, tax deduction for primary residence is 20 %.

c) Use a formula to calculate the total deductions in range B11-D11.

d) Use a formula to calculate the total tax due minus deductions in range B13-D13. If it results a negative amount, the cell value has to be 0.

e) Save the workbook.

12. A car company have dealerships in several cities. The table below shows the number of vehicles sold in the last month in every dealership.

Vehicle	Madrid	Barcelona	Valencia	Sevilla
Van	5	4	2	1
Lorry	3	3	1	1
Car	10	10	8	12
Motorcycle	30	25	40	20

If van price is €12,800, lorry price is €27,000, car price is €11,750 and motorcycle price is €4,200, do the following operations:

a) Create a new Excel workbook and enter the previous table with the vehicle sales in range A1:E5.

b) Enter the vehicle prices in range F2:F5 with the header "Unit price" in cell F1. Give a name to every cell with a price.

c) Use a formula to calculate the total sales by vehicle type in range G2:G5 and enter the header "Total by vehicle" in cell G1. In the formula you have to use references to the cells with the unit prices.

d) Use a formula to calculate the total sales by cities in range B6:E6 and enter the header "Total by city" in cell A6. In the formula you have to use the named cells with the vehicles prices.

e) Use a formula to calculate the total sales in cell F7 and apply it a bold face font format.

f) Save the workbook in a file with name car-dealerships.xlsx.

13. The monthly sales of a company in the last quarter appears in the table below.

October	November	December
€15.000	€10.000	€21.000

Open the Excel workbook last-quarter-balance.xlsx and do the following operations:

a) Use a formula to calculate the salaries for every month in range B5:D5. The salaries have a fixed part that appears in cell E5, a variable percentage of sales that appears in cell F5 and a plus percentage of sales if sales are greater than €20,000 that appears in cell G5.

b) Use a formula to calculate the rest of expenses for every month in range B6:D9. Each type of expenses have a fixed part that appears in column E and a variable percentage of sales that appears in column F.

c) Use a formula to calculate the total expenses for every month in range B10:D10.

d) Use a formula to calculate the profits for every month in range B12:D12.

e) Use a formula to calculate the minimum expenditure of the quarter in cell B14.

f) Use a formula to calculate the maximum expenditure of the quarter in cell B15.

g) Use a formula to calculate the average expenditure of the quarter in cell B16.

h) Use a formula to calculate the number of expenses of the quarter over €1,500 in cell B14.

i) Apply a Data Bars conditional formatting to range B5:D9.

j) Save de workbook.

14. An Internet provider wants to calculate how much have to paid their clients by the service. The Excel workbook internet-services.xlsx contains the the starting and ending dates of several Internet users. Open the workbook and do the following operations:

a) Use a formula to calculate the number of days that users have been using Internet service.

b) Use a formula to calculate the cost of the Internet service for every user. Apply a discount to the final cost according to the table below:

Days	Discount
Less than 90 days	0 %
Between 90 and 179 days	5 %
Between 180 and 359 days	10 %
360 days or more	20 %

Use references to cell B13 and range A16:B18.

c) Use a formula to calculate the total number of days in cell D11 and the total cost in cell E11.

d) Use conditional formatting to apply to range D3:D10 a red font colour if the number of days is greater than or equal to 360, a yellow colour if the number of days is between 180 and 350 and a green colour if the number of days is between 90 and 179.

e) Save de workbook.

15. A lemonade shop wants to calculate its profits during the summer. The Excel workbook lemonade.xlsx contains the sales and cost of a lemonade shop from June to September. Open the workbook and do the following operations:

a) Use a formula to calculate the sales for every month in range C3:C6. Use a reference to the unit price in cell B10.

b) Use a formula to calculate the variable cost per unit in cell E15.

c) Use a formula to calculate the variable cost for every month in range D3:D6. Use a reference to the variable cost per unit in cell E15.

d) Use a formula to calculate the total fixed cost in cell B16.

e) Use a formula to calculate the monthly apportionment of the fixed cost in cell B17. Divide the total fixed cost by the number of months.

f) Use a formula to calculate the total cost (the sum of the variable cost and the fixed cost) for every month in range E3:E6. Use a reference to the monthly apportionment of the fixed cost in cell B17.

g) Use a formula to calculate the profit for every month in cell F3:F6.

h) Use a formula to calculate the total units sold, total sales, total variable cost, total cost, and total profit.

i) Format the table like the one in the solution worksheet.

j) Save the workbook.

16. The CEU academy wants to elaborate the payroll for the last month. The Excel workbook payroll.xlsx has a worksheet with the basic salary of the CEU academy employees. Open the workbook and do the following operations:

a) Use a formula to calculate the overtime salary of every employee in range B7:F7. Use references to the extra hours of each employee are in the range B21:F21 and the remuneration of an extra hour in cell B24.

b) Use a formula to calculate the commissions of every employee in range B8:F8. The commissions are calculated applying a percentage on the basic salary. Use references to the commission percentage of each employee in the range B22:F22.

c) Use a formula to calculate the antiquity bonus for every employee. An employee has right to the bonus if he stated to work before the date of cell B19. The amount of the antiquity bonus is in cell B20.

d) Use a formula to calculate the gross salary for every employee in range B10:F10.

e) Use a formula to calculate the social security discount for every employee in range B12:F12. The social security discounts are calculated applying the percentage of cell B25 on the gross salary.

f) Use a formula to calculate the IRPF taxes for every employee in range B13:F13. The IRPF taxes are calculated applying a percentage on the gross salary. Use references to the IRPF tax percentage of each employee in the range B26:F26.

g) Use a formula to calculate the net salary for every employee in range B15:F15.

h) Save the workbook.

17. A laboratory has several suppliers of a product with different unit prices and discounts. The Excel workbook laboratory-suppliers.xlsx has a worksheet with the supplied units in the first quarter of this year by months. Open the workbook and do the following operations:

a) Use a formula to calculate the cost of supplied units by every supplier each month in range E10:G12. Apply the unit price of every supplier that appears in range B3:B5. Also apply the discount of every supplier that appears in range C3:C5 if the supplied units are greater than or equal to the minimum units to apply the discount that appear in range D3:D5.

b) Use a formula to calculate the total cost of supplied units for every supplier in range H10:H12.

c) Use a formula to calculate the total supplied units and the total cost of supplied units by months in range B13:G13.

d) Use a formula to calculate the grand total cots in cell H13.

e) Use a formula to show the month with the highest cost in cell D15.

f) Use a formula to calculate the average monthly cost by suppliers in range I10:I12.

g) Every supplier will apply a bonus discount the next quarter if the laboratory has an average monthly purchases over a minimum specified in range E3:E5 and if the supplied units all the months are greater than or equal to the minimum units specified in range F3:F5. Use a formula to calculate if every supplier will apply a bonus discount next quarter in range J10:J12. The formula should return "YES" or "NO" if the supplier will apply the bonus or not respectively.

h) Save the workbook.

18. The table below contains the sales and the salaries of several sellers in a company:

Seller	Salary	Sales		
		January	February	Mars
López	€1,500	€5,340	€5,500	€4,970
Merino	€2,100	€3,560	€4,525	€2,850
Pastor	€700	€2,850	€2,450	€1,850
Ramirez	€1,800	€6,250	€5,100	€4,940
Zamora	€1,100	€5,800	€4,500	€6,500

According to the policy of the company, sellers with an average ratio between sales and salary greater than 5 will receive a 5 % salary increase and sellers with an average ratio lower than 3 will be fired.

Do the following operations:

a) Crate an Excel workbook an enter the previous table in range a A1:E7. Observe that the cells of range C1:E1 have to be merged and centered.

b) Use a formula to calculate the ratio between sales and salary (RSS) for every month and seller on range F3:H7. Write appropriate headers on cells F1:H2.

c) Use a formula to calculate the average RSS for every seller on range I3:I7. Write an appropriate header on cell I2.

d) Use a formula to write a message with the action to take according to the average RSS on range J3:J7. The message should be "Increase salary" if RSS>5, "Fire seller" if RSS<3 and "Nothing" in any other case. Write an appropriate header on cell J2.

e) Use a formula to write a message with the new salary according to the action on column J. If the action is "Increase salary" increase the salary a 5 % and if the action is "Fire seller" the new salary will be 0.

f) Apply an Icon Set conditional formatting to RSS in range F3:H7. Use a green icon if RSS>5, a yellow icon if 3≤RSS≤5 and a red icon if RSS< 3. Use references to cells C10 and C11 in the conditions.

g) Save the workbook in a file with name salary-sellers.xlsx.

19. The Excel workbook quarter-payroll.xlsx contains the salaries of the employees of a company for the first quarter of this year. The salaries of each month is in a distinct worksheet. Open the workbook and do the following operations:
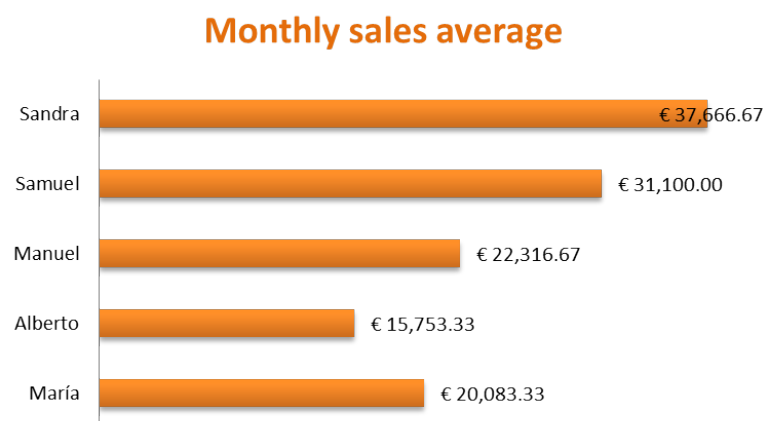
a) In the January worksheet, use a formula to calculate the commission for every employee. The commissions are calculated applying the appropriate percentage of the Commissions and taxes worksheet to the sales. Calculate the commissions for the other months copying and pasting this formula.

b) In the January worksheet, use a formula to calculate the gross salary for every employee. The gross salary is the sum of the basic salary in the salaries worksheet and the commissions. Calculate the gross salaries for the other months copying and pasting this formula.

c) In the January worksheet, use a formula to calculate the IRPF for every employee. The IRPF taxes are calculated applying the appropriate percentage of the Commissions and taxes worksheet to the gross salary. Calculate the IRPF for the other months copying and pasting this formula.

d) In the January worksheet, use a formula to calculate the social security discount for every employee. The social security discounts are calculated applying the appropriate percentage of the Commissions and taxes worksheet to the gross salary. Calculate the social security discounts for the other months copying and pasting this formula.

e) In the January worksheet, use a formula to calculate the net salary for every employee. The net salaries are calculated subtracting IRPF and social security discounts form gross salaries. Calculate the net salaries for the other months copying and pasting this formula.

f) In worksheet 1st quarter, use a formula to calculate the average monthly sales for every employee in range B3:B7.

g) In worksheet 1st quarter, use a formula to calculate the incentive for every employee in range C3:C7. The incentives are calculated applying the appropriate percentage of the Commissions and taxes worksheet to the average monthly sales.

h) In worksheet 1st quarter, use a formula to calculate the total gross salary of the first quarter for every employee in range D3:D7.

i) In worksheet 1st quarter, use a formula to calculate the total gross salary of the first quarter for every employee in range D3:D7.

j) In worksheet 1st quarter, use a formula to calculate the total IRPF of the first quarter for every employee in range D3:D7.

k) In worksheet 1st quarter, use a formula to calculate the total social security discount of the first quarter for every employee in range D3:D7.

l) Save the workbook.

20. The cars company AutocarSA has offices in Madrid, Barcelona, Sevilla and Valencia. The Excel workbook autocarsa.xlsx has a worksheet with the vehicles sold in every quarter for every city. Also it has a worksheet with prices of every vehicle and another worksheet with the taxes of every vehicle. Open the workbook and do the following operations:

a) In de Madrid worksheet, use a formula to calculate the amount sold (in €) for each type of vehicle in range F3:F6. Use references to the prices worksheet. Copy and paste the formula in the worksheets of the other cities.

b) In de Madrid worksheet, use a formula to calculate the registration taxes for each type of vehicle in range G3:G6. Use references to the taxes worksheet. Copy and paste the formula in the worksheets of the other cities.

c) In de Madrid worksheet, use a formula to calculate the VAT for each type of vehicle in range H3:H6. Use references to the taxes worksheet. Copy and paste the formula in the worksheets of the other cities.

d) In de Madrid worksheet, use a formula to calculate the amount sold (in €) for every quarter in range B7:E7. Use references to the prices worksheet. Copy and paste the formula in the worksheets of the other cities.

e) In de Madrid worksheet, use a formula to calculate the registration taxes for every quarter in range B8:E8. Use references to the taxes worksheet. Copy and paste the formula in the worksheets of the other cities.

f) In de Madrid worksheet, use a formula to calculate the VAT for every quarter in range B9:E9. Use references to the taxes worksheet. Copy and paste the formula in the worksheets of the other cities.

g) Use a formula to calculate the total amount in cell F7. Copy and paste the formula in the worksheets of the other cities.

h) Use a formula to calculate the total registration taxes in cell G8. Copy and paste the formula in the worksheets of the other cities.

i) Use a formula to calculate the total VAT in cell H9. Copy and paste the formula in the worksheets of the other cities.
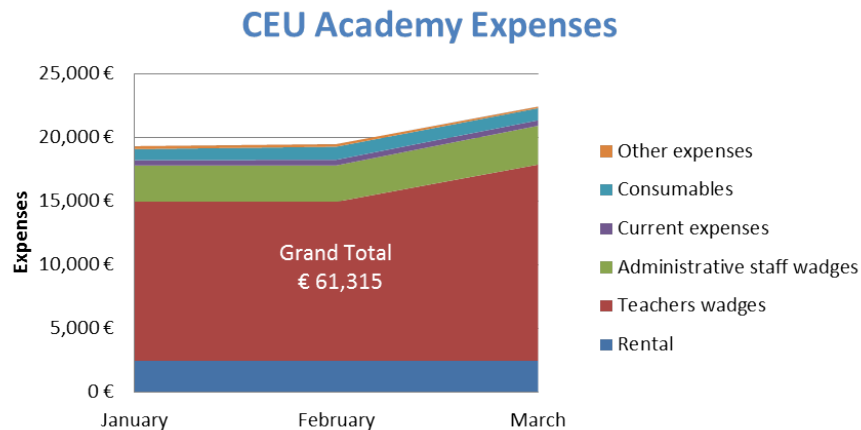
$j)$ Use a formula to calculate the grand total in cell I10. Copy and paste the formula in the worksheets of the other cities.

$k)$ Copy and paste the sales for every vehicle from the Madrid worksheet to the appropriate range in the Resume worksheet. Do the same for the other cities.

$l)$ Copy and paste the amount, registration taxes, VAT and total form the Madrid worksheet to the appropriate range in the Resume worksheet. Do the same for the other cities.

$m)$ Use a formula to calculate the totals sales for every vehicle type in all the cities in range F3:F6 of the Resume worksheet.

$n)$ Use a formula to calculate the total amounts, registrations taxes, VAT for all the cities in range F7:F9 of the Resume worksheet.

$ñ)$ Use a formula to calculate the grand total for all the cities in cell F10 of the Resume worksheet.

21. Use Excel to create the battleship game. The Excel workbook battleship.xlsx contains a template of the game with two worksheet, one for the defense and one the attack. The defense worksheet contains a board with several boats that are represented with the symbol "X". The attack worksheet contains two boars, one in range A2:J11 where the player will shot writing a "X" in the chosen cell, and the other in range L2:U11 where the player will see the result of its shots. The shot hits if the player writes an "X" in the same place where there is an "X" in the defense worksheet; otherwise the shot fails. The player have 50 shots available. If he destroy all the boats (hit all the "X"in the defense board) before to spend the 50 shots, he wins the battle; otherwise it loses. Open the workbook and do the following operations:

    $a)$ Use a formula to show the symbol "O" if the shot fails and the symbol "+" if the shot hits in range L2:U11.

    $b)$ Apply a conditional formatting to range L2:U11 to show a blue background if the cell contains the symbol "O" and a red background if the cell contains a symbol "+".

    $c)$ Use a formula to show the number of "X" in the defense board in cell X3.

    $d)$ Use a formula to show the number of spent shots in cell X4.

    $e)$ Use a formula to show the number of hits in cell X5.

    $f)$ Use a formula to show the text "Win" or "Lose" in cell X6 according to the result of the game.

    $g)$ Save the workbook.

3. Charts

22. Open the Excel workbook created in exercise 9 and create an appropriate chart to describe the sales and expenses forecast evolution.

23. Open the Excel workbook created in exercise 19 an create a chart like the one below.

Monthly sales average

|	
Sandra	€ 37,666.67
Samuel	€ 31,100.00
Manuel	€ 22,316.67
Alberto	€ 15,753.33
María	€ 20,083.33

24. Open the Excel workbook created in exercise 4 and create a chart like the one below.
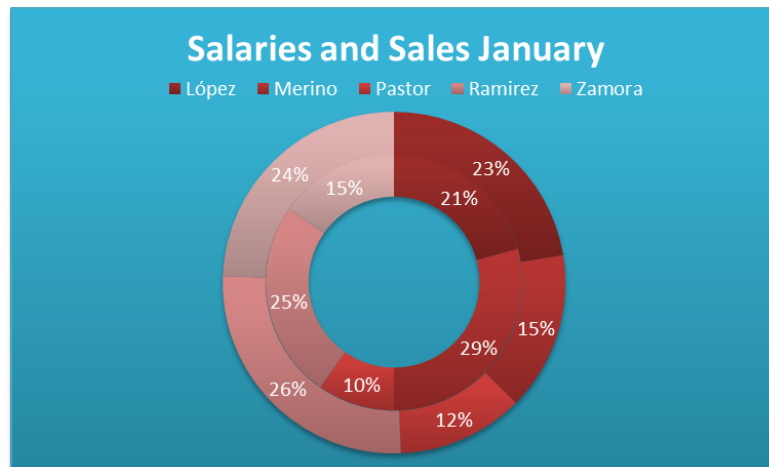

25. Open the Excel workbook created in exercise 7 and create a chart appropriate to describe the part of the annual income that correspond to fixed commissions, variable commissions, taxes and profit after taxes (PAT).

26. Open the Excel workbook created in exercise 12 and create a chart like the one below.
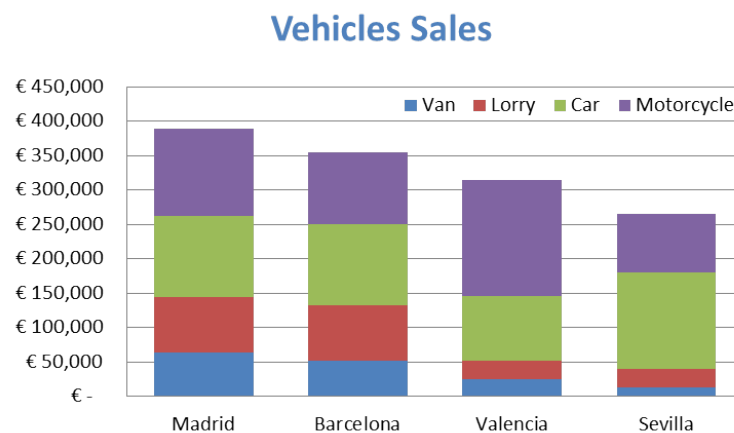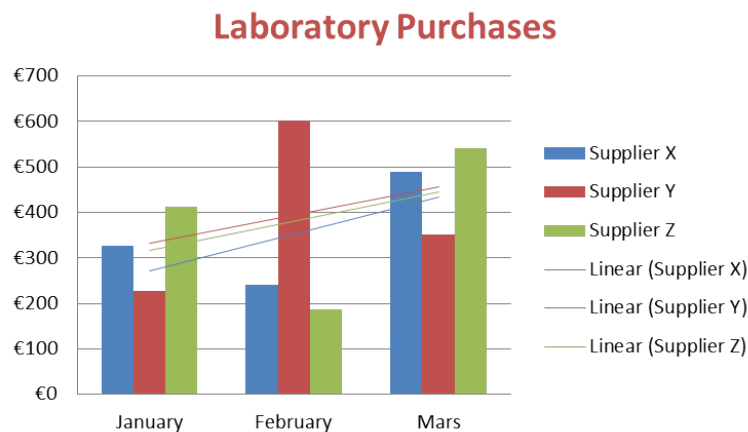

27. Open the Excel workbook created in exercise 15 and create a chart like the one below.
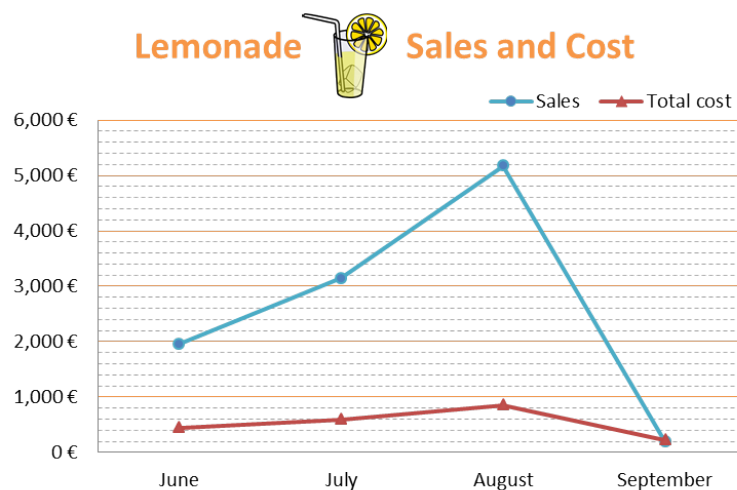
28. Open the Excel workbook created in exercise 18 and create a chart like the one below.

29. Open the Excel workbook create in exercise 17 and create a chart like the one below.

30. The table below shows the income and savings of 8 families in one month.

Income(€)	1240	1480	900	1120	2030	1570	1680	1300
Savings(€)	220	450	110	375	560	480	525	290

Create an appropriate chart to show the relation between income and savings.

4. Database management

31. The workbook billing-database.xlsx contains a database with the billing data of a computers company. The database fields are city, the shop, the department, the employee, the type of sales or work, the quantity and the amount billed. Open the workbook and do the following operations:

   a) Format the data list as a table.

   b) Sort data alphabetically by city, then by shop, then by department and finally by employee.

   c) Summarize the data list giving the subtotaling of de amount billed by cities.

   d) Summarize the data list giving the average quantity by departments.

   e) Create a pivot table and a column pivot chart with the following summaries:

1) The total amount billed by cities.
2) The total amount billed by cities, disaggregated by shops in rows, and by departments in columns.
3) The total quantity by the type of product.
4) The total quantity by the type of product in rows and by the employee in columns.
5) The total quantity by city, disaggregated by type of product.
6) The total amount billed by shop, disaggregated by employee.
7) The average quantity by department.
8) The average quantity by employees of Sevilla.
9) The total amount billed by the sales department in Gran Vía and Triana shops.

f) Filter the data list to show the only data of the sales department.

g) Filter the data list to show the records of employees whose name stats with letter A and have an amount billed over the average.

h) Calculate in cell J2 the number of employees with laptop sales over € 18,000.

i) Calculate in cell J5 the sales of Barcelona employees with a quantity over 20 units.

j) Calculate in cell J8 the employee with the maximum sales in the sales department.

32. The workbook workers.xlsx contains a database with data about 6366 workers of 5 EEUU states. The database fields are gender, race, state, years of education, study level and the yearly earnings. Open the workbook and do the following operations:

a) Format the data list as a table.

b) Sort data alphabetically by state, study level, then yearly earnings.

c) Filter the data list to get the workers with more than 16 education years and yearly earnings under $ 20,000.

d) Summarize the data list giving the subtotaling of de yearly earnings by states.

e) Summarize the data list giving the average yearly earnings by gender.

f) Create a pivot table and a column pivot chart with the following summaries:

1) The average yearly earnings and the count yearly earnings by states.
2) The average yearly earnings and the count yearly earnings by study levels.
3) The average yearly earnings by state in rows and by gender in columns.
4) The average yearly earnings and education years by state in rows an by gender in columns.
5) The average yearly earnings by gender and race for workers with a master degree or a doctorate.
6) The count yearly earnings by yearly earnings intervals of with $ 50,000.

g) Count the number of workers that meet the following criteria:

1) Female workers.
2) Female workers with a master degree.
3) Black female workers with a master degree.
4) Black female workers with a master degree and yearly earnings under $ 20,000.
5) Black female workers with a master degree and yearly earnings under $ 20,000 or White female workers with a doctorate and yearly earnings under $ 30,000.

h) Calculate the average yearly earnings for workers that meet the following criteria:

1) Male from Ohio.
2) Black male from Ohio.
3) Black male from Ohio with less than 10 years of education.
4) Black or male from Ohio or Indiana with less than 10 years of education.

33. The workbook spanish-debt.xlsx contains a database with data about the population, the GDP and the debt of the spanish economy in the last years. Open the workbook and do the following operations:

a) Use a formula to calculate the debt as percentage of the GDP in range E2:E92 of the Debt worksheet. Use the VLOOKUP function.

b) Use a formula to calculate the debt per capita in € in range F2:F92 of the Debt worksheet.

c) Create a pivot table and a line pivot chart with the following summaries:

1) The total debt of the whole spanish economy by years.
2) The debt by organism in rows and by years in columns.
3) The debt (as a %GDP) by type in rows and by years in columns.
4) The private (as a %GDP) debt by organism in rows and by years in columns.
5) The public debt (as a %GDP) by organism in rows and by years in columns.
6) The public debt per capita by organism in rows and by years in columns.

d) Create a pivot table and a sector pivot chart to show the following:

1) The 2007 debt by organism.
2) The 2012 debt by organism.
3) The 2007 debt by type.
4) The 2012 debt by type.

e) Create a pivot table and a column pivot chart to show the average debt (as %GDP) by organism.

5.   Descriptive Statistics

34. A poll on voting intention of citizens for the next election has surveyed 400 people of the three million people with right to vote who live in a city. Identify:

a) The study population and its size (N).

b) The sample and its size (n).

c) The individual.

d) The studied variable and its scale.

35. It is intended to conduct a study on the number of women looking for a job certain autonomous region. It is asked:

a) Describe the population and the sample to be studied.

b) Identify the individual or elementary unit in the study.

c) Define the variable to be studied and classify it correctly.

36. The manager of a publishing house aims to determine the areas of knowledge of the books with greater acceptance in the market. Due to the large number of books for sale, he only study 15 % of all books published. Answer the following questions:

a) What is the study population?

b) What is the sample selected?

c) What is the individual?

d) What is the variable variable to study? Classify it.

37. The director of a small company has conducted a survey among his workers that asked for the number of extra hours that they need every week. Identify:

a) The study population.

b) The selected sample.

c) The studied individual.

d) The studied variable and its scale.

38. Classify, giving a reasoned answer, the following variables according to their scale:

    a) Number of inhabitants per square Kilometre.

    b) Types of canned food products.

    c) Family income of a group of families.

    d) Number of fruits per tree.

    e) Level of education.

    f) The start-number of a runner.

    g) The temperature in degrees Celsius.

    h) The job function in a department of a company.

39. Give 3 examples of each type of economics variables according to their scale.

40. Classify the following variables according to their categories:

    a) Grade of an exam (SS, AP, NT, SB, MH).

    b) Category of a hotel ($\star$, $\star\star$, $\star\star\star$, $\star\star\star\star$, $\star\star\star\star\star$).

    c) Amount of money, in €, that a young people spends on leisure ($0-10$, $10-30$, $30-60$).

    d) Price of a bus ticket in € (the exact amount).

    e) Surface in m^2 of a house ($0-50$, $50-80$, $80-100$, $110-200$, $200-$).

41. Transform the variable that measures the surface of a house, in m^2, in a variable with ordinal scale, specifying their categories.

42. Transform the variable that measures the mark in an exam in:

    a) A variable with ordinal scale, specifying their categories and the order.

    b) A variable with nominal scale, specifying their categories.

43. The currencies used in a sample of financial transactions are shown below

Euro	Pound	Euro	Dollar	Dollar	Dollar	Yen	Yuan	Yen	Euro
Yen	Yuan	Pound	Dollar	Dollar	Euro	Euro	Yen	Pound	Pound
Dollar	Euro	Dollar	Yuan	Dollar	Yuan	Dollar	Euro	Dollar	Dollar

    a) Construct a frequency table of the currencies.

    b) Create a pie chart for the relative frequency of currencies.

    c) From the frequency table distribution, answer the following questions:

        1) How many transactions contains the sample?

        2) How many different currencies there are in the sample?

        3) Which is the more common currency in the sample of transactions?

        4) Which is the less common currency in the sample of transactions?

44. A sample of 16 stock shares has been evaluated according to the investment risk using the following scale: A= No risk, B= Low risk, C= Moderate risk, D= High risk and E= Extreme risk. The category for every stock share is shown below

B	C	B	A	C	D	A	E
C	D	D	A	C	E	C	B

    a) Construct a frequency table of the risk categories.

    b) Create bar chart for the absolute frequency of risk.

    c) Create a pie chart for the relative frequency of risk.

    d) From the frequency table distribution, answer the following questions:

        1) Which is the more common risk category in the sample?

    2) What percentage of shares have a moderate risk?

    3) What percentage of shares have a moderate or lower risk?

    4) What percentage of shares have an high or higher risk?

45. The number of subjects coursed by a sample of 20 students in a course year are

$$5 \quad 6 \quad 7 \quad 7 \quad 5 \quad 3 \quad 4 \quad 7 \quad 6 \quad 6$$
$$4 \quad 6 \quad 5 \quad 6 \quad 6 \quad 5 \quad 7 \quad 3 \quad 4 \quad 5$$

  a) Construct a frequency table of subjects.

  b) Create bar charts for all the type of frequencies.

  c) From the frequency table distribution, answer the following questions:

    1) Which is the more common number of subjects coursed in a year?

    2) How many students has coursed less than 5 subjects?

    3) What percentage of students have coursed less than or equal 5 subjects?

    4) What percentage of students have coursed more than 5 subjects?

46. The monthly rental (in €) per square metre for office space in the centre of Madrid are shown below

$$70 \quad 50 \quad 24 \quad 75 \quad 25 \quad 56 \quad 25 \quad 77 \quad 26 \quad 48$$
$$50 \quad 78 \quad 21 \quad 30 \quad 40 \quad 65 \quad 75 \quad 24 \quad 55 \quad 50$$
$$76 \quad 27 \quad 65 \quad 60 \quad 68 \quad 42 \quad 40 \quad 60 \quad 48 \quad 54$$

The data are recorded in the Excel workbook office-rental.xlsx.

  a) Construct a frequency table of office rentals using classes of width € 10.

  b) Create a histogram for the absolute frequency.

  c) Create a histogram for the cumulative absolute frequency.

  d) From the frequency distribution, answer the following questions:

    1) What percentage of office space costs less than or equal to $€ \, 40/m^2$.

    2) What percentage of office space costs less than or equal to $€ \, 60/m^2$.

    3) What percentage of office space costs more than $€ \, 50/m^2$.

    4) If a company that is looking to hire office space can pay between $€ \, 30/m^2$ and $€ \, 50/m^2$, how many buildings can they consider?

47. The workbook grades-gender.xlsx contains the grades in economics of 500 students.

  a) Construct a frequency table of grades using the classes 0-5, 5-7, 7-9, 9-10, and the corresponding absolute frequency histogram.

  b) Construct two frequency tables of grades (one for men an other for women) using 10 classes of width 1.

  c) Create a overlapped histogram for relative frequency of grades, overlapping distributions of men an women.

  d) Create a stacked histogram for relative frequency of grades, stacking frequencies of men and women.

  e) Create relative frequency histograms of grades for men and women. Who has obtained better grades, men or women?

48. The table below contains the frequency of phone call durations (in minutes) of a sample of clients of a mobile phone company.

Duration	Calls
0-5	42
5-10	68
10-15	44
15-20	21
20-25	12
25-30	5

Open the workbook phone-call-durations .xlsx and do the following operations:

a) Complete the frequency table of call durations.

b) Create a histogram for the relative frequency.

c) Create a line chart or polygon for the relative frequency.

d) Create a histogram for the cumulative relative frequency.

e) Create a line chart or ogive for the cumulative relative frequency.

49. The data below shows the I+D investment (in thousand of euros) of a sample of pharmaceutical companies:

$$1,350 \quad 1,690 \quad 1,250 \quad 1,490 \quad 1,970 \quad 2,210 \quad 2,200 \quad 1,470 \quad 1,650 \quad 1,780$$
$$2,120 \quad 1,840 \quad 1,950 \quad 1,950 \quad 2,180 \quad 1,390 \quad 2,120 \quad 2,300 \quad 1,590 \quad 1,480$$
$$2,010 \quad 1,590 \quad 1,920 \quad 2,140 \quad 1,780 \quad 1,880 \quad 2,050 \quad 1,960 \quad 1,780 \quad 2,010$$

The data are recorded in the Excel workbook i+d-investment.xlsx.

a) Construct the frequency distribution table grouping data in 5 classes with width 210, starting in 1250 and finishing in 2300.

b) Create a histogram for the relative frequency and plot the corresponding polygon. Which shape has the histogram?

c) Create a histogram for the cumulative relative frequency.

d) Compute the mean for the investment and interpret it.

e) Which investment value represents the 50 % of the distribution?

f) How much invest a company in I+D usually?

g) How much invest the 70 % of the companies as much?

h) Which percentage of the companies invest less than € 1,880?

i) Compute the quartiles for the investment and interpret them.

j) Compute the inter-quartile range for the investment and interpret it.

k) Create a box and whiskers plot for the investment and interpret it.

50. A survey has asked 30 Spanish families about their annual savings. The data are in the Excel workbook household-savings.xlsx

a) Construct the frequency distribution table grouping data.

b) Create a histogram for the annual savings.

c) Create an ogive for the annual savings.

d) What is the average annual savings of the families?

e) Which percentage of families have annual savings under € 12,500?

f) Compute and interpret the median.

g) Which is the minimum annual savings that achieve the 63 % of the most thrifty families?

51. The Excel workbook workers.xlsx contains a database with data about 6366 workers of 5 EEUU states.

    a) What is the average yearly earnings of workers?

    b) What is the average yearly earnings by gender?

    c) Compute the standard deviation for yearly earnings by gender. Who has less variability in the yearly earnings, men or women?

    d) What is the average yearly earnings by states? In which state is more representative the mean?

    e) How is the skewness of the education years distribution?

    f) How is the kurtosis of the education years distribution?

52. The Excel workbook phone-bills.xlsx contains the phone bills of a sample of clients of a mobile phone company.

    Compute the following statistics and interpret them:

    a) Mean

    b) Median

    c) Mode

    d) Quartiles

    e) Percentile 65

    f) Variance

    g) Standard deviation

    h) Coefficient of variation

    i) Coefficient of skewness

    j) Coefficient of kurtosis

53. The Excel workbook water-consumption.xlsx contains the yearly volume of water used by a sample of households of a city in m^3.

    a) Compute and interpret the quartiles.

    b) Create a box and whiskers chart. Are there outliers in the sample?

    c) How is the skewness of the sample distribution?

54. An investor wants to decide where to invest some money between two types of investments (A or B). In order to take the best decision the investor has taken a sample of annual rates of return from each type of investment. The data are in the Excel workbook investment-returns.xlsx

    a) Compute the means for every type of investment and interpret it.

    b) Compute the standard deviation for every type of investment and interpret it.

    c) Which type of investment has less variability?

    d) Compute the standard score for every value in the sample. Are there outliers in the sample?

    e) Compute the quartiles and interpret them.

    f) Compute the interquartile range and interpret it.

    g) Create a box and whiskers chart with different boxes for every type of investment.

    h) What is the best type of investment? Why?

55. Use the sample of exercise 46 to compute:

    a) The average rental per square metre. Is representative of the sample?

    b) The third decile.

    c) The skewness coefficient. Interpret it.

    d) The kurtosis coefficient. Interpret it. Does this sample come from a normal population?

56. Use the sample of exercise 50 to compute:

    a) The mean.

    b) The standard deviation.

    c) The coefficient of variation.

    d) The standard scores. Are there outliers in the sample?

57. Use the sample of exercise 47 to answer the following questions:

    a) Who has a higher mean, men or women? What mean is more representative?

    b) Create a box and whiskers chart with different boxes for every gender.

    c) What distribution is more symmetric, the men or the women distribution?

    d) What distribution has a kurtosis more normal, the men or the women distribution?

58. Use the exercise 48 to compute:

    a) Mean

    b) Median interval

    c) Mode interval

    d) Variance

    e) Standard deviation

    f) Coefficient of variation

    g) Coefficient of skewness

    h) Coefficient of kurtosis

    Interpret the results.

59. The table below contains the frequency distribution for the monthly incomes of a sample of 300 household.

Income in €	ni
1000–1300	20
1300–1600	32
1600–1900	40
1900–2200	53
2200–2500	80
2500–2800	30
2800–3100	25
3100–3400	20

Open the workbook household-incomes .xlsx

    a) Which are the most frequent household incomes?

    b) Under which household income are the 50 % of the households?

    c) Which household income represent better the households of the sample? Is this value a good representative of the income distribution?

    d) How is the skewness of the distribution?

    e) How is the kurtosis of the distribution? Could be considered normal the income distribution?