

8 Spreadsheets and Databases

Topic

Spreadsheet, databases

Learning objectives

Students will be able:

- to understand the basic features and applications of spreadsheets
- to understand the basic features and applications of databases

Key words

Spreadsheet, column, row, cell, formula, value, chart, graph, line graph
pie chart

Database, DBMS, relational database, index, file, record, field, update,
index, retrieve, search, sort, query

Spreadsheets

Spreadsheet software allows data and information to be displayed and managed in a table format. Spreadsheets are mathematical **tables** which show data in **cells** that are organized in **rows** and **columns**. A spreadsheet allows calculations to be carried out on cells or groups of cells, both within individual spreadsheets and across linked spreadsheets.

A column is a vertical line of cells labelled with a letter.

A row is a horizontal line of cells labelled with a number

A **cell** is an intersection of a column and a row, it is labelled with a letter and a number, it can hold three types of data: text, numbers and **formulae**.

Formulae are entries that have an **equation** which calculates the value to display. We can calculate totals, percentages, average, etc. When you change the value of one cell, the values of other cells are automatically recalculated.

Symbol	Meaning
+	plus
-	minus
*	multiplied by, times
/	divided by
=	equals, is equal to
:	to
%	per cent

Spreadsheets have many **built-in functions** that can be carried out by referring to the function by name. For example, =SUM(A1:A5) means: add up the values in the cell range A1 to A5.

The format menu lets you choose font, alignment, borders, column width, etc.

Most spreadsheets programs can also generate graphics representations, such as line graphs, bar charts, pie charts, etc.

Typical applications of spreadsheets:

- Calculating and managing accounts and other financial information
- Performing calculations on data collected in experiments and surveys
- Producing data from which graphs can be drawn
- Income and expenditure
- Sales forecasting
- Staff hours, rates to pay and tax
- Mortgage payments and interest rates
- Number statistics

Databases

A database is essentially a computerized record-keeping system. The software used to store, organize and retrieve the data is called the **database management system – DBMS**.

Information is entered into the database via **fields**. Each **field** holds a separate item of information. The **fields** are grouped together in **records**. (A record of a student can consist of several fields containing his or her first name, surname, date of birth, address, phone number, parents 'personal data, etc.). The user can define how a record will be organized by choosing the number of fields,, their names, , the size of each field and the type of data it will hold.

Records are grouped into **files**. Records can be easily **updated** – any field containing information can be changed.

Once you have added data to a set of records, **indexes** must be created. An **index** is a list of records ordered according to a content of certain fields (for example a surname). This helps to **search** the database and **sort** the records.

There are two main types of databases:

- **Flat file databases** – all the data is stored in a single file and the sorting and searching of reports is done in this single file. This kind of a database is easy to maintain but is suitable for small amounts of data only.
- **Relational databases** – they use a DBMS to link independent files together. Two databases can have a common field which is used to relate the two files.

A database **query** function allows you to extract information according to certain conditions or criteria.

The sort, search and logical conditions used in a database are:

- Sort ascending
- Sort descending
- Is equal to (=)
- Is less than (<)
- Is greater than (>)
- Is less than or equal to(<=)
- Is greater than or equal to (>=)
- Is not equal to (<>)
- AND
- OR
- NOT

For example a logic condition **AND** is used when we need to search for information using two criteria.

Status = Age > 30 years AND Average salary > (it will retrieve all people older than 30 with an average salary of more than £6,000.

Typical applications of databases:

- Creating and maintaining personal lists (students, customers, patients...)
- List of suppliers to a company
- Library catalogues
- Details of careers available with qualification requirements
- etc.

Vocabulary

	Definition	Translation
--	------------	-------------

bar chart	a graph with bars whose lengths are proportional to quantities	sloupcový diagram, graf
cell	an intersection of a column and a row in a spreadsheet	buňka
column	a vertical line of boxes labelled with a letter in a spreadsheet program	sloupec
formula	a mathematical equation that is used to calculate and analyse data	vzorec
line graph, line chart	a graph consisting of dots linked with lines	spojnicový graf
pie chart	a circular chart divided into triangular areas proportional to the percentages of a whole	kruhový, výsečový graf
row	a horizontal line of boxes labelled with numbers in a spreadsheet program	řádek
spreadsheet	a program which allows the user to analyse information in tabular form by manipulating rows and columns	tabulkový procesor
value	a numerical quantity	hodnota
database	a file of structured data	databáze
DBMS	a database management system - the software used to store, organize and retrieve the data in a database	systém řízení báze dat
relational database	a database system that maintains separate , related files, but combines data elements from the files for queries	relační databáze
field	a unit of information in a record in a database	pole
file	a collection of records in a database	soubor
index	a list of records ordered according to a content of certain fields in a database	rejstřík
query	a request for data in a database which allows us to extract data according to a certain criteria	dotaz
record	a unit of a file consisting of a number of interrelated data elements (fields)	záznam
search	to look for specific information	hledat
sort	to reorder data into a new sequence	třídít
update	to make something more modern or suitable by adding or changing information	aktualizovat

Tasks and Questions

1) Read the following formulae and explain what they mean:

Example: =A2*B2.....equals cell A2 multiplied by/times cell B2

- a) =A10*B3
- b) =B3*15%
- c) =SUM(B9:B24)
- d) =K5/B3
- e) =D4-B4/B5
- f) =Sum(H4:H7)
- g) = Sum(A1:A4, A10, A12, A14)
- h) =Average(A1:A9)
- i) =MAX(F3:F8)

2) Listening: Infotech p. 73

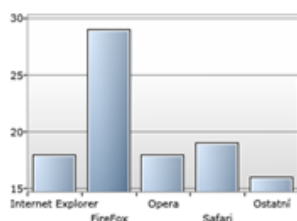
C  Listen to Lucy Boyd giving a training course on basic Excel and check your answers to A and B.

D  Listen again and decide whether these sentences are true or false. Correct the false ones.

- 1 A spreadsheet displays information in the form of a table with a lot of columns and rows.
- 2 In a spreadsheet you can only enter numbers and formulae.
- 3 You cannot change the width of columns.
- 4 Spreadsheet programs can generate a variety of charts and graphs.
- 5 Spreadsheets cannot be used as databases.

3) Name the following types of graphs:

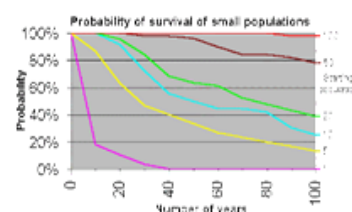
a)



b)



c)



4) Read the following query and explain what it means:

SELECT ALL WHERE NAME = "SMITH" AND AGE > 35

5) Which fields would you include in the following databases?

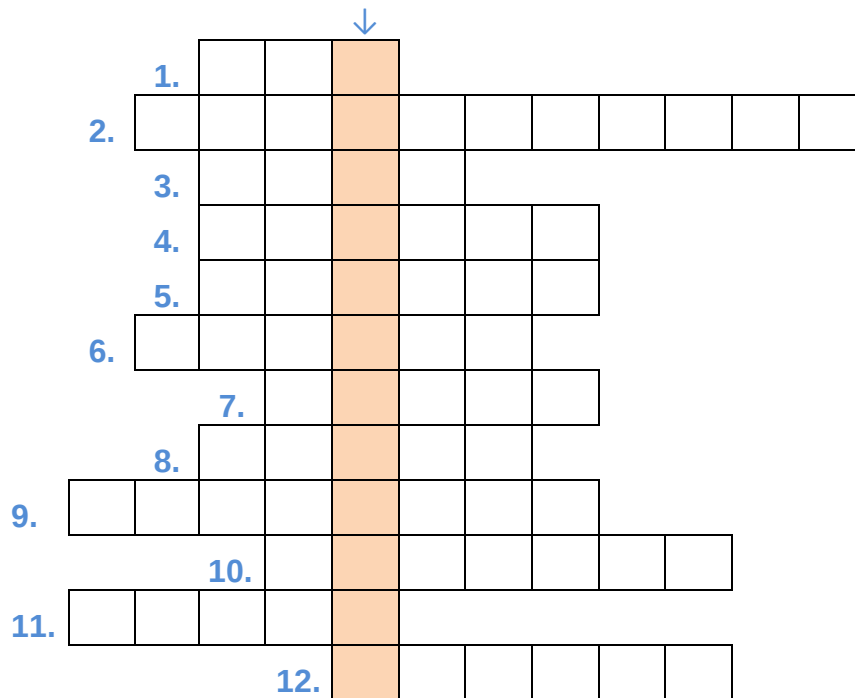
- a) The patients of a general practitioner
- b) A library catalogue
- c) Employees of a company and their salaries
- d) Database of volcanoes

6) Creating an Access database: Put the steps in the correct order:

- a) Left-click the option "Blank database...", which will then ask you to name your database. Helpful Hint: Access databases are saved with the .mdb extension.
- b) From the menu choose File < New
- c) The Access Database interface should now be displayed
- d) Name your file and press Create. This will automatically save your blank database, so remember where you put it!
- e) Start Access
- f) The "New File" side bar will be displayed on the right-hand side of the screen

7) Complete the puzzle:

- 1. a horizontal line of boxes labelled with numbers
a program which allows the user to analyse information in tabular form by manipulating rows and
- 2. columns
- 3 an intersection of a column and a row
- 4 a vertical line of boxes labelled with a letter
- 5 to make something more modern or suitable by adding or changing information
- 6 a unit of a file consisting of a number of interrelated data elements
- 7 a list of records ordered according to a content of certain fields in a database
- 8 a unit of information in a record in a database
- 9 a file of structured data
- 10 a mathematical equation that is used to calculate and analyse data
- 11 a request for data in a database which allows us to extract data according to a certain criteria
- 12 to look for specific information



Summary

Spreadsheet software allows data and information to be displayed and managed in a table format. A spreadsheet allows calculations to be carried out on cells or groups of cells.

A **database** is essentially a computerized record-keeping system. The software used to store, organize and retrieve the data is called the **database management system – DBMS**.

Questions:

1. What is a spreadsheet?
2. What are spreadsheets used for?
3. How is data organized in a spreadsheet?
4. What types of data can be entered into a cell?
5. What is a database?
6. What is a DBMS?
7. How is data organized in a database?
8. What is updating a file?
9. How much information does a field hold?
10. What is a query?
11. Give examples of typical applications of:

- a) Spreadsheets
- b) Databases

Literatura

- [1] ESTERAS, Santiago Remarcha. *Infotech : English for computer users*. 4th ed. Cambridge : Cambridge University Press, 2008. 168 s. ISBN 978-0-521-702997.
- [2] ESTERAS, Santiago Remarcha; FABRÉ, Elena Marco. *Professional English in Use : ICT*. 1st ed. Cambridge : Cambridge University Press, 2007. 118 s. ISBN 978-0-521-68543-6.
- [3] GLENDINNING, Eric H.; MCEVAN, John. *Basic English for Computing*. Revised and Updated. Oxford : Oxford University Press, 2003. 136 s. ISBN 0194574709.
- [4] CUSHING, Steve. *ICT: written by GCSE examiners*. London: Letts, 2005. ISBN 1-84315-511-7.
- [5] <http://thecomputereducation.com>
- [6] <http://www.webopedia.com>
- [7] <http://www.teach-ict.com>