Information Systems and Data Management
(27000-27006)

Free University of Bolzano Bozen

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Exercise Book

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Contents

1 Financial Functions

Exe 1.1 Cash Flow table

An investor receives 4000€ from a bank. The investor has to pay 150€ each month for 2 years (24 payments) plus a final 1000€ payment. The investor pays also 10€ for administrative expenses at the beginning of the investment:

- Create a cash flow of the investment;
- Compute the NPV for a discount rate of 2,5%;
- Compute the NPV for a sequence of different possible interest rates, from 0,5% to 20% with a 0,5% step;
- Compute the IRR.

Exe 1.2 IRR

Compute the IRR of the 2 following investments:

1. 110000€ received and paid back in 80 payments of 1500€ every three months (20 years in total) plus a final payment of 6000€.
2. You give 3000€ to an investor and then you receive five yearly payments of amount 500€.
    - add a further payment and evaluate the IRR again
    - add a second further payment and compute the IRR once more

Exe 1.3 Constant Loans

Consider a loan of 10000€:

- Given 14 yearly payments of amount 989€, compute the TAN, without building the cash flow table;
- Given 14 payments and a 5% TAN, compute the amount to be paid yearly;
- Building the cash flows and using XIRR, check the results of the two previous points;
- Given a 6,75% TAN and a maximum affordable payment equal to 746€, determine the number of payments;
- Given a 6,75% TAN and 14 payments, compute the amount of required interest year by year;
- Build the cash flow table corresponding to the last case above and check that XNPV returns the TAN.

Exe 1.4 Adjustable loans

Consider a 50000€ loan with annual payments equal to 2499,9 €:

- determine the number of payments required given a 3,5% rate (round the number of payments to an integer number);
- build the full cash flow table.

After 5 years, you can negotiate the mortgage loan conditions. Determine:

- The amount to pay in order to extinguish the loan in 15 years overall (10 more years) keeping the same rate.
- The corresponding rate if the payment is 7000€.
- The overall IRR of the loan in the last case.

2 Visual Basic for Applications (VBA)

Exe 2.1 Gas Consumption

Consider sheet VBA in laboratory.xlsx. Write a function to compute the fuel cost for a given trip and for a given fuel type.

The engine can use three different fuel types:

- Gasoline,
- Lpg,
- Diesel.

If the provided fuel type is not in the list, print a warning message and use gasoline. The engine type is an optional argument of the function and its default value is gasoline.

Assume the following fuel costs per liter (in the function):

- Lpg: 0.55 €
- Gasoline: 1.25 €
- Diesel: 1.15 €

Exe 2.2 Average

Consider the worksheet “statistics” in laboratory.xlsx and:

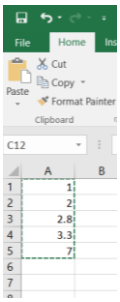
1. Implement in VBA a function that reads as input a range of cells and returns the average values;
2. Modifying the previous function, create a new function that reads a cell range and a parameter and returns the average of the numbers above the parameter. The function must check that the number of cells above the parameter is larger than 0 and display an error message if not.

Apply the two functions to columns A and B and compare the results with the two corresponding Excel built-in functions.

Exe 2.3 Find Value

Implement a VBA function that, given a value as parameter, finds the closest value in a cell range. The function must skip all empty and non-numeric cells. If the target value cannot be found (because the range does not include any numeric value) the function returns 0 and displays an error message.

Example:



=*findValue*(A1:A5;3) → 2.8

3 Data Table and Solver

Exe 3.1

In a new worksheet, create a table to analyze the revenue of a company in the four trimesters of a year, given the following information:

- The company sells 100 products in trimester 1 at 10 euro each;
- Each trimester the production grows of 20%
- The company has fixed production costs:
  - 300 euro per trimester if the production is below 140 pieces,
  - 500 euro otherwise
- The consumable for each product costs 3 euro (hardware).

The table must look like the one in figure below; where cells in yellow (and green) include formulas and cells in white contain the parameters defined above.

Use Data Table to evaluate how the total net income changes when growth varies from 5% to 40% and price from 8 to 15 euro.

	I Trim.	II Trim.	III Trim.	IV Trim
Amount	100	120	144	172,8
Price	€10,00	€10,00	€10,00	€10,00
Income	€1.000,00	€1.200,00	€1.440,00	€1.728,00
Fix Cost	€300,00	€300,00	€500,00	€500,00
Prod Costs	€3,00	€3,00	€3,00	€3,00
Total Costs	€600,00	€660,00	€932,00	€1.018,40
Net	€400,00	€540,00	€508,00	€709,60
CumulativeNet				**€2.157,60**
Growth	20%			

Exe 3.2

Your small company produces two products: “prodA” and “prodB”. You sell products of type “prodA” at 8 euro and each product requires 0,7 hours of the production plant, whose operating cost is 5 euro/hour. The sell price of products of type “prodB” is 15, but you need 1 hours of the production plant. According to your historical data, you can expect to sell maximum 100 products of type “prodA” and 60 of type “prodB”. Your company has also 500 euro of fixed costs, independently of the production.

1. Create a spreadsheet to evaluate to total net profit for a given production (see picture below).
2. Using the data table tool, analyze how the total net profit varies for different productions of “prodA” and “prodB”.

	Prod A	**Prod B**
Production	90	55
Price/Product	8	15
Hours/Product	0,7	1
Max Sell	100	60
Net Profit	405	550

Cost/hour	5
Fixed Costs	500

Total Net Profit	455

3. Using Solver, maximize the Total Net Profit given the following constraints:
   a. the maximum number of production hours is 16hours x 5days;
   b. for each product the minimum production is 40 pieces

Exe 3.3

Your company manufactures two types of golf bags: Standard and Deluxe. Every Standard bag generates a 9 euro profit and every Deluxe bag a 15 euro profit. The table below shows the working hours required at each production department for the two bag types.

Bag type	Cutting and Dyeing	Sewing	Finishing	Inspection & package
Standard	0,7	0,5	1	0,1
Deluxe	2	0,83	0,67	0,25

Each department can work a maximum number of hours per month:

- Cutting & Dyeing: 630 h;
- Sewing: 600 h;
- Finishing: 708 h;
- Inspection & Packg. 135 h.

Assume that the demand is much higher than the number of golf bags you can produce.
Using Solver, determine the monthly production of standard and deluxe bags that maximizes the total profit.

Exe 3.4

You have a 2.00 € voucher to spend on chocolate. A small (100g) bar costs 17cent, a large (250g) one is 32cent. However, there's a special deal on the small bars whereby if you buy three you get one free. You want to buy as much chocolate as possible - ideally, you want to spend every penny, as the shopkeeper does not give change for a voucher. How many of each sort should you buy? How does the result change if you allow spending less than 2.00 euro.

Exe 3.5

Blue Ridge Hot Tubs, Inc. sells two models of hot tubs: The Aqua-Spa and the Hydro-Lux. The company purchases prefabricated fiberglass hot tub shells and installs a common water pump and the appropriate amount of tubing into each hot tub. The number of hours it takes to install each model, the tubing required, and the profit for each of the two models is described in the table below.

Hot tube Model	Installation Hours	Tubing required	Unit Profit
The Aqua-SPA	9	12	€ 350,00
Hydro-Lux	6	16	€ 300,00

The company expects to have 200 pumps, 1566 hours of installation, and 2880 m. of tubing available during the next production cycle. The company can sell all the hot tubs it produces.

- Determine the optimal number of Aqua-Spa and Hydro-Lux hot tubs to produce in order to maximize the total profit
- Using scenario manager evaluate the total profit for 4 possible scenarios:
  - produced Aqua-spa units = 5, produced hydro-lux units = 10
  - produced Aqua-spa units = 10, produced hydro-lux units = 5
  - produced Aqua-spa units = 4, produced hydro-lux units = 6
  - produced Aqua-spa units = 6, produced hydro-lux units = 4
- Apply a 2D sensitivity analysis (using data table) evaluating the total profit changing the number of produced tubes of each model from 0 to 30 with a step of 5

Exe 3.6

Wood Walker is a self-employed furniture maker. He makes three different styles of tables: A, B, and C. Each model of table requires a certain amount of time for cutting component parts, for assembling, and for painting as reported in the table below. Wood can sell all the units he produces. Model B may be sold without painting. The total number of hours/month for cutting, assembling and painting is limited as reported in the table below.

Model	Cutting hours	Assembling hours	Painting hours	Profit per Table
A	1	2	4	€ 35,00
B	2	4	4	€ 40,00
unpainted B	2	4	0	€ 20,00
C	3	7	5	€ 50,00
Capacity Hours/month	200	300	150	

- Determine the product mix that will maximize his profit.
- Given the product mix that maximizes the profit:
  - apply a 2D-sensitivity analysis to evaluate the total profit varying the profit for model A from 5 € to 30 € and the profit for model B from 5 € to 50 €;
  - evaluate the total profit for the following scenarios:
    - Unit profit for model A = 20 €, unit profit for model C = 20 €
    - Unit profit for model A = 15 €, unit profit for model C = 25 €
    - Unit profit for model A = 25 €, unit profit for model C = 15 €

Exe 3.7

The Electro-Poly Corporation is the world's leading manufacturer of slip rings. A slip ring is an electrical coupling device that allows current to pass through a spinning or rotating connection. The company recently received a $750,000 order for various quantities of three types of slip rings. Each slip ring requires a certain amount of time to wire and harness. This table summarizes the requirements for the three models of slip rings:

	Model 1	**Model 2**	**Model 3**
Number ordered	3000	2000	900
Wiring/Unit (hours)	2	1,5	3
Harnessing/Unit (hours)	1	2	1

Unfortunately, Electro-Poly does not have enough wiring and harnessing capacity to fill the order by the due date. The company has only 10,000 hours of wiring capacity and 5,000 hours of harnessing capacity. However, the company can subcontract any portion of the order. The unit costs of producing each model in-house and buying the finished products from a subcontractor are listed below:

	Model 1	**Model 2**	**Model 3**
cost to make	€ 50,00	€ 83,00	€ 130,00
cost to buy	€ 60,00	€ 97,00	€ 145,00

- Determine the number of slip rings to make and the number to buy in order to fill the customer order at the least possible cost.
- Given the number slip rings to make and to buy that minimizes the total cost, apply a 2D sensitivity analysis to evaluate the *total cost* varying
  - The *cost to make of model 2* from 20 euro to 60 euro (step of 5)

    - The *cost to buy of model 2* from 10 euro to 50 euro (step of 5)
- Given the number slip rings to make and to buy that minimizes the total cost, evaluate the *total cost* varying the *cost to make* of each model for the following scenarios:
    - model 1 = 60, model 2 = 50, model 3= 70
    - model 1 = 70, model 2 = 60, model 3= 50
    - model 1 = 50, model 2 = 70, model 3= 60

4 Taxes

- Create an Excel document that computes the amount of taxes you have to pay given your annual income. Consider the following taxation scheme:
    - Retirement contribution: 9% of the income
    - On the remaining gross income the following tax rates apply:
      up to 15.000 euro → 23%
      up to 28.000 euro → 27%
      up to 55.000 euro → 38%
      up to 75.000 euro → 41%
      above 75.000 euro → 43%
    - Each rate is applied to the amount exceeding the previous threshold (i.e: 23000 → 15000*23%+8000*27%)
- Compute the amount to pay, the net income (after taxes) and the average tax rate for a given income.
- Create a mathematical graph reporting the average tax rate as a function of the annual total income.
- Solve the exercise implementing a VBA function that
    - reads as input the gross income; the thresholds and related tax rates;
    - returns as output the amount to pay

5 Relational Databases

For each of the following exercises, design the corresponding relational structure diagram (relational model), including tables, with the proper attributes, and relations. For each table, clearly indicate primary and foreign keys. For each exercise, a solution (among many possible) is presented in the next section.

Exe 5.1 Student Dataset

The university administration needs a database to handle data regarding students, exams and courses. Design a relational structure diagram satisfying the following constraints.

1. Students are identified by the student ID and have: name, surname, birth date, enrolment year and degree course.
2. Each course identified by a name, is held in a specific language in the first or second semester and assigns a given number of credits.
3. For each course, several exams take place. Students enrol through the university web site that delivers an enrolment number for confirmation. For each student, all attempts are recorded with the related marks.
4. Exams take place in a given date and time. One single professor is in charge of preparing, supervising and evaluating the exams. The professor name and surname are stored together with the text of the exam.

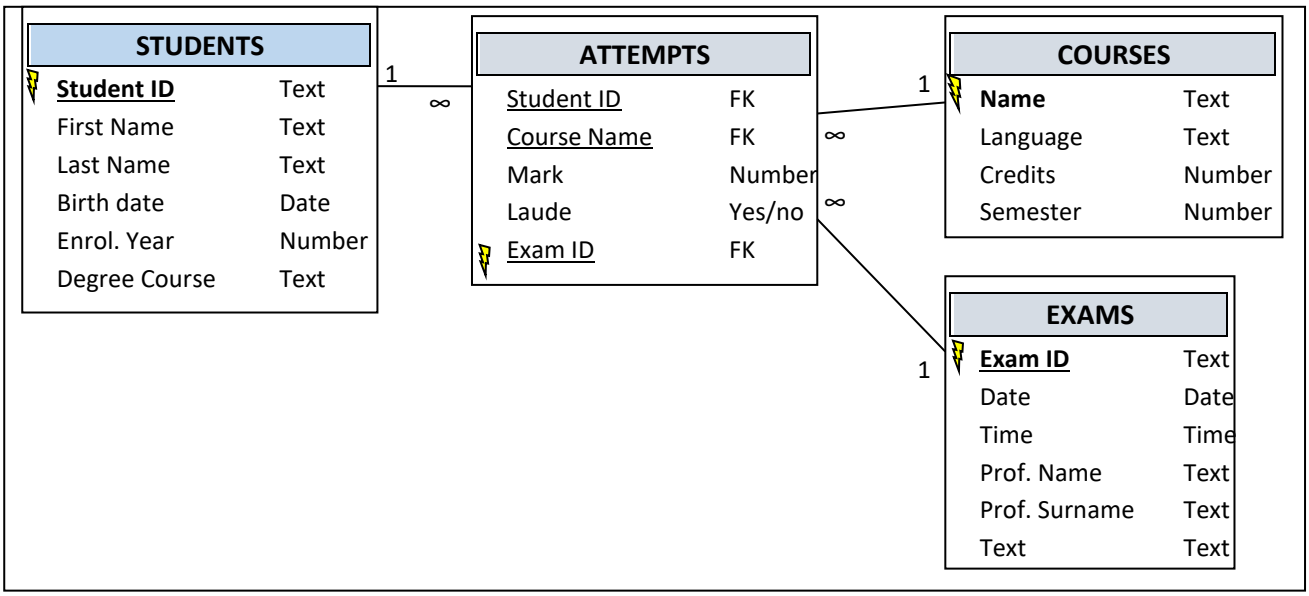


Figure 1 Database architecture for exercise 1

Exe 5.2 Multiplex Centre

Develop a database for supporting a multiplex cinema centre. Design a relational structure diagram satisfying the following constraints.

1. The multiplex centre operates several cinema rooms. A room has a number, a room name, a number of seats. Its number identifies a room.
2. A movie has a title and a code. The code identifies the hard-copy. The movie has been produced by a production company in a specific year and is available in a specific language. Whenever a copy is available for parallel sessions, it has a different code.
3. A session takes place in a room on given date and time. Only one session can take place in a room at a given date and time (during a session only one film is shown). The same title could be shown in different sessions, possibly at the same date and time, and in different languages as well.
4. Reservations are made for a given number of seats and for a specific session. A person can make a reservation connecting to the multiplex website. The person provides name, e-mail address and phone number. For a given session, a reservation is uniquely identified by the assigned "Reservation Number". Tickets can be either printed at home or delivered at the ticket office.

Exe 5.3 Winery

A winery in the South-Tyrol region needs a database for storing information related to the wine productions.
According to the requirements described below, draw a database architecture with proper tables and relations.

1. The winery produces several different regional wines (Müller Thurgau, Lagrein, ...). A wine has a name, a specific production area and other descriptors like type (red, white, ...) and alcohol content. Each wine is uniquely identified by an ID.
2. The wine is obtained from grapes supplied by the members of the winery. The winery is a "Cooperative Society", thus the members are at the same time owners of the various vineyards.
3. Members are provided with a member ID, that uniquely identifies each of them. Each member has name, surname, address and vineyard references. The members may also have a specific role in the winery administration.
4. Yearly, at the end of the grape harvest, the winery collects grapes from the various members. The winery wants to keep track of the grape name, grape quantity, date of the harvest and the supplying member.
5. Finally, the winery has to record each produced wine with the production year, the used grapes and the supplier, the produced hectolitres and the cellarmaster. A product ID is assigned to each wine production. A member of the winery may be also a cellarmaster.

Exe 5.4 Music Library

We want to create a database in order to store the information related to our music library. Each DVD includes several songs which have authors and performers. On the other hand, a person may be either author or performer of many songs. The database requirements are listed below:

1. For each disk, we want to store the disk ID, the title and the year of production. Each disk ID is unique.
2. A song has a title and a number that indicates on which track it is recorded on one of the disks (identified by disk ID). For each disk, a song is uniquely identified a song ID.
3. For each person, either author or performer, we want to store the person ID, the name, and the nationality. Person IDs are unique.
4. Each song has at least one author. There are different types of authorship, e.g., composer, text writer, or arranger. For each author of a song, we want to store the type of authorship.
5. Each song has at least one performer. There are different instruments for a performer, e.g., voice, piano, violin. For each performer we want to store the instrument played during the recording.

Exe 5.5 Social Network

A database needs to be developed in order to register users, contacts, messages, pictures of a "University Social Network". Design the relational structure diagram that captures the requirements stated below.

1. Through the "University Social Network" people can contact new and old friends and share with them common interests: opinions, web–links, pictures, video, etc. People participating in the social network have a personal account (user identifier, password, and email address). The user ID uniquely identifies a person.
2. Users should be able to search on the network for a user, and then to establish a friendship. For each friendship the two user identifiers of who requested and who accepted the friendship are stored. The registration date and time are recorded too.
3. Users activities on the network should be tracked: written opinions, messages sent, shared pictures and videos:
   - Message, and texts in general are registered with an identifier number, the publish date, and the type (message, news,..);
   - Picture and video are registered with a code number, a short description of the object, the submission date, the type, and the typical attributes (quality, size, etc.).

6 Access

Exe 6.1

Open the database “MultiPlexCentre.accdb” that supports a multiplex cinema centre.

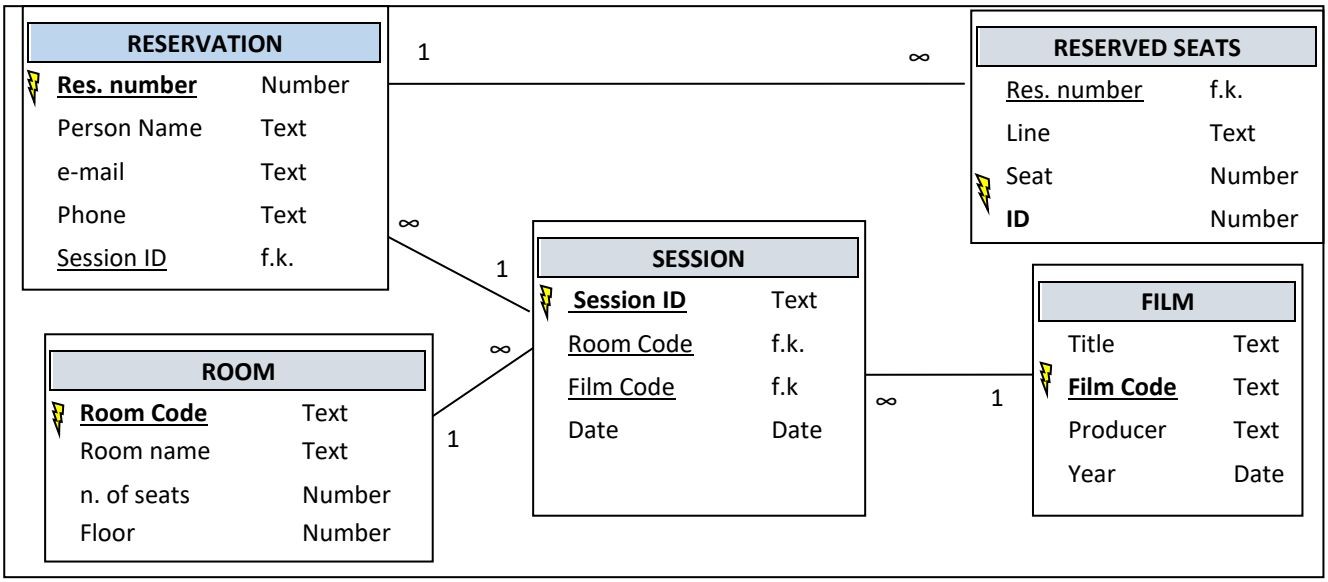


Figure 2: Multiplex Cinema Centre - Relational Model

6.1.1 PART A (Selection and Summary Query)

Q01. Build a query that returns the titles of English movies with sessions scheduled in January. Show title, session id.

Q02. Build a query that, given a session specified by the user (SessionID), returns the reserved seats ordered by line and seat.

Q03. Build a query that returns title, production year and language of the Italian movies produced between 2008 and 2010.

Q04. Build a query that returns the titles of the movies with sessions scheduled in rooms with more than 100 seats. Show title, room name and floor.

Q05. Build a query that returns for each session the German movies and the date corresponding to 30 days after the scheduled date. Show session id, title and the new date.

Q06. Build a query that returns the movie session for a language and a floor provided by the user. Show the title, the scheduled date and the room name.

Q07. Build a query that verifies if any session of the “Twilight Saga” has been scheduled. If yes, show the scheduled time and the room name.

6.1.2 PART B (Summary Queries)

Q09. Build a query that shows for the first floor the total number of seats and the average seats per room.

Q10. Build a query that returns the sessions with the total number of reserved seats, ordered by the number of reserved seats.

Q11. Considering that the price of one ticket is 7.5 euro, build a query that shows the income provided only by the reserved seats of each session.

Q12. Build a query that returns name, e-mail and phone of the people who reserved more than 2 seats.

6.1.3 PART C: Validation Rule, Forms, Reports

V1. Build a validation rule with text which checks that the number of seats per room be positive

V2. Build a validation rule with text which checks that the session year be not after today

F1. Build a form to view films. Lock the form to avoid films' insertions

F2. Build a form to insert a new reservation with the reserved seats. Lock the form to avoid reservations modifications

F3. Build a form to view rooms and sessions. Lock the form to avoid room insertions, modifications and deletions

R1. Build a report to display, room by room, session by session, the reservation in Person name alphabetical order

Exe 6.2

Open the database “Winery.accdb” that supports a winery in the South-Tyrol region.

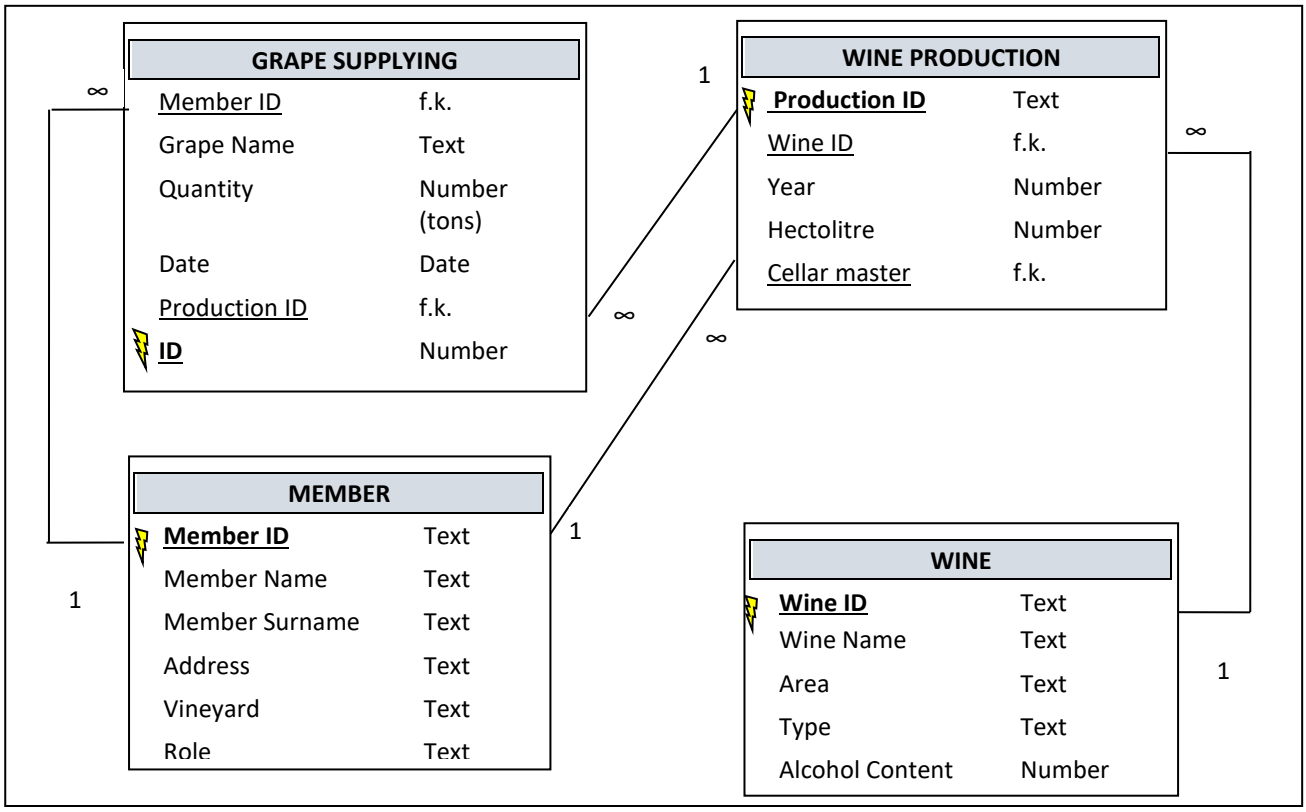


Figure 3: Winery - Relational Model

6.2.1 PART A

Q01. Build a query that returns for each regional wine the corresponding hectoliters produced between 2009 and 2010 sorted in ascending order by wine name and year.

Q02. Build a query that, given a wine production specified by the user (ProductionID), returns the grape supplier, the grape name and the corresponding quantity;

Q03. Build a query that, given an owner of a grape supplier entered by the user, returns the wine productions for which he supplied grapes. Moreover, it returns the corresponding year, in ascending order, and the quantity in kilos (convert the unit of measure from tons to kilos, 1 ton = 1000 Kg);

Q04. Build a query that shows the hectoliters produced each year for a regional wine, ordered by hectoliter;

Q05. Build a query that compares the yearly quantity of grapes supplied by each vineyard, but considering only the grape harvest made in September. Return for each vineyard its references and the corresponding supplying: the grape name, the grape harvest year, and the quantity. Sort in ascending order by vineyard and year;

Q06. Build a query that returns all the wine productions for which the cellar master is a member of the winery;

Q07. Build a query that returns name, surname and address of the members with a role in the winery administration;

Q08. Build a query that returns the regional wines that have an alcohol content less than 5.

6.2.2 PART B

Q09. Build a query that for each wine production in 2010 and with more than 2000 hectoliters returns the grape supplier owner and the number of months from the grape harvest date to now;

Q10. Build a query that compares the wine productions of 2010. Return for each wine production the wine name and the area of production, the produced hectoliters, the cellar master, the total quantity of grapes received for that production, and the number of suppliers involved (the winery member who supplied the grape);

Q11. Build a query that returns for each wine production of 2010, the wine name and the area of production, the total amount of money the winery had to pay to its members for the supplied white grapes considering that in 2010 the price of the white grape was 1.25 euro (per kilo)

6.2.3 PART C

F1. Build a form to view wines with their production. Lock the form to avoid wines deletions

R1. Build a report to display, grouped by member, year by year, the wine productions for which the member is cell-master

R2. Build a report to display, wine by wine considering only those wine with alcohol < 8%, the cell-master in alphabetical order

Exe 6.3

Open the database "Disk_Song.accdb" that keeps track of compact disks, and songs recorded on them, together with authors and performers of the songs.

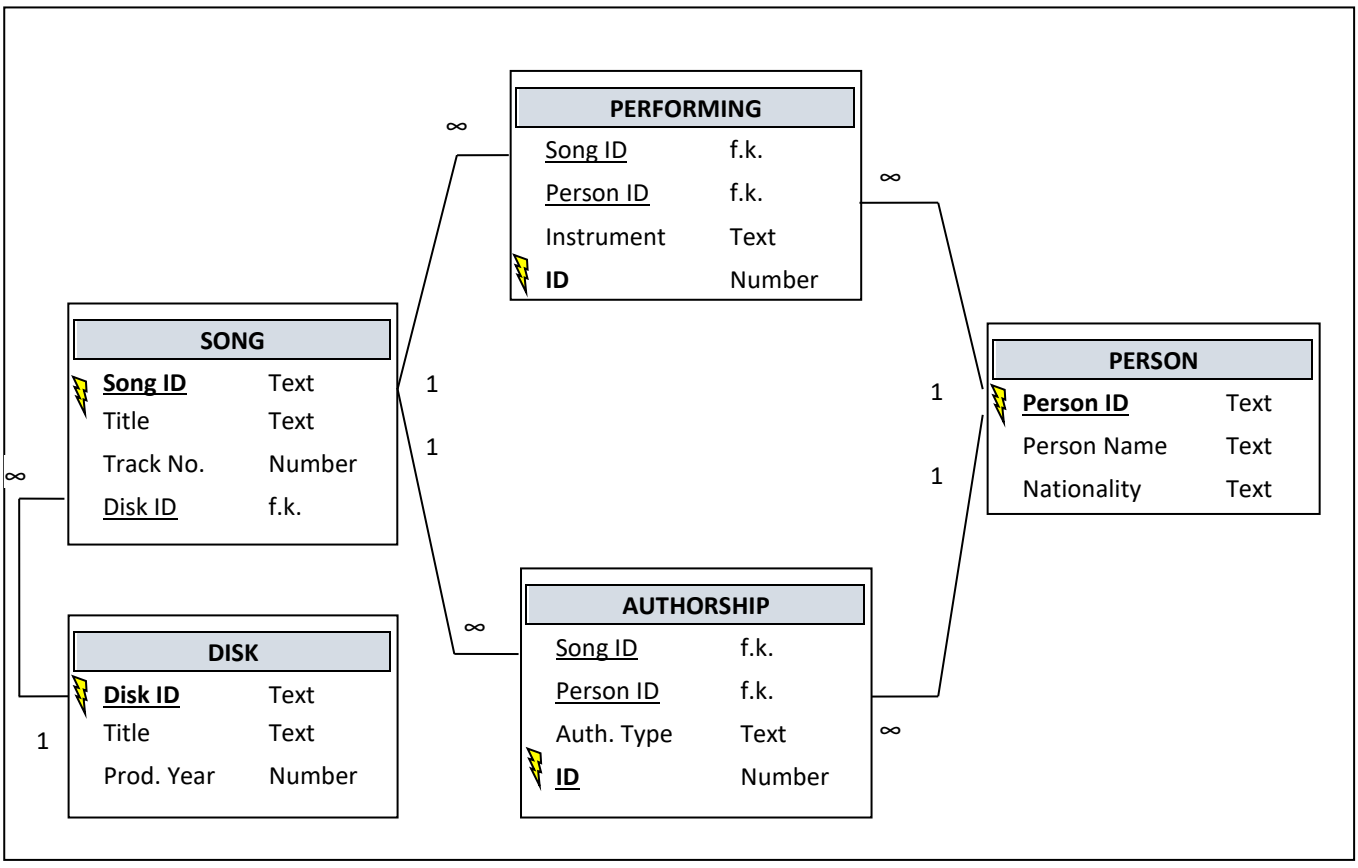


Figure 4: Disks and Songs - Relational Model

6.3.1 PART A

Q01. Build a query that, given a song specified by the user (the title), returns the names of the corresponding authors in alphabetical order

Q02. Build a query that returns the songs with a piano performance, displaying title and name of the performer(s) too.

Q03. Build a query that shows the performers whose first name is Elton and play guitar.

Q04. Build a query that returns the disks with title equal to one of its songs.

Q05. Build a query that returns the disks containing more than 2 songs;

6.3.2 PART C

F1. Build a form to view disks with their songs. Lock the form to avoid disks insertions and songs modifications

R1. Build a report to display, person by person, the songs for which he is author

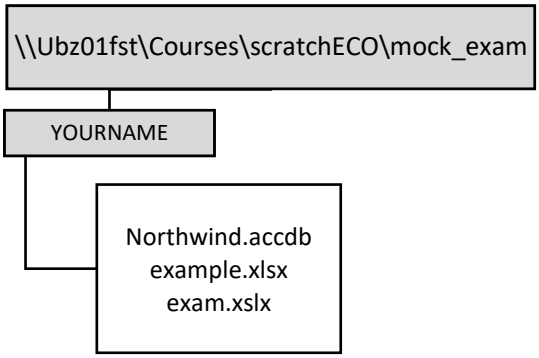
R2. Build a report to display, person by person, the songs which he is performing

7 Mock Exam

Rules

- No communication with other people or among students is allowed. Phones and every other means of communication must be turned off. Opening any communication program on the computer is not allowed and is considered cheating.
- You are responsible for the correct copy of your files.

Enter Windows with your login. You have 40 minutes starting from now.



Copy the archive in **\\ubz01fst\Courses\scratchECO\mock_exam\YOURNAME** on your Desktop and extract its content. At the end of each exercise copy here only the files you are required to return.

Exercise Excel

Open with Microsoft Excel 2010 file **example.xlsx** and save it with name **exam.xlsx**. Then in sheet **First**:

- write in cells C21 and D21 the averages of Number1 and Number2 and in cells C22 and D22 the standard deviations;
- using appropriate partial absolute references, fill each row of column F and column G with the corresponding value in column C and D multiplied by C22/C21 or D22/D21;
- in each row of column H if the corresponding values of columns F and G are both smaller than 3 write “little” otherwise write a dash (trattino, Halbgeviertstrich);
- apply, with conditional formatting, in column E a green highlight to cells smaller than average;
- if Number1 minus Number2 is negative write in the corresponding row of column I the square root of the natural logarithm of Number1, otherwise write nothing;
- create a vba macro to solve the previous point and show the result in column J;
- apply to background of column A, with conditional formatting, a green yellow colour scale.

In a new sheet named **diet** solve the following problem using the solver tool. You have to define a diet which provides at least 20 mg of proteins, 30 mg of iron and 10 mg of calcium daily. Given that:

- vegetables provide 5 mg/kg of proteins, 6 mg/Kg of iron and 5 mg/Kg of calcium and cost 4 €/Kg;
- meat provides 15 mg/kg of proteins, 10 mg/Kg of iron and 3 mg/Kg of calcium, costing 10 €/Kg;
- fruits provide 4 mg/kg of proteins, 5 mg/Kg of iron and 12 mg/Kg of calcium and cost 7 €/Kg;

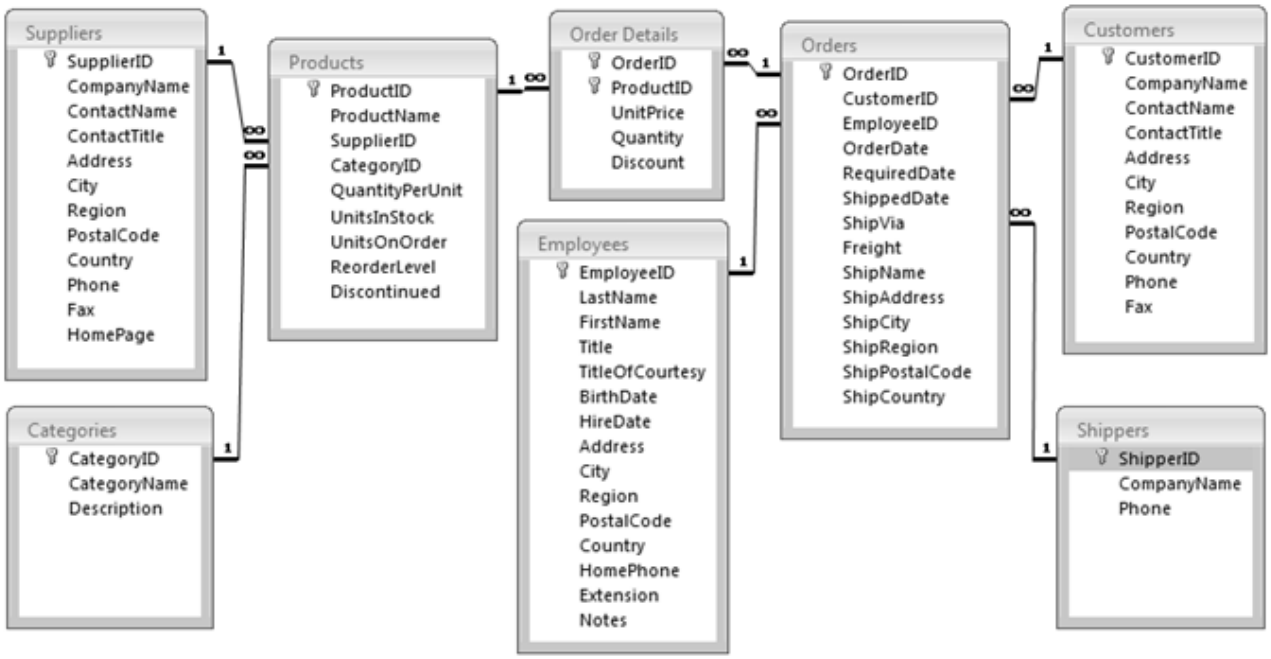
Determine the cheapest diet. The diet must include at least 0,5Kg of each type of food.

In a new sheet named **loan** build the complete loan table for a loan of 400 000 euro with interest rate at 2% for the first seven years and 6% for the next five years. Build a mathematical graph for debt at 1st January by year.

Return file **exam.xlsxm**.

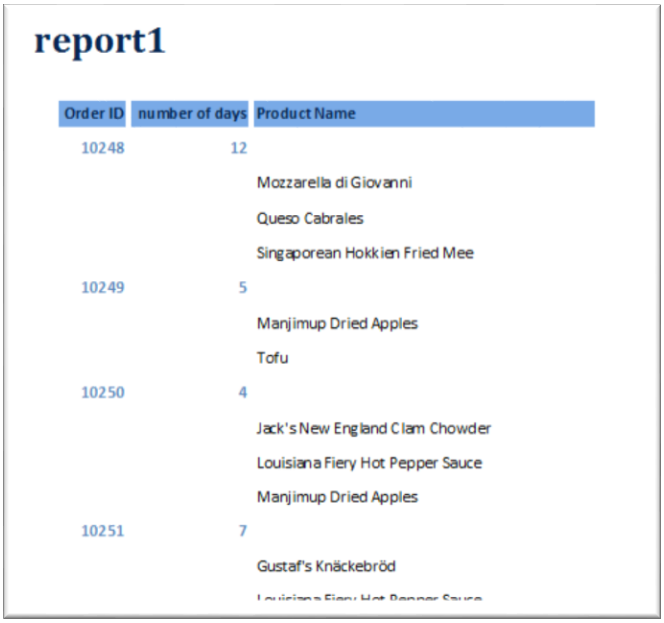
Exercise Access

Open database **northwind.accdb** and



- build query "**query1**" which asks for a customer's company name and shows the number of its orders handled only by the employee "Nancy Davolio". Show only the number of orders;
- build report "**report1**" which displays order by order the number of days between the order date and the shipping date and the product list sorted in alphabetical order.

  Return file **Northwind.accdb**.



report1

Order ID	number of days	Product Name
10248	12	
		Mozzarella di Giovanni
		Queso Cabrales
		Singaporean Hokkien Fried Mee
10249	5	
		Manjimup Dried Apples
		Tofu
10250	4	
		Jack's New England Clam Chowder
		Louisiana Fiery Hot Pepper Sauce
		Manjimup Dried Apples
10251	7	
		Gustaf's Knäckebröd

8 VBA Solutions

```
Function Ex2_1(Km, Consumption, Optional fuelType = "Gasoline")
fuelPrice = 1.25
If fuelType = "Diesel" Then
        fuelPrice = 1.15
ElseIf fuelType = "Lpg" Then
        fuelPrice = 0.55
ElseIf fuelType <> "Gasoline" Then
        MsgBox ("Undefined fuel Type, I am gonna use Gasoline")
End If
Ex2_1 = fuelPrice * Km / 100 * Consumption
End Function


Function Ex2_2(r As Range)
Sum = 0
For Each x In r
        Sum = Sum + x
Next
Ex2_2 = Sum / r.Cells.Count
End Function


Function Ex2_2b(r As Range, th)
Sum = 0
Count = 0
For Each x In r
        If x > th Then
                Sum = Sum + x
                Count = Count + 1
        End If
Next
If Count <> 0 Then
        Ex2_2b = Sum / Count
Else
        MsgBox ("No Values Above " & th)
        Ex2_2b = 0
End If
End Function
```

```
Function Ex2_3(r As Range, y)
minDist = 99999
found = 0
Ex2_3 = 0
For Each x In r
        If IsEmpty(x) = False And IsNumeric(x) = True Then
                dist = Abs(x - y)
                If dist < minDist Then
                        Ex2_3 = x
                        minDist = dist
                        found = 1
                End If
        End If
Next
If found <> 1 Then
        MsgBox ("Couldn't find any, returning 0")
End If
End Function
```