| | **Question** | **Answer** |
|---|---|---|
| **1** | **Algorithms** | |

| | |
|---|---|
| A tourist can buy tickets at a fixed value of 25 units to travel on the underground railway represented in the diagram. | * tourist inserts the ticket at start point *<br>Input - ticket<br>Output - Write start-position-code on the ticket<br>* tourist inserts the ticket at destination point * |
| For example, a journey form F to C costs 11 units.<br>Each ticket has an electronic record of the number of units remaining. At the start and the end of each journey the tickets are entered into an automatic machine. At the starting point a machine records the code identifying the station. | Input - Read number-of-units-on-card<br>* calculate price of journey *<br>If     start-position-code = "A" and end-destination = "B"<br>Then   cost-journey = 3<br>If     start-position-code = "D" and end-destination = "F"<br>Then   cost-journey = 3<br>etc. etc.<br>If     cost-journey > number-of-units-on-card<br>Then    keep card<br>Else     subtract cost-journey from number-of-units-on-card<br>       write (new) number-of-units-on-card<br> * end program * |
| At the destination the machine calculates the number of units used and calculates the number of units left on the ticket. | |
| As long as there are any units remaining, the passengers can travel any distance, as far as they like. Machines retain tickets which have no units remaining. | |
| Write an algorithm to describe what the ticket machine does at the end of a journey. | |

| | **Algorithms** | |
|---|---|---|
| **2** | | |

| | |
|---|---|
| Explain the difference between a compiler and an interpreter. | |
| Give one example of the use of a program written in a low-level language. | |

| | **Applications** | |
|---|---|---|
| **3** | | |

| | |
|---|---|
| Some customers of a bank use electronic funds transfer (EFT) to pay for purchases. Explain one disadvantage of EFT to the customer and one advantage to the bank of this method of payment. | EFT is electronic (fund) money transfer. Customers could make use of a bankcard, either with magnetic strip or a Chip-card.<br><br>Each customer needs to have a account number sometimes a password, called a PIN-code. Some cards require just your signature on the receipt (Credit cards)<br><br>Disadvantage for customer:<br>- you can spend too much too easy<br>- if you loose it, big problems can arise!<br>- you might not know how much money you have left<br><br>Advantage to the bank:<br>- always available to customers (24 hours a day)<br>- no queuing in the bank<br>- it will cost less and is very fast |

| | Question | Answer |
|---|---|---|

| 4 | **Applications** | |
|---|---|---|
| | What are expert systems? | An expert system is the type of software people usually mean when they talk about artificial intelligence. Software that uses an expert system comes up with recommendations for the best solution to a complex problem, based on information you (the user) feed it about the current situation. You ask the computer a question or pose a problem, and the expert system provides an answer, based on a "knowledge base" of human expertise. |
| | | The person programming an expert system analyzes the behavior of a human expert in the field, breaking down the expert's handling of the problem into a set of explicit rules ("if the molten steel contains 1.4 % copper, then increase the temperature to 675 degrees, unless the carbon content exceeds 1.5%, in which case . . ."). Once a good expert system knows all the relevant rules, its recommendations should match those of the expert. The catch is teaching the expert system all the rules it will need to deal with every possible scenario it might confront —no expert system can be as flexible as a person. When an expert system isn't programmed very well, some of its decisions can be pretty funny. |
| | | Expert systems are used in equipment repair, investment analysis, insurance planning, route scheduling, training, medical diagnosis, production control, and in other areas. |

| 5 | **Applications** | |
|---|---|---|
| | Staff at a bicycle factory use computer-aided-design and computer-aided manufacture (CAD/CAM) to design and make the parts for the bicycles. | CAD is computer aided design. It allows to draw in 3D any part needed to construct a bicycle. In the old days they used blue prints (on paper). |
| | | Advantages: |
| | | - you can magnify components (zoom in / out) |
| | Describe two features of the CAD program that makes it suitable for designing the parts for the bicycles. | - you can scale / rotate / reshape / change / add patterns |
| | | - you can create a model |
| | | - it is very accurate |
| | | CAM is computer aided manufacturing. The computer regulates the production process. Tulip builds in Rosmalen a factory using CAM, that makes PC's all automatically. The computers control the processing, have all the data concerned and necessary. |

| 6 | **Applications** | |
|---|---|---|
| | What is a database? | A database document is just a collection of information stored in computerized form. The simplest way to understand a database is to think of it like a set of 3 x 5 cards. Since the information is on your computer, though, a click of the mouse or the stroke of a key can alphabetize those "cards," or find just the names of the people on the cards who live in a certain town, or tell you who owes how much money, and so on. |
| | | Computer databases can be highly structured, storing the same kind of information about each item in the database in well-defined compartments. This works as if you printed a standard form on each of your 3 x 5 cards— perhaps with one space for a name, one space for an address, and one space for a telephone number. In a structured computer database, the "space" for a name, a part number, a price, is called a field. A record corresponds to one of the individual 3 x 5 cards. The record contains a complete set of fields, all filled with information corresponding to a particular item: if your database is a name-and-address list, each record represents a person; if your database is a parts catalog, each record represents one part. |
| | | A specific set of fields and records organized in a specific order, including the information they contain, is called a table. In fact, tables are often displayed on the screen with each item or record, in a row, and each field as a column. |
| | | Structured databases can be either flatfile databases or relational databases. In a flatfile database, you can work with only one data table —one set of fields —at a time. In a relational database, you can use multiple tables (multiple database documents) at once. Flatfile databases are much easier to understand and use, but relational databases are much more efficient for many things you commonly do with data, especially in businesses. |

| Question | Answer |
|---|---|

A database can also be simply a free-form collection of information, without any particular structure. In this case, the analogy would be to a pile of notes you've written on whatever paper was handy at the time — the information on each piece of paper doesn't have to be organized in the same way.
The term database can also refer to the software package itself that you use to create the database.

---

### 7

**Applications**

What is a database? Who will use it?

A database is a program that allows to enter and store data (in so-called "FIELDS") and give you the option of doing all kinds of **retrieval (searches, find any information)**. On of the first databases was Dbase, nowadays most people use Filemaker (from Claris), or Access (from Microsoft).
Essential for databases is also, that they allow to produce all kinds of lists and reports of your stored information. It is easy to sort information and to have user-friendly access to your data.

People who make use of a database:
- office workers (to store customers, addresses, phonenumbers etc.)
- teachers (to store information about students and their results)
- libraries (to store and retrieve information about books, customers etc,)

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### 8

**Applications**

What is a flat file (hierarchical) database?

A database is a program that allows to enter and store data. A flat file database only uses simple singel files to store the data. Flat-file databases can be extraordinarily complex, but they are simple in this sense: All the records in a single flat-file database must conform to the same rigid structure, that is, every record in the database has the same fields as every other record.

Datastructure:
Database
        File(s)
           Records
             Fields

---

### 9

**Applications**

What is a relational database?

A database is a program that allows to enter and store data. A **relation is a link between two databases** (or 2 files in a database) that permits one of them (the master database) to borrow and use data from the other. You may call the latter file the 'related' database; some prefer to call it the 'servant' or 'lending' database.

Data structure:

Database
File               File
Records    <->   Records
Fields           Fields

The different files can be linked together (the relations) and can pass information through. Usually the link can be made by making use of certain Key-Fields. Those Key-Fields shoul store the same data (e.g. a customer number, an account number).
A big advantage of relational databases is the fact, that data is stored only once. Once you ad or change data in a record or field, it will be known in all relevant other files. You will neve get inconsistent data this way.

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### 10

**Applications**

What is a spreadsheet? Who will use it?

A spreadsheet is a program that allows to enter data (in so-called "CELLS") and give you th option of doing all kinds of **calculations automatically** (after filling in some formulas). The first spreadsheet was Lotus-123, nowadays most people use Excel (from

| <u>Question</u> | **Answer** |
|---|---|
| | formulas). The first spreadsheet was Lotus-123, nowadays most people use Excel (from Microsoft). |
| | Essential for spreadsheets is also, that they allow to create visual (colorful) **CHARTS** and **GRAPHS** of your calculations and results. |
| | People who make use of a spreadsheet: |
| | - bookkeepers (do calculations, budgeting) |
| | - teachers (to calculate grades) |
| | - bankers (to do calculations about rent, mortgages etc.) |

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**11** **Applications**

| What is software? Give 3 examples of application software used in business and/or office. | Software is the (digital) data needed in any computer system. It stores all instructions (how to operate) and all necessary data (information needed to run a certain program) |
|---|---|
| | - Spreadsheet (Excel), used for doing calculations and producing charts |
| | - Wordprocessor (Word, Wordperfect), allowing to produce letters etc. |
| | - Database (Filemaker, DBase), allowing to store and retrieve large amounts of data |
| | - E-Mail (Eudora, Compuserve), software allowing to send and retrieve electronic mail (e.g. via the Internet) |

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**12** **Control Systems**

| Give one feature of a microprocessor-controlled camera that is not available in a manually controlled camera. | Auto focus |
|---|---|
| | Flash light control |
| | Automatic rewinding |
| | Time control (e.g. 5 pictures a minute) |

---

**13** **Control Systems**

| The oxygen content and temperature in a fish tank have to be controlled. | |
|---|---|
| (a) Write an algorithm to achieve this. | |
| (b) State six items of hardware, other than the processor, that the system must contain. | |

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**14** **Database**

| A company receives all of its orders by telephone. The company has purchased a database of incomplete addresses. The name field and part of the address 1 (street) field are left blank. An example of a record which would appear on the screen is | A) They would ask the customers on the phone! |
|---|---|
| | B) To identify each record. Names could be double, that whu an unique number is required |
| NAME: ADDRESS 1: ADDRESS 2: ADDRESS 3: CODE: | c) They would set up a mailmerge, first do a find (search / query) for the right information, do a sort on the records found and then print the mailmerge (using the database fields name, address etc.) |
| New Way Christleton Camshire ZIP CT3 8LX | |

| Question | Answer |
|---|---|
| (a) When new customers telephone the company they are asked for their ZIP CODE (post code) which is then used to search this database for a record with a matching ZIP CODE (post code). Describe how the staff will try to check that the correct record has been found. <br><br> (b) Explain why a unique reference number should be added to each record. <br><br> (c) Describe how the company could use this database efficiently to write the same letter to all people living in New Way. | |

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**15** | **Database** | |
|---|---|---|
| A garage keeps a database of cars for sale. <br> (a) The database is stored on disk. What type of file access would be used? <br> (b) Give an example of a situation when a record would be <br>     (i) deleted <br>     (ii) amended <br><br> (c) Explain how the database could be recovered if the disc became corrupted and it was no longer possible to read it. | a) Random, direct file access <br> b) (i) If a car is sold (delete the record) <br>     (ii) If a car would change it's price <br> c) There should be a backup file available. A good way would be to have different versions of the backup, a so-called father-son backup generation file. |

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**16** | **Database** |
|---|---|
| What is a **file**? | A file is a particular collection of information you use as a unit. Files can hold just about any kind of information, including text, numbers, graphics, or software programs. <br> Files that hold the information you actually work with, such as a report you write or a graphic you create, are referred to as documents, document files, or data files. <br> Files that contain programs are program files; some program files are applications or utilities. Even the folders or directories on your disk are files. |

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**17** | **Hardware** |
|---|---|
| Mention the 3 type of computers that you know. State for each of them an example of practical use. | 1. Main frame <br> is a multi-user system, where up to thousands of terminals cab be connected to one very powerful CPU. It is mainly used by world wide operating companies, that have to share the same data (like SHELL, KLM etc.) <br> 2. Mini <br> is also a multi-user system, but on a far smaller scale. It is mainly used in one building, so workers can share the same data. You can connect some 24 terminals (or PC's). The operating system is usually UNIX or WINDOWS-NT. <br> 3. Micro <br> is a stand-alone single user computer. A Personal computer is a good example. The first Micro's were the calculators! |

| | Question | Answer |
|---|---|---|
| 18 | **Hardware** | |
| | What is a Chip? | A chip is an electronic device, that can store the equivalent of millions of digital switches. Before the chip was invented, transistors were used. Chips are made for various purposes.<br><br>We distinguish:<br>- Memory chips (can store data)<br>- CPU-chips (used for e.g. personal computers, famous are Intel and Motorola)<br>- Video chips (can store video data, used for displaying graphics on monitors)<br>- Microprocessors (a one-chip computer, used in many devices) |
| 19 | **Hardware** | |
| | What is a laptop computer? | It is a portable personal computer (PC). It uses batteries and can be used for about 2 or 3 hours. The screen is usually a LCD-matrix. Those screens don't use up a lot of electricity. |
| 20 | **Hardware** | |
| | What were Light Bulbs (Valve or Tubes) used for in the old days of computing? | They were able to have 2 states (on or off). They in fact were the first electronical parts used in the first computers build (e.g. the ENIAC). Tubes were followed by smaller and more reliable parts, the TRANSISTORS. |
| 21 | **Hardware** | |
| | What is a microprocessor? Where can you find them? | A microprocessor is a single chip that has a complete central processing unit on it. To function as a complete computer, it also needs memory, a clock, and a power supply. Well, a computer on a chip has its own built-in clock and its own memory, so all it needs is a power supply to function. These tiny things are used in all kinds of things, from car parts to children's toys.<br><br>You can find them as controlling devices in watches, VCR's, televisions, calculators, vending machines etc. |
| 22 | **Hardware** | |
| | A multimedia information system is being installed in a shop which sells plants for gardens. The system will help customers with little or no knowledge of gardening to choose plants which exactly suit their requirements. Customers indicate their preferences to the system using a touch-sensitive screen.<br><br>Explain why a touch-sensitive screen is considered the most suitable input method. | |
| 23 | **Hardware** | |
| | Describe a Punch Card. | Punched cards were used in the beginning days of computing. There were no monitors connected to computers yet, so the data input was quite complicated. Punch card typist would use special type writers (no ink, but they would punch holes in the tiny little cards). A pile of cards would then be inputted into the computer with the help of card readers. Important was the fact that they all had to be in order. The people who wanted to see the results then would have to wait untill somebody would bring them the printed results (done with loud lineprinters). This could sometimes take a day or two! |
| 24 | **Hardware** | |

| Question | Answer |
|---|---|
| What is DTP? | Desktop publishing (DTP) is the process of creating printed documents that look professionally produced, using page layout software running on a personal computer, along with a high-quality, yet affordable, printer. |
| | To publish something with the traditional method, you would send typed or handwritten text to a typesetter, who would turn it into typeset text called "galleys," which took a couple of days. If there were corrections, it took another couple of days to get those back. If you didn' know how to lay out the pages yourself, you'd take the galleys to a print shop, along with your art (illustrations and photographs). The people there would cut up the galleys with scissors and paste the pieces onto the pages along with the artwork. If something needed to be changed on the finished "paste-up" or "mechanical," it would be possible, but a lengthy and expensive process. Finally, the print shop would reproduce the document in quantity. Instead, you might pay a graphic designer to take the project from conception to completion and the designer would go through this process, creating the mechanical herself and taking i to the print shop to be reproduced. |
| | With desktop publishing, by contrast, you can create the entire document sitting at your ow desk. You can think of the page layout software and the computer as the typesetting and layout area, and the laser printer as the printing press. You proof the project on your own printer; if it isn't right, you just turn back to your computer, make the changes, and print it again. |

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**25** **Hardware**

| Describe a floppy disk. | A Hard disk allows to store data in a efficient way. Data will be stored digital (as zeros and ones). This is done by magnetizing the surface of the disk itself. This means you will have to take care of your disk, if you hold a floppy disk close to a magnet, you will definitely loose all of your stored data. Nowadays floppy disks store up to **2 MEGABYTES** of data They come usually in the size of 3.5" (inch). |
|---|---|
| | Inside the floppy you will find a rotating soft disk. The disk is divided in SECTORS and in TRACKS. All parts on the disk will get an address, so the computer later will be able to retrieve the data very fast. |

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**26** **Hardware**

| Describe a Hard disk. | A Hard disk allows to store data in a efficient way. Data will be stored digital (as zeros and ones). This is done by magnetizing the surface of the disk itself. This means you will have to take care of your disk, if you hold a floppy disk close to a magnet, you will definitely loose all of your stored data. Nowadays hard disk store up to several **GIGABYTES** of data |
|---|---|
| | Inside a hard disk you will find a rotating metal disk, where an arm with a magnetic head (th read / write head) is attached. The disk is divided in SECTORS and in TRACKS. All parts on the disk will get an address, so the computer later will be able to retrieve the data very fast (search time in average is ca. 10msec.) |

---

**27** **Hardware**

| Explain how you would use a windows environment to copy a file from a floppy disk to a hard disk. | |
|---|---|

---

**28** **Hardware**

| What is a daisy wheel printer? | When personal computers first came out, daisywheel printers were the only type of affordab printer that could print sharp-enough text for important documents like business communications or college papers. Daisywheel printers work by pounding raised, fully-formed letters made of metal or plastic against the paper through a ribbon, just like a typewriter. |
|---|---|
| | To be precise, a daisywheel printer has the characters mounted on the end of narrow projections arranged in a circle, like spokes on a wheel, or like petals on a daisy. |

| | Question | Answer |
|---|---|---|
| 29 | **Hardware** | |
| | Handshaking | |
| 30 | **Input Data** | |
| | The data read from cheques and other transactions at a large bank is stored on magnetic tape. What type of file access must be used to access this data? | Only serial File Access can be used (read the records in a serial way, one after another in a row) |
| 31 | **Input Data** | |
| | The customer account number and branch code are printed on the bottom of bank's cheque.<br><br>a) Name an item of data that must be typed in magnetic ink on each cheque before it is processed.<br>b) Give one advantage of using magnetic ink character recognition as an input method to input the data on the cheques. | |
| 32 | **Input Data** | |
| | What is COM? | COM stands for computer output on micro film or micro fiche.<br><br>A (photographic) picture is taken from the contents of the computer screen. This picture will be reduced (a lot!) and with many others it will be put onto a fiche or on a film. In order to see the pictures you will have to use a viewer. It has a background light and will enlarge the pictures. |
| 33 | **Input Data** | |
| | Alphanumeric characters | |
| 34 | **Input Data** | |
| | What is analogue data? | It's data with an unlimited number of values posible. An analogue thermomether will show the temperature on a scale only. You cannot see exactly the real temperature. |
| 35 | **Input Data** | |
| | What is digital data? | It's data with a limited number of values possible.<br>On the display of a digital device you will see most of the time some numbers. They tell exactly the value. |
| 36 | **Input Devices** | |
| | What is OCR? Who would use it? What do you need? | Optical Character Recognition<br><br>Postoffice reading the Postcode (ZIP) for automatic mail-sorting<br><br>Hardware: a scanner<br>Software: an OCR program |
| 37 | **Input Devices** | |
| | What is OMR? Who would use it? What do you need? | Optical MARK Recognition |

| **Question** | **Answer** |
| --- | --- |
| it? What do you need? | Marking of tests, where students fill in with a pencil the boxes (good for multiple choice!!) |
| | Hardware: a special OMR scanner |
| | Software: an OMR recognition program |

---

**38** | **Input Devices** |
| --- | --- |
| Give one example of the use of speech recognition devices. Give one reason why speech output may not be a sensible method of giving warning messages to drivers. | |

---

**39** | **Input Devices** |
| --- | --- |
| Give two distinctive features of a computer system needed to do CAD | Can do 3D usually. Can show high resolution (small details) Shows exact measurements Allows changes in the model |

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**40** | **Input Devices** |
| --- | --- |
| Referring to their use in the design of the bicycle parts (in a company that uses CAD/CAM), explain the purpose of one input device and one output device. | Input device: <br>- a lightpen for clicking on objects on the monitor <br>- a drawing tablet (also called digitiser) <br><br>Output device: <br>- a plotter, capable of printing large maps in colour <br>- lathe, a machine that can cut out metal <br>- cutter, it's a plotter that uses a knife (making signs) <br>- a high resolution monitor |

---

**41** | **Input Devices** |
| --- | --- |
| What is a GDU? | **Graphic display unit.** <br>**Used by e.g. architects.** <br>**It can be a light pen, drawing pad (or tablet) with a pen attached.** <br><br>**Output can be a a plotter (suitable for big drawings)** <br>**and a high resolution colour monitor.** |

---

**42** | **Networking** |
| --- | --- |
| The police need to keep files of wanted people to write accounts of interviews with suspects, to produce details of their expenses and to send messages to and receive messages from the other terminals on their network. <br><br>List the four types of software that must be available on the network. | Software for files of wanted people: <br><br>Software for accounts of interviews: |

| | Question | Answer |
|---|---|---|

**43** **Operating systems**

Describe three different tasks that could be performed by a computer operating system.

---

**44** **Output Devices**

What is a port?

It is a digital connection, you can attach devices to a port.

You can find ports at the back of your computer to connect e.g. a printer or modem.

Also the CPU is connected to input and output ports, so that the digital data can be used by analogue devices. Remember the example of the port in a washing machine!!

---

**45** **Programming**

What is Rogue Value?

It is an **unusual value** to show / reach the end of data input (in a program).

For example when you would read records of customers, you could let the program stop if instead of a name the characters "######" will be read. It is quite normal that when program run with a loop (iteration), they have such a rogue value to stop the loop.

---

**46** **Programming**

What is a compiler?

When a computer programmer writes a program, the programming language use has some resemblance to human speech—even we non-programmers can read some of the words, like 'if' and 'then' and 'do', almost look like real words. But a computer can't understand anything about a program written in a programming language, not even the plus signs.
In order to run that program, the programmer has to first convert it into computer-ese, known as machine code, using a special program called a compiler. Usually, the compiler produces an intermediate form of the program which is then converted (with other moduls as well) to the final, working form by a "linker," another special program.
As a verb, to compile a program is to convert it into machine code using a compiler.

---

**47** **Programming**

What is Verification?

Check the data before you input it into the computersystem

E.g: type the data twice and then compare the result. If it is not the same, repeat it all again

(Disadvantage: slow, expensive, time consuming!)

---

**48** **Programming**

What is a Dry-Run?

It is the testing of an Algorithm by using test-data. You fill in a table the input data, you calculate the inbetween results and you write down the calculated output.

By doing so, you will be able to test if your algorithm works well.

---

**49** **Programming**

What is a string?

A string is a piece of text (e.g: "Hello"). It is usually written in quotes, especially as (part of) an instruction in any programming language.

E.g:     WRITE "Your age is " AGE
              WRITE -> this is the instruction (output on screen)
"Your age is " -> this is the string
              AGE -> would be a Variable, storing a number

---

**50** **Security**

| Question | Answer |
|---|---|
| What is Computer fraud? | |

### Security

| 51 | | |
|---|---|---|
| | What is a hacker, what is a cracker? | A cracker is a hacker turned bad—a malicious meddler who likes to sneak into sensitive, secured information. Hackers are very interesting people, obsessively into their computers, particularly the programming of them (as opposed to power users, who just use the programs). Journal-ists got confused and starting calling the people who break into security systems "hackers." |

### Social impacts

| 52 | | |
|---|---|---|
| | Explain why the staff using terminals might be concerned about the effects on their health. Give two reasons why they might be worried. | |

### Software

| 53 | | |
|---|---|---|
| | Analogue-to-digital conversion | |

### Software

| 54 | | |
|---|---|---|
| | What is a multimedia system? | A system that makes use of: - sound - CD-ROM - graphics display - often also a GUI operating system - capable of showing video on the screen Often used for playing games, but also for encyclopedias! |

### Software

| 55 | | |
|---|---|---|
| | Which one of the following types of storage will not allow data to be retrieved at random? A. Main memory B. Read only memory C. Hard disk D. Magnetic tape E . Bubble memory | A magnetic tape. It can only be read seriel (in sequences). Records on a tape can not be addressed directly, it will be necessary to start at the beginning of the tape and read seriel (in sequence) until the wanted record (information) is found. |

### Software

| 56 | | |
|---|---|---|
| | Every night Handibank's computer processes cheques and updates customer accounts. Name the type of processing that is used. | Batch processing |

### Software

| 57 | | |
|---|---|---|
| | Give an example of an ON-LINE computer application. Explain why this application would not be suitable for batch processing. | Any example of a control system would be fine (air-conditioning, traffic etc.) |

| | **Question** | **Answer** |
|---|---|---|
| 58 | **System Design** | |
| | A feasibility report has been accepted by a company.<br><br>(a) Describe two items that would be stated in the feasibility report. | |
| 59 | **System Design** | |
| | A systems analyst has to investigate an existing system in detail to find out how it works. Describe two methods of fact-finding that should be used. | |
| 60 | **System Design** | |
| | Several years ago the owner of a small shop bought a computer system. The owner did not ask a systems analyst for advice and, when the business increased, the computer system became unsuitable .<br><br>(a) The owner has now consulted a systems analyst. Give a reason why the systems analyst will do a feasibility study. | |
| 61 | **System Design** | |
| | A company needs a new software application for its business.<br>It is decided that a programmer should not be employed and that software packages with a graphical user interface should be purchased.<br><br>(i) Give one advantage of buying software packages instead of writing a program.<br>(ii) Give one advantage of a graphical user interface. | |
| 62 | **System Design** | |
| | A systems analyst is concerned about future maintenance of a new developed system. Give two ways that sensible choice of software and suppliers could help with future maintenance. | 1. Make sure the supplier is a well-known company, that can guarantee full support, also for many years in the future<br>2. Look for a supplier that has experience with the system. They might be specialised.<br>3. Look for software that fulfils standards. There are many standards (e.g. ISO) |

| | **Question** | **Answer** |
|---|---|---|

| **63** | **System Design** | |
| | Explain why parallel running can be a suitable method of implementation a shop's new payroll system. | |

| **64** | **Telecommunication** | |
| | **There are an increasing number of electronic mail systems in use. Subcribers to these systems can communicate messages to each other via a centralised computer system.** **– State what hardware a subscriber must have to access to in order to use such a system.** | A user will need to have: 1. A modem in order to connect to his electronic mail provider. Some well-known providers ar Compuserve and America On-Line. The Internet is probably the most used e-mail system world-wide. 2. A computer system (likely with a printer attached), that offers him the mail-software (communication software.) 3. In order to be able to store, print, file and organise, send, forward etc. the mail, the user wil have to obtain special e-mail software (like Microsoft Mail or Eudora) 4. A provider (for his mail services) and a PASSWORD. The user will also receive an unique mail-address. |

| **65** | **Validation** | |
| | What is a check-sum? | Checksum is a technique used by some communications protocols, such as XMODEM, to check for errors in the information that has been transmitted over the wires. The numbers of bits, or electronic units, of information, is added up (summed) before it is sent. Then the protocol sends that sum along with the data. When the receiving computer gets the data, it counts the bits and checks it with the sum that was sent along. If the two sums don't matcl there was probably an error in the transmission. |

| **66** | **Telecommunication** | |
| | What is meant with the expression "Information Technology" IT ? | It is the knowledge about all modern technology used to process and transfer information. Our society has changed into an 'Information Society'. It involves the science about computers (hardware and software), but also the science about handling information. It includes things like: - information interchange (e-mail, internet) - information transfer (banking, universities etc.) - information retrieval (databases, teletext etc.) - information security (network protection, data legislation rules) - information processing (payroll, invoices, stock control) etc. etc.! |

| **67** | **Hardware** | |
| | Digital watches contain a microprocessor. Explain the Input, Output and Processing (IPO). | **Input:** The input usually comes from a quartz-crystal. The swinging of the crystal (very fast, but also very accurate) will tell the CPU on the microprocessor how to measure the time. Also the settings you can make (pressing buttons, in order to make a time adjustment, set a alarm function etc.) should be mentioned here. **Output:** The output is of course the time (will be displayed on a small LCD-display). The watch could also show the date etc. It even might have a small acoustical alarm function. |

| Question | Answer |
|---|---|
| | **Processing:**<br>The CPU will process the ticks of the crystal. It will count them and after some amount of ticks it will add one second to the actual time. The microprocessor contains also some instructions (stored in it's memory, probably ROM) that will tell the CPU that 60 seconds are a minute, to change the year after 365 days etc. |

**68**

**Hardware**

| Explain the meaning of a Buffer | **A store for temporary data**, used for e.g. transfer from data between 2 devices (Computer -> printer). Buffers are also used to overcome the problem of data transmission between 2 devices with significant difference in the speed they operate. (See the input and output buffers in the CPU). |

**69**

**Hardware**

| What is a dot matrix printer? | A dot matrix printer uses tiny metal pins striking the paper through an inked ribbon to prin the text and graphics on the page. Each time a pin hits the ribbon, a little dot of ink gets deposited on the paper. That's why most dot matrix printers are impact printers. As the printhead moves back and forth across the width of the page, electronics inside the printer te the pins when to fire to create the correct pattern of dots. Because they have a built-in tracto feed mechanism, dot matrix printers work with "continuous paper"—the kind that comes in big fan-folded stacks with pinholes along either side.<br>By rights, laser and inkjet printers also deserve to be called dot matrix printers, since they too compose text and graphics as a matrix of tiny dots. Be that as it may, the term just isn' used for lasers and inkjets. With a few exceptions, dot matrix printers print bigger dots than laser printers, so their resolution is lower. They're also slower and noisier—when a dot matrix machine is printing it sounds like a monstrous metallic insect. On the positive side, the typical dot matrix printer is much cheaper than a laser printer. And because the pins actually strike against the paper, you can print multi -copy (carbon or carbonless) forms wit a dot matrix printer, which you can't with a laser. A Laser writer is a non impact printer! |

**70**

**Input Devices**

| Name 2 analogue input devices. | All **sensors** are analogue input devices. You could mention:<br>- temperature sensor<br>- pressure sensor<br>- voltage sensor<br>- a recording microphone attached directly to a computer<br><br>A scanner (e.g) can scan analogue pictures (and changes them into digital data) |

**71**

**Input Devices**

| Mention and describe the use of two very modern input devices used at a bank for customers. | 1. A magnetic stripe (card) reader (used e.g. to get money from an ATM-machine, using a customers bank-card)<br><br>2. A chip card reader (used e.g. to withdraw or load money on a chip card. Such a card can k used to pay small amounts of money at shops. The card is a substitute for cash money!) Chip cards are often used as telephone cards nowadays.<br><br>3. A credit card. These cards are used to pay money in shops etc. The cards can have a magnetic stripe, but they don't have to. They have an ID-number (the credit card number) an the signature of the owner visual printed / written on the card.<br><br>Chip cards and magnetic cards are safer for the customer to use. (No signature or other data t be seen directly!). |

**72**

**Input Devices**

| What input device would you recommend in a public environment, where people are | **A Touch screen** - by pressing (touching) the screen with your finger, you can make choices and make the computer do what you want (e.g. in a library) |

| **Question** | **Answer** |
|---|---|
| environment, where people are using computers for public services? | |

---

**73** **Input Devices**

| What is a POS? | Point of Sale.<br>It is the selling point in (e.g.) a supermarket, where the articles leave the store. Stock information is kept here, so is the price. They do so by using Bar Codes and storing the data in a database. |
|---|---|

---

**74** **Output Devices**

| Name 2 analogue ouput devices. | Allmost all output devices are analogue. They must be analogue, if persons have to be able to recognise the output. You could mention:<br>- a monitor (screen / terminal)<br>- a VDU<br>- a printer<br>- a (soundcard with) loudspeaker |
|---|---|

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**75** **Output Devices**

| Name 2 digital input devices. | Allmost **all computer storage devices** are digital. If we store or save computer data, it is usually done on digital media. The data will be stored as zeroes or ones. Since they are storage devices (also called back store), all of them can also be used as **digital input devices**. Sometimes the storage will occur magnetical, sometimes with the help of laserbeams.<br><br>You could mention:<br>- a floppy disk drive (magnetical)<br>- a harddisk drive (magnetical)<br>- a tape (magnetical)<br>- a cassette (magnetical)<br>- a CD-ROM disk drive (optical / laser)<br>- a laser disk reader / writer  (optical / laser) |
|---|---|

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**76** **Output Devices**

| Name 2 digital output devices. | Most ouput of data is analogue. That's because we are able to see (!) the data.<br><br>Digital are:<br>a modem<br>a floppy<br>a CD-ROM |
|---|---|

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**77** **Social impacts**

| A bank introduces banking by telephone and machines that allow customers to withdraw cash outside the bank.<br><br>(a) Give one advantage for bank workers.<br><br>(b) Give two disadvantages for bank customers. | |
|---|---|

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**78**

| What is RAM? | RAM is random access memory. It is memory that can be changed or altered, it can be used for storing data. |
|---|---|

| Question | Answer |
|---|---|
| | You can find RAM as part of the Main Store in any CPU, where it is used mainly to store the programs (and data) that actually run on the computer. The more RAM you have, the bigger the programs are that you can use (or more at the same time!) ROM in the CPU are silicon chips.<br><br>RAM as Back store would be e.g. a harddisk. They can store a lot of data, up to 4 Gigabyte nowadays. You can write and delete data on RAM-devices |

**79**

| What is ROM? | ROM is read only memory. It is memory that cannot be changed or altered, it can only be copied (read-only). You can find ROM as part of the Main Store in any CPU, where it is used mainly to store the boot (start-up) information of the computer. Also quite often other parts of the operating system are stored in ROM. ROM in the CPU are silicon chips.<br><br>ROM as Back store would be CD-ROM, these are optical disks, that you can read only. They can store a lot of data, 600 MB nowadays. |

**80**

### Programming

| Explain the relationship between a compiler, a source program and an object program | The source program (e.g. written in Pascal) will be translated by the compiler into a machin readable code that can be used by the specific computer, the object code. |

**81**

### Programming

| What is Assembler? | Assembler is a low level programming language. Assembler contains instructions that are based on a specific CPU. That means that there are several assembler versions, they are different for different CPU's (like Intel, Motorola etc.) Assembler code still needs to be compiled into machine code (binary code), so the program can run on the specific CPU (computer) example: Store 4, Load 3, Add 4, Print 3 (the numbers determine the registers = storage places in the CPU) |

**82**

### Software

| Explain three disadvantages of using integrated packages. | |

**83**

### Software

| What is a GUI? | A gui is a **graphical user interface**. The Apple Macintosh computer was the first computer who used a GUI. It makes the working with a computer system **user-friendly** and easier. Also Windows from Microsoft is using a GUI. The word interface stands for the way we can communicate with a system (**Man-Computer interface**)<br><br>If you look at the operating system MS-DOS, it's know as a **single command line** interface. You will have to type commands like -> **A:/dir** in order to see what files there are on your floppy disk. When you use a GUI, you will just click the icon of your floppy and you will see the contents (again listed with small icons in a new window).<br><br>Computers will use (e.g.):<br>- little icons and pictures (representing programs, or items like a bin or trash)<br>- menus. We know drop-down, pull-up menues etc.<br>- make use of colours. Colours can identify different items (like programs)<br>- makes use of sound (you can e.g. hear the mouseclick)<br>- pointers (usually in combination with a mouse) |

| | Question | Answer |
|---|---|---|

### 84 — Control Systems

| Question | Answer |
|---|---|
| Plants grow in soil that needs to be damp. **How could a computer system help to keep the soil damp? Explain the purpose of each hardware item you mention.** | You will need to have a **reliable, steady** computer, which will be **on-line** 24 hours a day. It will measure the moisture with the help of a computer input device, a **sensor**. The sensor is in fact an **analogue to digital converter (ADC)**, so the information (the data) will be inputted into the computers CPU. You will need probably several sensors in order to get sufficient data. The computer will hav a **software program**, that gives instructions what to do. In case the moisture is too low, the **CPU** will send a **start signa** to an output device, which will initiate e.g. an engine or pump, so water will be sprinkled onto the soil. If the moisture **reaches a certain valu**e (measured by the sensors) the CP will send a **stop signal** to the (e.g.) pump. Very helpful would be a **keyboard** and **monitor** to change any settings, and a **printer** that can print out any mistakes and all the measured data of certain intervalls. |

### 85 — Input Data

| Question | Answer |
|---|---|
| What is a Bar code? | It's a defined code (coded data), consisting of bars in different width and pattern (black and white). The barcode will store some specific information (the article number) about the article it is attached to. There are several definitions of bar codes, used for particular applications. Famous is e.g. the ISBN-number (found on all books) which is always also printed as a bar code on the book. Information can be:<br><br>- article number<br>- manufacturer number (code)<br>- sort of article |

### 86 — Input Devices

| Question | Answer |
|---|---|
| A bar code reader is an input device which can read data presented in a machine readable form. Give 2 other methods of reading data automatically and give for each an example of an application. | **Punch card reader** - used in (old-fashioned) programming<br>**MICR-reader** - a magnetic ink reader, used for reading cheques in banks (old-fashioned)<br>**Lightpen** - used for recognizing input on a computer screen (e.g. architects)<br>**Scanner** combined with OCR - a scanner can be used to read documents, the OCR (optical character recognition software) will recognize the characters and convert the scanned image into readable text.<br>**Mark sense reader** (scanner) - this input device will recognize marked (checked) boxes or pre-printed forms. These forms are mainly used for large data entries, such as multiple choic exam papers. Also to collect data (e.g. gas-meter) from different locations.<br>**Chipcard reader** - the Chipcard reader will recognize the data stored in the chip (in the memory). It can be used with modern telephones, so no cash money is necessary, since the amount available is stored on the card.<br>**Magnetic card reader** - the reader device will recognize the information stored on the magnetic stripe on the card. It is less reliable as the Chipcard, but cheaper to produce. It is very often used as an identification card for banks, shops etc. Cards could be used to receive money from ATM machines. |

### 87 — Programming

| Question | Answer |
|---|---|
| What data types can you mention? | Data can be classified according:<br>Alphanumerical data (all you can find e.g. at a keyboard)<br>- Characters (like used in the alphabet)<br><br>Numerical data (all numbers, including decimal point, comma, arithmetic signs (+ * etc.)<br>- Integers (whole numbers)<br>- Real numbers (numbers with decimal value)<br><br>- Boolean type (true/false values only) |

### 88 — Validation

| Question | Answer |
|---|---|
| Mention 3 different validation checks which can be used on an order code number like: 0947251839 | **Length check** - all code numbers should have 10 digits (for example also valid for a dutch telephone number)<br>**Range check** - the order number should be in between 1 and 999999999<br>**Availability check** - check if the order number is available in the database system<br>**Check-sum** - check (calculate) the total of the orders by hand and compare with the computers calculation<br>**Data-Type-Check** -> see if they are all numbers |

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**89**

**Database**

| | |
|---|---|
| What is sorting? | This is arranging records in logical order, according to a specified field (like Surname or City |

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**90**

**Input Data**

| | |
|---|---|
| What is a Key-Field? Describe an example. | It's a special field in a record that identifies it. The field-value usually is unique. It could be for example the personal ID-number. |

---

**91**

**Software**

| | |
|---|---|
| What is merging? | It is the **combining of 2 or more files** to form a single one.<br>(Compare Mail Merge, combination of Wordprocessing document and Database records) |

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**92**

**Control Systems**

| | |
|---|---|
| **With reference to a computer-controlled train system,**<br>a)      explain why it is a **real-time system**,<br>b)      describe the **data** and how it is collected,<br>c)      describe **how the data is used**. | |

---

**93**

**Control Systems**

| | |
|---|---|
| Name one application that must be carried out by using online processing. | All applications where immediate feedback is necessary. You could mention:<br><br>- heart monitoring at the intensive care in an hospital<br>- central heating control applications<br>- POS (point-of-sale) applications |

---

**94**

**Input Data**

| | |
|---|---|
| Which one of these applications could most conveniently use a **serial access** file?<br>A.      Producing pay slips<br>B.      Running students' programs from terminals<br>C.      A program library<br>D.      Information retrieval | A can be used for serial access (we read one record after the other, until all records are processed (calculating the wages for a worker). |

---

**95**

**Operating systems**

| | |
|---|---|
| Which of these applications must be **real time**?<br>A.      Checking exam marks<br>B.      Flood warning system<br>C. Calculating gas bills<br>D. Maintaining a Building Society's customer files | Only B is real time, the others don't need immediate (interactive) control. They can be run anytime, just when the output is needed.<br><br>A flood warning system won't allow any delay in transmitting / processing the data. Input and output data are processed immediately and resuts can be used right away (in this case to give warnings, alarm signals etc.) |

| Question | Answer |
| --- | --- |

**96**

### Software

| | |
| --- | --- |
| Computers are used to do the following jobs. Which one is done in **batch mode**?<br>A.     Producing a payroll<br>B.     Computer Aided Instruction<br>C.     Traffic light control<br>D.     Flying an aeroplane | A is done in Batch, the others need immediate (interactive) control. |

**97**

### Programming

| | |
| --- | --- |
| A Vending Machine sells hot and cold drinks. The hot drink costs 60, cold drinks 75cents. You have coins of 50, 20 and 5 cents. Write the algorithm for this machine. | Input Type-of-Drink<br><br>If     Type-of-Drink = "HOT"<br>Then  Charge = 60<br>ELSE   Charge = 75<br><br>Display Charge<br><br>While  <u>Charge > zero</u>  Do<br>    Input Coin<br>    Charge = Charge - Coin<br>    Display Charge<br>End-While<br><br>Deliver Drink |

**98**

### Programming

| | |
| --- | --- |
| A Vending Machine sells hot and cold drinks. They cost 75 or 60 cents. You have coins of 50, 20 and 5 cents. Write the algorithm for this machine, that can display a message if you try to pay too much!! | Input Type-of-Drink<br><br>If     Type-of-Drink = "HOT"<br>Then  Charge = 60<br>ELSE   Charge = 75<br><br>Display Charge<br><br>While Charge > zero Do<br>    Input Coin<br>    If     Coin > Charge<br>    Then  Reject Coin<br>          Display "Wrong Coin, Try again"<br>    Else   Charge = Charge - Coin<br>    Display Charge<br>End-While<br><br>Deliver Drink |

**99**

### Programming

| | |
| --- | --- |
| A Vending Machine sells hot and cold drinks. They cost 75 or 60 cents. You have coins of 50, 20 and 5 cents. Write the algorithm for this machine, that can display a message if you try to pay too much!! | Input Type-of-Drink<br><br>If     Type-of-Drink = "HOT"<br>Then  Charge = 60<br>ELSE   Charge = 75<br><br>Display Charge<br>Input Coin |

| Question | Answer |
|---|---|

**Answer**

```
While Charge > zero Do
     While    Coin > Charge   Do
            Display "Wrong Coin, Try again"
             Input Coin
     End-While
     Charge = Charge - Coin
     Display Charge
     Input Coin
End-While

Deliver Drink
```

---

## 100  Pseudo-Code

A shop sells items, all have an unique number. When a customer buys an item, the article barcode number is scanned and the price is looked up in a database. If a "#" is entered, the terminal at the cash counter will show the total to pay, read the amount given and display the change money to give back. **Write an algorithm to produce a till (receipt) which will show the name of the articles, the price of each, the total cost, the money given, the change due to the customer.**

```
Put  zero into Total-Price

Repeat  until article number = "#"
   Read  Article number (from terminal)
   If      article is found in the database (find record in database-file)
   Then   print  Article-Name, Article-Price
            add   Article-price to Total-Price
   Else    display on terminal "type error, type again"
End Repeat

Print  "Total price= "  Total-Price
Read     Money-Given
Calculate Money-Given minus Total-Price = Change
Print      Change
Print      "Thank you, goodbye"
```

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## 101  System Design

The top-down design method is used to design a new program. Give two advantages of using top-down design.

You analyse the problem step by step, beginning very roughly ending with detailed programming. It is normal to devide a big task into smaller tasks, each reaching a more detailed level. Top-Down approaches are often described with the help of Structure flowchart (diagrams)

Advantages:
1. It is likely that you make less mistakes
2. You will analyse all requirements (of all tasks)
3. Better to control the development (tasks more          manageble)
4. Allows to work on different tasks (by diff. people)

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## 102  System Design

Jane owns her own store and she sells many articles. She asks a systems analyst to help her to decide whether to computerize her business. **Mention 3 questions the analyst should ask her.**

Question 1 - how much money can you invest?
Question 2 - how many items do you sell?
Question 3 - how often (and how) does she order new articles?
Question 4 - does she want to know daily financial figures?
Question 5 - does she want to know daily stock figures?
Question 6 - what else should the system be able to do (e.g. wordprocessing, printing) etc.)
Question 7 - will other people have to use the system as well? (Network!)
Question 8 - does she prefer easy data input, e.g. bar codes with a bar code scanner?
Question 9 - does she want to know how other sales people perform?

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## 103  System Design

List the main stages in systems analysis and explain briefly what happens at each stage.

| | **Question** | **Answer** |
|---|---|---|

| 104 | **System Design** | |
| | What 2 different strategies are there to implement (and test) a new system in a company? | 1. Parallel running of the new system<br>2. Piloting of the new system<br><br>1<br>Adv.: You can compare old and new system<br>Disadv.: People need to work on 2 systems simultaneously<br><br>2.<br>Adv.: Small is beautiful, less work for employers<br>Disadv.: You cannot compare results so well, it might take more time |

| 105 | **System Design** | |
| | What is the last step in systems design (and often forgotten) | The testing of the program. This needs to be done during the programming itself and later when the system is implemented in the company.<br>All mistakes need to be reported (in a log book / file) so that they can be traced and removed |

| 106 | **System Design** | |
| | What is the purpose of a feasibility study? | The purpose is to see if the problem can be solved by a computerised solution. Here it is checked if such a slotution makes sense and is wort implementing. The costs (e.g.) might b too high! |

| 107 | **System Design** | |
| | What items should be included in the feasibility study? | - a list of all things that the new system is required to do<br>- a description of all solutions that are eventual possible<br> (alternatives)<br>- estimated costs of each solution<br>- a timeschedule for each solution<br>- a comparison of costs against profits (cost/benefit)<br>- references to existing solutions (somewhere else maybe)<br>- a list of all human, technical and economic factors<br>- a conclusion of what seems to be the best strategy to continue |

| 108 | **System Design** | |
| | Two types of documentation must be written after a new program has been developed for a company. Name the two types and explain why each one is needed. | User manual<br>It shows the users how to use the system (how to input data, how to print / see results). It will show examples of screens and describes all help facilities etc.<br><br>Technical documentation<br>It is not for the user, but for the programmers that need to change / update / repair the system. It usually contains flowcharts, pseudocode and a list of all computercode (e.g. in Pascal or Cobol). Also all input and output data and methods are listed. |

| 109 | **Applications** | |
| | Why is weather forecast a typical data logging application? | The data involved (measured with the help of sensors) is recorded automatically and non-stop All this information needs to be stored and sent to a connected computer. The computer the will process the recorded data. No manual data input is needed. |

| 110 | **Networking** | |
| | Mention advantages of a Bus LAN network compared to a STAR LAN network. | 1. You will need less cable - less installation costs<br>2. You don't need a central computer (or HUB), the network is cheaper as a star-network<br>3. You wouldn't need a central HUB |

| 111 | **Networking** | |

| Question | Answer |
|---|---|
| Mention advantages of a STAR LAN network compared to a BUS LAN network. | 1. More stable - if one computer link fails, only that computer is affected, none of the other<br>2. Faster data transfer - all computers can communicate directly to each other (peer-to-peer)<br>3. More flexible - you can easily add computers, just hook them up (with own cable) to the central point |

**112**

### Networking

| | |
|---|---|
| What are the 3 main parts of the Internet? | 1. Electronic Mail (E-Mail)<br>2. World Wide Web (WWW) - the graphical part of the net<br>3. Usenet - discussion / news groups |

**113**

### Networking

| | |
|---|---|
| What is the difference between EDI and E-Mail? | E-mail is unstructured mail (electronic mail), that can be sent by anyone to anyone (for example connected to the internet). It could be anything from a love letter to a business reply.<br><br>EDI is structured mail (electronic data interchange), that for example is used by companies. might be used to send orders, or to make payments. EDI needs to be written exactly according detailed descriptions (as confirmed by the partners involved). |

**114**

### Networking

| | |
|---|---|
| A police station has installed a ring network with five terminals.<br><br>(a) Name two other items of hardware that would be attached to the network and describe their purpose<br>(b) A ring network was chosen in preference to a star network. Give one reason why | 1. A printer - to print out letters, reports, pictures and / or fingerprints maybe<br>2. A modem - allowing to communicate with other police stations<br>3. A scanner - to scan pictures , fingerprints etc.<br>4. A fax - alowing people to send faxes from their computer directly<br><br>A Ring network will be the cheapest way! You will need not too much cable and there is no need for a so-called HUB |

**115**

### Networking

| | |
|---|---|
| Describe a LAN | You should draw / mention most of the following devices:<br>Network Printer<br>Network Fax<br>Fileserver<br>Cables (wiring system)<br>HUB<br>Workstation<br>VDU<br>Terminal<br>Router<br>Gateway<br>Modem<br>Bus-topology<br>Star-topology |

**116**

### Networking

| | |
|---|---|
| Describe a WAN. | A WAN is a **wide area network**. It can be as wide as the whole earth. A good example o such a network is the INTERNET. All countries of the world are connected via Sea-cables, satellite connections, Micro wave transmitters etc.<br><br>You can connect your own Computer to a WAN by making use of a **MODEM**. You can then dial into the telephone network and connect to the desired WAN.<br><br>If you want to connect your LAN (local area network) to a WAN, you will need also a |

| Question | Answer |
| --- | --- |
| | **MODEM**, but sometimes it's better to make use of a **GATEWAY**. This will be a specia[l] computer, allowing the data transfer between 2 different networks. |

You should draw / mention most of the following devices:
Network Printer
Fileserver
Cables (wiring system)
Workstation
VDU
Terminal
Telephone network system
Router
Gateway
Modem
Satellite

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**117** | **Networking**

| What are the functions of the operating system (the network software) of a LAN? | - It will check if a certain user is entitled to use a specific program.<br>- It will check if a certain user is entitled to use a specific printer.<br>- It will store special files on a fileserver (e.g. user's personal data, like in our lab)<br>- It will scan for virusses on the network.<br>- It will store user passwords, user rights, user privileges etc.<br>- It will allow users to share recoures (hardware like printer, fax etc.) or software (e.g. mail folder or certain programs).<br>- It will allow a network administrator (or operator) to check network use, change password[s] and priviliges etc. |

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**118** | **Networking**

| Using a diagram or otherwise, describe<br>a)  in detail the hardware and software configuration of a networked electronic  office<br>b)  describe one advantage of a system for the manager and one advantage for the office worker. | |

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**119** | **Networking**

| What is a computer network? | It is a cabling system connecting computers and other resources like printers. By doing so, they can exchange data to each connected device. |

The standard nowadays is Ethernet (mind: not the same as Internet). Ethernet is a norm, describing which cables to use and how the computers will communicate to each other (using a special communication protocol)

There are 2 main types of networks: LAN and WAN

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**120** | **Telecommunication**

| What is the function of a **file server** in a local area network? | In a computer network, the file server is the computer responsible for storing and retrieving the files used by all the computers connected to the network.<br>Let's say your computer at work is on a network (connected to other computers), and you want to look up the name of a customer in the company database. The information you nee[d] will be located in database files on the file server's hard disk. Database software running the server opens the necessary files and the information comes back to your screen over the |

| Question | Answer |
|---|---|

network wires.

You can even run programs on your own computer that are stored on the file server's hard disk. Other people on the network can use the same files and programs. There is software running on the file server that controls who gets to use which files, and how many people get to do it at the same time.

Often, the file server is dedicated, meaning all it does is dish out files to the other computer on the network, and no one sits at the computer and actually uses it. In other cases, the file server also gets used as a working computer.

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**121** | **Telecommunication** |

| Networks are used to ensure the efficient exchange of information.<br><br>With the help of diagrams describe **two different network configurations**. | We distinguish between BUS and STAR configurations (topologies).<br><br>A bus network has a beginning and end of the network. The ends will carry terminators. Along the bus-network all devices can be connected (using network connectors) *(see picture)*<br><br>A star network has a central node (access point) where all devices are connected to. So all devices have their own cable to the central node (which usually is a fileserver). |

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**122** | **Security** |

| How can you protect data against physical damage / theft? | 1. First of all make sure that you have data backup's !<br>2. Use a generation set of backup files (grandfather . . )<br>3. Make sure you have the backup's also saved at a different place<br>4. Install locks, special keys, entry after code only etc.<br>5. Protect the computers with fireproof doors etc.<br>6. Install (infra-red) alarms<br>7. Put the computers on the top floor of the building |

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**123** | **Security** |

| How can you protect a computer system against computer viruses? | A computer virus is software, usually a **program written to self-replicate and transfer** to other systems. It could e.g. be stored on a floppy disk and transfer itself to the hard disk (and you won't notice!) The program will then maybe delete or damage files.<br><br>- install software that will scan for viruses<br>- install software that can kill (remove) scanned viruses<br>- disallow the use of floppy disks (or scan immediately and eject if a virus is found))<br>- regularly scan your hard disk for viruses (automatically)<br>- set passwords on your system (especially if you allow users to dial in via a modem)<br>- don't copy software that is not legal bought<br>- be careful with cheap (shareware) games (they often come with viruses)<br>- if they connect to e.g. the Internet, big companies install "Fire-Walls", software that will detect all unallowed transactions.<br>- regularly make back-ups of all your files |

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**124** | **Security** |

| What are File generations? | It means that you keep a set of files, all of them in chronological order of time created. This method is used to backup important files and in case you will have to upload some of the ol backup data you will have the opportunity of going 'back in time' if needed. One of you backup files could be destroyed or not in working order . . . |

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**125** | **Security** |

| What is a computer virus? | A computer virus is software, usually a **program written to self-replicate and transfer** to other systems. It could e.g. be stored on a floppy disk and transfer itself to the hard disk (and you won't notice!) The program will then maybe delete or damage files.<br>A virus can also be part of a program (e.g. a Macro virus in a wordprocessor).<br>A virus can also be transmitted via a network (e.g. the Internet) |

| | **Question** | **Answer** |
|---|---|---|
| 126 | **Security** | |
| | Describe common data protection legislation rules. | Personal data can only be stored for registered purposes<br>Personal data should be kept up-to-date.<br>Personal data should not be kept longer than necessary.<br>Personal data should be protected for any improper use.<br>Individuals have to right to know if (and see) the data stored about them.<br>Nobody may hack into an information system in order to obtain or change data.<br>It's not allowed to copy software, without subscription and payment. |
| 127 | **Security** | |
| | Describe one way government laws help to protect personal data held in a bank's customer files. | 1. The law prohibits unauthorised access to the data. That means the data is and must be protected.<br><br>2. The law for sees, that the owner of stored data always has the right to know about the data stored. Customers need to be informed about the existence of (any) database. Unfortunately, many companies don't do so! |
| 128 | **Software** | |
| | Personnel records in a large company are held on a computer file on disk and are processed by the computer. The key field in each record contains the employees payroll number.<br>A. What is a record?<br>B. What is the key field?<br>C. Give examples of cases where a record would need to be:<br>    (i) deleted,<br>    (ii) inserted,<br>    (iii) amended. | A.<br>A record will store all information needed (stuctured in fields) to identify and describe one employee.<br><br>B.<br>The key-field will be the field which allows to identify an employee directly. It will in most cases be a numerical field (e.g. employeee identification number).<br><br>C.<br>We would need to delete a record when an emplyee is no longer working for the company.<br>We would need to insert a record, when a new worker joins the firm.<br>We would need to amend (to change or update) a record, when any field describing an emplyee needs to be changed. An emplyee might change his addres, his phone-number, change her name etc. etc. |
| 129 | **Wordprocessing** | |
| | What software would be used in an office, to inform all customers (stored in a database) about a new product? | First **search** for all customers in the database (find all).<br>Then **Sort the records** (maybe according to postcode).<br>Then use the wordprocessor combined with the database in order to produce a **mailmerge** (write letter and add database fields like Name and Address, then print and merge). |
| 130 | **Wordprocessing** | |
| | What software would be used in an office, where they produce letters and invoices and keep accounts of customers? | Wordprocessor, Database and for the accounting eventually a spreadsheet or a specific bookkeeping program. |
| 131 | **Applications** | |
| | What is **computer simulation**? Give a practical example. | Simulation is when a computer program (using a lot of math) imitates a real life object or a process and then displays what happens to that object or process when conditions change. For instance, physical models of aeroplanes are created on the computer and then put throug simulations of turbulence and storms to see how the planes react. The computer can do wha wind tunnels used to do.<br>Larger computers can simulate stars and molecules so scientists can study certain aspects of them.<br>The game Microsoft Flight Simulator so realistically simulates flying a plane that it's ofter |

| Question | Answer |
|---|---|
| | used in professional flight instruction. |

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**132** | **Applications** | |
|---|---|
| Give 2 uses of Expert systems. | An expert system has a **knowledge database** and a **rules database**. Examples are:<br><br>- medical diagnosis<br>- oil prospecting programs (used e.g. by Shell)<br>- fighting militairy battles<br>- configuring computer systems<br>- determing molecular structures<br>- advise / decision making programs (e.g. banking, insurance companies)<br>- chess software |

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**133** | **Applications** | |
|---|---|
| What are expert systems. | Expert systems have both a **knowledge database** and a **rules database** included. The knowledge must be inputted by experts themselves. They will gather all facts and put them into the **knowledge (facts) database.** The rules also have to be inputted into the expert system. The information comes from again the experts themselves. The rules will be inputted with the help of special programming languages, developed for expert systems (e.g ADA). Rules will explain when some facts are valid and when not. E.g. If somebody has temperature he might be sick **or** he might just be a bit over heated after a soccer game playe in the summer.<br><br>Examples are:<br><br>- medical diagnosis<br>- oil prospecting programs (used e.g. by Shell)<br>- fighting military battles<br>- configuring computer systems<br>- determining molecular structures<br>- advise / decision making programs (e.g. banking, insurance companies)<br>- chess software |

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**134** | **Input Data** | |
|---|---|
| What is ASCII ? Who invented it? What is it used for? | American Standard Code of Information Interchange.<br><br>It is used to enable computers to exchange binary information. The meaning of zeros and ones can be looked up in a "Table", where is listed what e.g.  00001101  would be. It can be a number or a character! |