

Hörverstehenstexte

⊙ A1 Einstiegsaufgabe

Answering machine: Hello, you have reached getgoingeu, a private organisation which will try to help you to find the right work placement or internship in Europe. We are situated in Brussels and are supported by major European companies.

If you sign in on our website, www.getgoingeu... .org, we will send you our newsletter with the latest openings.

At present, *West Cheshire Enterprises* in Ellesmere Port – that's *W-e-s-t C-h-e-s-h-i-r-e Enterprises* in E-l-l-e-s-m-e-r-e P-o-r-t – is offering work placements lasting eight weeks each for an industrial mechanic, two IT specialists, an electrician, a product designer and two joiners. The placements begin either on March 1 or October 15. You need to be in your third year of training. Your spoken English should be fairly good. You will work in a team. Please send an application with your CV online. You can download the form from the West Cheshire Enterprises website. We look forward to helping you get the work placement that suits you. Goodbye.

⊙ A2 Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 1

Linda: *Durham Waterworks*, Linda Healy speaking. How can I help you?

Ian: Ian Summers here, from *Pump Supplies Ltd*. I'd like to speak to Geoffrey Harris in the Purchasing Department. I have tried ringing the number on his visiting card but it's always busy.

Linda: Yes, I know. I'm sorry about that. There's been something wrong with Mr Harris's extension all day. However, he's not in at the moment. Would you please try a different extension sometime after 3 pm? That would be the same main office number you dialled just now plus extension 33066.

Ian: Well, I won't be able to call then, but how about tomorrow morning?

Linda: He should be in then. I'll tell him you called, Mr Summers. But just in case you miss him, could you leave me a number where he can reach you?

Ian: Of course. My mobile number is 0161 6820144... . Thanks very much!

Linda: You're welcome! Goodbye.

Ian: Goodbye.

⊙ A3 Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 2

Receptionist: *Goedemorgen. MK CNC Machine Tools Amsterdam.*

R. Dietrich: Good morning. Sorry, do you speak English?

Receptionist: Yes, of course. This is Hanne Mertens at *MK CNC Machine Tools Amsterdam* speaking. What can I do for you?

R. Dietrich: This is Rolf Dietrich from *Drehmax* in Münster, Germany. We're having problems installing the Highspeed CNC Drilling Machine that was delivered yesterday.

Receptionist: I see, Mr Dietrich. Just a moment please, I'll connect you to Robbe Vermeulen.

R. Dietrich: Thank you.

R. Vermeulen: Good morning, Robbe Vermeulen speaking, how can I help you?

R. Dietrich: Good morning. My name is Dietrich from *Drehmax*, Münster, Germany. We can't complete the installation of the Highspeed CNC Drilling Machine that you delivered yesterday.

R. Vermeulen: What model CNC drilling machine are we talking about, Mr Dietrich?

- R. Dietrich:** Let me see, it's the DT-C-245.
- R. Vermeulen:** And the order number please?
- R. Dietrich:** I've got it here, DTC-1500-SCH.
- R. Vermeulen:** Yes, I have it on the screen in front of me. So what seems to be the problem, Mr Dietrich?
- R. Dietrich:** I keep getting an error message – ERROR 3190. We've tried everything: we downloaded new software; we restarted the system. Perhaps it would be best if you sent a service technician over right away.
- R. Vermeulen:** That won't be necessary. Is the machine connected to the Internet?
- R. Dietrich:** It is actually.
- R. Vermeulen:** Good. Then please click on the red-and-white logo of our company, open the pull-down menu where it says "remote access", and type in CL-REM-245.
- R. Dietrich:** That's all?
- R. Vermeulen:** Well, not quite. I now have access to your machine, and I am sure we can fix it. In case there should be any questions, I have your number on the display. Shall I give you my mobile number so that you can call me directly in case there are any problems in the future?
- R. Dietrich:** Ok, go ahead.
- R. Vermeulen:** It's 0032 141 8899 001... .
- R. Dietrich:** I'll repeat that: 0032 141 8899 001... .
- R. Vermeulen:** That's right. My name is Vermeulen, that's V-e-r-m-e-u-l-e-n. Thank you for contacting us and we will get onto the problem right away, Mr Dietrich. Bye for now.
- R. Dietrich:** Goodbye and thank you very much.

© A4 **Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 3**

- A. Green:** *Power Tools*, Cardiff, customer service. My name is Alan Green. How can I help you?
- Customer:** Hello, this is Grace Miller from *Engineering Tech* in Bradford. We've got a problem with a power drill we bought from you. It's a Super Drill 800 XS+. For some reason the reversing lever has stopped working.
- A. Green:** Ok. How long have you had the drill?
- Customer:** Er, we got it about four or five months ago.
- A. Green:** That's good news. We offer a six-month warranty on this particular product, in which case it is still within the warranty period.
- Customer:** Okay. What do I do now?
- A. Green:** Well, you can take the drill, along with your warranty or proof of purchase, to one of our approved service centres. They will be pleased to either repair or replace it for you.
- Customer:** Where can I find the address of a service centre in Bradford?
- A. Green:** If you go to our website, that's www.power-tools/services... .uk, you'll find a list of addresses.
- Customer:** Ok, I'll do that. Well, thank you very much for your help.
- A. Green:** That's all right, madam, you're welcome. Goodbye.

© A5 **Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 4**

- Instructor:** Hello Brad. How are you getting on?
- Brad:** Hello Mr Wilkinson. I'm afraid that I can't start the column drill.
- Instructor:** Have you checked all of the power switches?
- Brad:** Yes, I have. After I checked the main switch, I released the safety button.
- Instructor:** Did you release it properly? Look it's still locked in. You turn it a bit to the right and then pull it out. Then it's released.

Brad: Oh, I see.

Instructor: Now we'll check if the machine is set correctly. Hmm, let's see. The spindle is set up fine and the drill's properly clamped in the chuck. By the way, what is the required revolution speed?

Brad: Well, the drill is an HSS centre drill, so I set the speed at 2,500 revolutions per minute. That's the highest possible speed.

Instructor: Right. After centring, you take the required revolution speed from the table here at the front of the machine gear box.

Brad: Yes, the diagram in the table gives the ratio of the revolution speed to the diameter of the drill.

Instructor: And make sure that the machine table is high enough so that you can drill properly into the material.

Brad: Oh yes, you're right. That makes a big difference. Thank you. The machine vice has to be in the central position. Is that right?

Instructor: Yes, it is.

Brad: Thanks a lot, sir! It should work now.

Instructor: Ok, if you need any more help, just give me a ring. I'll be in my office.

© A6 **Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 5**

Interviewer: Good evening and welcome to tonight's programme. Our topic tonight is CAD – that's computer-aided design – and our guest is Julia Benton, who teaches at the Design Technology College in Manchester. Ms Benton, can you explain why CAD technology has become so important?

Ms Benton: Well, before CAD technology was introduced, engineers had to build prototypes or models of a product they wanted to manufacture later on. If you didn't get the prototype right the first time, development took a really long time. Nowadays, computer simulations are commonly used or three-dimensional digital mock-ups are designed to determine the mechanical strength of a material.

Interviewer: Why is this information important?

Ms Benton: Well, we need to know what loads and stresses a material, such as the steel in the axle of a car, can bear before it breaks.

Interviewer: In what other ways has CAD changed development in industry?

Ms Benton: Well, with the implementation of CAD, development costs have also been reduced enormously.

Interviewer: You mentioned 'mock-ups' just now. Could you explain what a mock-up is so our listeners can understand?

Ms Benton: Of course. A digital mock-up is a model that you design on your computer monitor with CAD. If you design it properly, the model has got all of the simulated functions of a prototype, and you save on materials for prototypes and on personnel to build them, too.

Interviewer: I see. Where does CAM come in then?

Ms Benton: CAM is short for computer-aided manufacturing. Here we're talking mainly about robots. Nowadays a single computer with a CAM system can control many robotic machine tools on the factory floor, such as milling machines, lathes and welding machines.

Interviewer: That must make production easier to monitor.

Ms Benton: Yes, it does. You can alter a set program and implement changes in design quickly and easily. You don't have to reprogram each robot individually, which would greatly increase production times, of course.

Interviewer: Thank you very much for taking the time to talk to me, Ms Benton.

Ms Benton: No problem, thank you for having me on the programme.

Interviewer: Now it's time for a commercial break before we go on to our next topic ...

⊙ A7 **Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 6**

Answering machine: Hello, this is Zofia Kowalczyk speaking. I'll spell my name for you: Z-o-f-i-a K-o-w-a-l-c-z-y-k. My customer account number is 2135554980. If I remember correctly, you will also need the phone password for our account. It is A32EF-71X.

It's Saturday, 10:30 pm. I was trying to access our website to do some editing and put in some new advertisements, but my password was not accepted. I'm sure I typed it in correctly. After three tries, access was denied and I couldn't open the pull-down menu anymore. I also wasn't able to ask for a new password.

I wasn't sure how quickly you would check your emails; that's why I'm calling the emergency hotline. Please check the login and send me a new password. Since I won't be in my office on Monday, please send the password to the following address: teddy23@living... .net. If you need to contact me in person, you can call me on my mobile. The number is 0168 53155 688... . Thank you for your help. Goodbye.

⊙ A8 **Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 7**

Karen: Hello there. This is Karen Anderson. We are looking into entry requirements and procedures for EU citizens travelling to the USA. I'm talking to Mr Burton from the US consulate. Mr Burton, thank you for finding time for us. Could you give us some information about the current passport and visa regulations for EU citizens travelling to the USA this year?

Mr Burton: Well, if you have an e-Passport and you plan to stay in the United States for fewer than 90 days, and if you have a return ticket, you are eligible for the Visa Waiver Program, that's the VWP.

Karen: What exactly is an e-Passport?

Mr Burton: It's one that has an electronic chip containing the name and birthdate and other information about the holder. It must also contain a digital photo.

Karen: What about biometric passports, the ones with fingerprints on a chip?

Mr Burton: Biometric passports from VWP countries issued since October 26, 2006, are valid. If your passport was issued before October 26, 2006, and is not biometric but is machine readable, it is still valid for travel.

Karen: Are there any particular procedures or regulations at the port of entry?

Mr Burton: The US-VISIT program officially became the Office of Biometric Identity Management (OBIM) in 2013 and includes scanning for fingerprints and digital photographs of visitors on entry.

Karen: It sounds like the procedure takes a long time!

Mr Burton: It does add a few minutes to the entry procedure. However, there are now Automated Passport Control (APC) kiosks operating at many large international airports. They scan your passport and fingerprints, take a photo, and process biographic information. The system then issues a receipt to be given to the Customs and Border Protection officer. The APCs save a lot of time. If you are travelling on the VWP, you must apply for authorization to enter the USA by sea or air no later than seventy-two hours prior to departure.

Karen: Do I need to visit the consulate to get authorization?

Mr Burton: No, you can only apply online using the Electronic System for Travel Authorization (ESTA). There is a fee of fourteen dollars, payable by credit card. Approval is usually received within minutes and the authorization is valid for two years or until your passport expires. You must supply information about yourself – your name, date of birth, country of birth. You also have to provide passport information and travel information such as carrier name, flight number and the city where you are boarding. You must also give the address where you expect to spend the first night in the USA and your credit card information, of course. It is

suggested that you print out the application response and carry it with you.

Karen: Ok, thank you for explaining everything, Mr Burton.

Mr Burton: You're very welcome.

⊙ A9 Übungsaufgabe: Rezeption – Hörverständnis, Aufgabe 8

Justin: Good morning and welcome to the show. This is Justin Taylor and today we are going to talk about rare earths. Not all of our listeners may be familiar with this term. Years ago only scientists and mineralogists knew what rare earths were, and what they were needed for. As modern technology advances, the demand for these rare earth elements, or REEs, is also growing: approximately 134,000 tonnes last year, and the figure may well go up to 180,000 tonnes in the next few years. Some of you may also have heard that we are largely dependent on China, the world's biggest supplier of rare earths – and China has recently reduced its exports of rare earths from 50,000 to 30,000 tonnes. So what are the consequences for industrial nations, especially since recycling rare earths doesn't really seem to be an option yet? Before we introduce the participants in our discussion, we would like to answer the question: What exactly are rare earths? Here to tell us more about rare earths is our correspondent, Jo Edwards.

Jo: Thank you Justin. The rare earth elements are a group of 17 naturally occurring metallic elements used in small amounts in everything from high-powered magnets to batteries and electronic circuits. The materials (including scandium, yttrium and a group of elements called the lanthanides) have specific chemical and physical properties that make them useful in improving the performance of computer hard drives and catalytic converters, mobile phones, hi-tech televisions, sunglasses and lasers. As technology advances, so the demand for the metals rises; in the past decade, their use has doubled. There are several kilograms of such elements in typical hybrid petrol-electric cars made by Toyota and Honda, a market that will expand in coming years. Despite their name, rare earth elements are not actually all that rare. In a report on the elements published this year, the British Geological Survey put their natural abundance on the same level as copper or lead. China has a near-monopoly on mining the elements. According to the geological survey China has 37% of the world's estimated reserves, about 36m tonnes, but controls more than 97% of production. The former Soviet bloc has around 19m tonnes and the US 13m, with other large deposits held by Australia, India, Brazil and Malaysia. The Royal Society of Chemistry is raising awareness of declining mineral resources, making conservation of rare earth and other elements a priority for 2011. The US House of Representatives is also worried about security of supply and is considering legislation to try to end America's dependence on Chinese imports. The Mountain Pass mine in California, shut down in 2002 because of environmental and cost issues, is now to be reopened, along with potential mines at Bear Lodge in Wyoming and Bokan Mountain in Alaska. Other sources, untapped as yet, include Greenland. Estimates suggest the land mass could meet 25% of global demand for REEs. South Africa also has potential for rich REE deposits, as do Malawi, Madagascar and Kenya.

Speaker: Thank you, Jo. Now I would like to introduce the participants in our discussion.

⊙ A10 Prüfung 1, Aufgabe 1

Speaker: This is Louisa Clarke and today I am going to talk about acetylene cylinders. The golden rule is to:

Handle acetylene cylinders with care

Do not drop or jar them; do not roll them across the floor. Keep them in an upright position, and if returned to an upright position, leave for an hour to settle.

Fit flashback arresters (or equivalent)

Fit flashback arresters onto the pressure regulators on both the acetylene cylinder and the oxygen cylinder. These, or equivalent devices, prevent any decomposition travelling back into the cylinder.

For long lengths of hose, fit arresters on both the blowpipe and the regulator, and shorten the hose as soon as the long length is no longer required. [...]

There are a number of incidents each year where a flashback into an acetylene cylinder triggers decomposition, leaving the cylinder in a dangerous, unstable condition, which can lead to an explosion.

A flashback occurs if there is a flammable mixture of fuel gas and oxygen in the hoses when the torch is lit. This can ignite the mixture and will travel backwards into the cylinder. A flashback can cause decomposition of the acetylene.

An explosion of the cylinder immediately after a flashback is rare. If decomposition is identified early, there is time to evacuate, call the fire and rescue services and take emergency action.

The fire and rescue services cool cylinders for at least an hour, then monitor them for another hour. They then decide whether it is safe to enter the exclusion zone or move the cylinder.

© A11 **Prüfung 2, Aufgabe 1**

Answering machine: Good afternoon, Mr Klein. This is Paul Summers from *Personal Protection Ltd* in London speaking. It's 3 pm on Wednesday, 21 January. Thank you very much for your interest in my presentation on protective clothing in London on 24 March. The presentation was fully booked in no time, but I'm very pleased to tell you that your registration could still be accepted for this date and I look forward to seeing you then. You wrote on your registration form that you intend to fly in to Heathrow Airport on 23 March. As we think that it is very important to take good care of our visitors, we would be pleased to pick you up from Heathrow Airport on your arrival. Could you possibly send us the details of when exactly you expect to arrive on 23 March? We hope to hear from you soon. We will get in touch with you with more information about the presentation in due course. Oh, and Mr Klein, please don't hesitate to contact us if we can help you in any way. Thanks. Goodbye.

© A12 **Prüfung 3, Aufgabe 1**

Mr Knowles: Good morning, Ms Bulat. Pleased to meet you. I hope you had a smooth flight.

Ayshe: Hello Mr Knowles. Nice to meet you, too. Yes, the flight was ok but I was very excited about my trip to England.

Mr Knowles: Don't worry. I'm sure you will enjoy your time with us. Well, tomorrow is your first day and I know from your German boss in Schwerin that you have had some experience serving guests. Am I right?

Ayshe: Yes, you are. I know how to take breakfast orders and serve guests.

Mr Knowles: That's good to hear. Many apprentices are a bit unsure of themselves when they have to serve guests who speak a foreign language for the first time.

Ayshe: Well, I hope my English is good enough and that I can understand everyone.

Mr Knowles: Just take your time, Ms Bulat. Some apprentices also have problems understanding the dishes and ingredients right at the beginning. If you need help, you can ask Mike who works in the kitchen. He's from Germany originally and he'll be happy to help you.

Ayshe: That sounds great. Is he in today? Maybe I could have a quick chat with him...

Mr Knowles: Oh, I'm afraid not but you can have a talk with him tomorrow morning. There will be enough time.

Ayshe: Great. I am looking forward to seeing him then.

Mr Knowles: Fine. Well then, let's get back to your job. First of all, you will help to prepare both the continental and English breakfasts for the guests in the kitchen. We do not offer a breakfast buffet in the mornings. The guests can order breakfast from the menu. Do you have any questions?

Ayshe: Could you explain the difference between a continental and an English breakfast? I'm a bit confused.

Mr Knowles: Coffee, tea, rolls, butter, cheese and jam are usually part of a continental breakfast. It is something similar to a "normal breakfast" in Germany, I suppose. Our continental breakfast also includes croissants and hot chocolate. An English breakfast, however, is served with fruit juice and fresh fruit as well as bacon, sausages, fried or scrambled eggs, baked beans, mushrooms and grilled tomatoes.

Ayshe: I see. Thank you, Mr Knowles.

Mr Knowles: You're welcome Ms Bulat. Could you be in the kitchen at quarter to six?

Ayshe: Yes of course. I'm looking forward to getting started.

Mr Knowles: Great. See you then.

© A13 Prüfung 4, Aufgabe 1

Interviewer: Good evening and welcome to *Quarter to Ten* on QKWM Radio, or www.qkwm-radio.de. Our topic tonight is building materials, and our guest is Joanna Delaney, an expert from the *Dublin Architectural and Building Association*. Welcome, Joanna. So what makes you a building expert?

Joanna: Well, I've been an architect for over 25 years. I help people to build the house of their dreams.

Interviewer: Are there certain materials you prefer?

Joanna: Yes, there are. Materials depend largely on what you want to build. But the first material I always look at is wood.

Interviewer: Why wood?

Joanna: First of all, it's natural; it smells, feels and looks good. And you can use it for furniture, windows, ceilings, and even for building structures. Also, wood is sustainable and extremely durable – think of the historic buildings in medieval towns. Wood lasts a long time, centuries even ...

Interviewer: Yes, but aren't there a number of insects that can destroy wood? I've heard about woodworm, wood-boring beetles and so on.

Joanna: Yes, some insects can do serious damage. Woodworm, for example, can attack the structural parts of a building, and its beams and rafters. But there are some very reliable protective finishes for building timber on the market.

Interviewer: What about fungi or mould?

Joanna: Not all fungi and moulds destroy the structure of wood, but we also have powerful finishes to treat the wood, although it is best if these are applied before assembly.

Interviewer: Let's move on to another point. We all know that wood burns easily, so why use wood for the structural parts of buildings at all?

Joanna: Let me reassure you: it's not so easy for oak beams to catch fire. Try holding a match to a piece of oak. When wood starts to burn from the outside, you get a layer of charcoal. Char has very useful properties: it insulates the wood underneath against the heat. The fire cannot get to the wood for a long time and the wood stays intact much longer. Also, char cuts off the oxygen supply to the unburnt wood – without oxygen, no combustion.

Interviewer: Are you trying to tell me that wood is fire-resistant?

Joanna: To a certain degree, yes, especially some kinds of wood such as thick oak or teak beams.

Thin roofing battens will burn very fast, of course. Additionally, we treat wood with fire-retardant materials; these are special chemical substances that penetrate the outer layers. They make wood last longer in case of fire.

Interviewer: We'll take a short break and if our listeners have any questions, please send us an email or call us at 01 16 8806 742... .

© A14 **Prüfung 5, Aufgabe 1, Teil 1**

Answering machine: Hello, this is Annelies Brouwer. I'd better spell that for you: It is A-n-n-e-l-i-e-s B-r-o-u-w-e-r. I work for *Euro-Dutch Marketing* in Amsterdam; it's Thursday, March 16, 9.30 pm. This is a message for Mr Baumann.

My client is a supplier of your company. That's where I got your telephone number. I'm making a plan of the most important fairs in Germany for my client. Before we book anything, it would be worthwhile knowing which fairs your company intends visiting in the next 12 months. This information would help my client to decide which fairs he should also be present at. I would appreciate it if Mr Baumann could call me back.

I won't be in my office during the next three days, so I'll leave you my mobile phone number: that's 0031 653 12551519.... My e-mail address is brouwer_marketing@eurodutch... .com. Thank you very much.

© A15 **Prüfung 5, Aufgabe 1, Teil 2**

Interviewer: Welcome to Quarter to Ten on KWQ Radio, this is Matthew Dunne. Our topic tonight is Germany's so-called '*Energiewende*' and the obstacles Germany is facing on its way to a more sustainable energy supply. What has been achieved since Chancellor Merkel's audacious announcement, following the catastrophe in Fukushima in 2011, that German nuclear power plants would be shut down by 2022?

Our guest is Sarah Edwards, an internationally renowned expert from the *Cardiff Centre for Energy Research*. She has served as an adviser for British and European electricity companies and written several books about sustainable energy.

Ms Edwards: Thank you for inviting me. Yes, experts across Europe have all been looking at Germany and its goal of closing down all nuclear power plants by 2022. There were plans before Fukushima, you know, for a complete shutdown by 2036.

Interviewer: You mean it wasn't just Fukushima that triggered the change in policy.

Ms Edwards: Exactly. Public opinion in Germany has never been totally in favour of nuclear energy. There have been protests against nuclear power plants and the rail transportation of radioactive waste on a number of occasions.

Interviewer: So, what has happened since 2011?

Ms Edwards: Germany has been subsidizing renewable forms of energy: wind power, solar power and hydroelectric energy being the most prominent forms.

Interviewer: Yes, we know the vast parks with windmills in hilly areas and above all in coastal regions.

Ms Edwards: This is where the problem lies. Transporting the electricity from the windy coast in the north of Germany to the industrial south, where the electricity is needed, is a challenge that hasn't yet been met.

Interviewer: What precisely are the problems?

Ms Edwards: Well, the first problem clearly is that you have to build power lines right across Germany – and they are not nice to look at. So a lot of protest has built up against them.

Interviewer: I wouldn't want to have a high-voltage power line right through my backyard, that's for sure.

Ms Edwards: I wouldn't either. This problem could be solved by laying the lines underground; however, that would mean investing a lot more money.

Interviewer: You said this was the first problem – what's the second?

Ms Edwards: Well, the second is a physical problem – electricity is lost when it is transported through long power lines.

Interviewer: And what's to be done about that?

Ms Edwards: You have to transform the electricity produced in power stations to very high voltages, up to as much as 400 kV; that way you minimize power losses. When the electricity reaches the consumers, it must be transformed down to the 400 volts used in industries or to 230 volts for households.

Interviewer: Getting back to the subject at hand: To what extent has Germany replaced non-renewable energy with renewable energy?

Ms Edwards: Despite all of the impediments, Germany managed to raise the share of renewable energies from 3.4 % in 1990 to 24.1 % in 2012. Current figures show that 25.8 % of Germany's energy requirements come from renewable energy. Nuclear power still contributes 15.9 % and fossil fuels, finally, are still as high as 58.3 % – that's almost two-thirds of a type of energy that produces tremendous amounts of CO₂ and is responsible for the greenhouse effect.

Interviewer: That's all we have time for today. Thank you.

Ms Edwards: Thanks.

© A16 Prüfung 6, Aufgabe 1, Teil 1

Answering machine: Hello Mr Andres. This is Jonathan Miles, project manager at *Better Chemicals Ltd.* I will get right to the point: it's 6:20 am. here in London and at 3:36 a.m. we were attacked by an unknown intruder. Our network is down and we cannot access any of our file servers. But that's not our main problem, since we don't work on Sundays and my IT people tell me that everything will be up and running again on Monday.

The log files are useless since they were erased before the attacker crashed the system. We hope you can reconstruct at least parts of them and shed some light on this incident. What we need to know is which files the attacker accessed and possibly copied. We also need to know how he got through our security system and gained access to the network; a system which you sold us if I may remind you.

We are sending the HDDs with the erased log files to you with one of our employees on Monday morning. Ms Richards will arrive at Munich Airport at 10:15 a.m. with British Airways flight BA 394. Would you be so kind as to arrange for a pickup from Munich Airport?

Oh, before I hang up: to avoid any misunderstanding – we are not saying the attack was your fault. But there must be some security holes in your system which you should look at so this doesn't happen again. Goodbye.

© A17 Prüfung 6, Aufgabe 1, Teil 2

Speaker: My name is Kate Lee and today I'm going to talk about firewalls.

Firewall introduction

Traffic into or out of a computer is filtered through 'ports,' which are relatively arbitrary designations appended to traffic packets destined for use by a particular application.

By convention, some ports are routinely used for particular types of applications. For example, port 80 is generally used for insecure web browsing and port 443 is used for secure web browsing.

Traffic to particular applications can be allowed or blocked by 'opening' or 'closing' (i.e. filtering) the ports designated for a particular type of traffic. If port 80 is 'closed,' for example, no (insecure) web browsing will be possible. The AntiVirus page might also be of interest.

The Linux kernel includes the netfilter subsystem, which is used to manipulate or decide the fate of network traffic, headed into or through your computer. All modern Linux firewall solutions use this system for packet filtering.

The kernel's packet filtering system would be of little use to users or administrators without a user interface with which to manage it. This is the purpose of iptables. When a packet reaches your computer, it is handed off to the netfilter subsystem for acceptance, manipulation, or rejection based on the rules supplied to it via iptables. Thus, iptables is all you need to manage your firewall (if you're familiar with it). Many front-ends are available to simplify the task, however.

Users can therefore configure the firewall to allow certain types of network traffic to pass into and out of a system (for instance, SSH or web server traffic). This is done by opening and closing TCP and UDP 'ports' in the firewall. Additionally, firewalls can be configured to allow or restrict access to specific IP addresses (or IP address ranges).

Iptables is the database of firewall rules and is the actual firewall used in Linux systems. The traditional interface for configuring iptables in Linux systems is the command-line interface terminal. The other utilities in this section simplify the manipulation of the iptables database. For example:

- UFW (Uncomplicated Firewall) is a front-end for iptables and is particularly well-suited for host-based firewalls. UFW was developed specifically for Ubuntu (but is available in other distributions), and is also configured from the terminal.
- Gufw is a graphical front-end to UFW, and is recommended for beginners.
- UFW was introduced in Ubuntu 8.04 LTS (Hardy Heron), and is available by default in all Ubuntu installations after 8.04 LTS.
- Firestarter is a popular graphical front-end for configuring iptables in Linux systems and is fully functional. However, it is no longer actively maintained or updated.
Firestarter can conflict with UFW if both are running at exactly the same time. However, both UFW and Firestarter modify iptables in an episodic fashion, so that true conflicts are rare. When using Firestarter, be aware that it must be run as root. Leaving the program open to monitor the firewall could become a security problem. The correct way to use Firestarter is to open the program, set the firewall rules and then close it.
- Guarddog is a front-end for iptables that functions in KDE-based desktops, such as Kubuntu. It has a greater deal of complexity (and flexibility, perhaps).

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Sharon: Hello, Mr Wright, my name's Sharon Halliday. I appreciate your taking the time to talk to me.

Mr Wright: Hello Ms Halliday. Pleased to meet you.

Sharon: Although quite a few different technologies are available, the combustion engine is still the most common way of powering cars. As a former chief engineer with a car manufacturer, I'm sure you know a lot about the pros and cons of different types of engines.

In the past you were highly critical of electric cars and the average consumer's behaviour seems to have proved you right. Are you still?

Mr Wright: Thus far, I haven't found any evidence that would make me change my position on electric cars. The lithium battery is all that engineers have come up with and that isn't making any significant progress, unlike the combustion engine, which manufacturers are improving every day.

When batteries are used in cars, they have tremendous disadvantages. The temperature has a strong influence on a battery. Its capacity is affected by the operating temperature and it falls by about 1% per degree below 20°C. High temperatures aren't ideal either: they accelerate the aging and self-discharge processes of the batteries.

Another problem is that the network of filling stations needs improving. The superchargers are still often 200 miles away from each other.

Sharon: Has the development of the car battery come to a standstill? Aren't engineers trying to improve its capacity and provide a greater driving range?

Mr Wright: Yes, I was just coming to that. Increased capacity means a heavier car and this reduces the car's range and costs a lot of money. It's a vicious circle. But don't get me wrong, electricity in cars is not entirely out of the question.

Sharon: So where do you see its role?

Mr Wright: In the high-performance hybrid. This technology allows you to store energy whenever you brake. This energy makes the car faster and far more fuel efficient.

Sharon: And what about gas-powered vehicles? Liquid gas already fuels trucks and trains. Is it suitable for cars as well?

Mr Wright: Good question. The answer is only to some extent. In Tokyo, taxis running on LPG, that's liquefied petroleum gas, are in the majority. But they lose trunk space, which is a big disadvantage. On the other hand, gas makes a lot of sense in trucks. It's cheaper and cleaner than diesel, and the space is available for the gas tanks. Matters are quite different with cars.

Sharon: Why so?

Mr Wright: If you don't want the tanks in the trunk, they have to fit under the rear suspension. Because of their size though the suspension needs to be reconstructed. In addition, some people are concerned about safety. The fear of explosions and fires doesn't exactly help the matter at hand.

Sharon: Point taken. How about fuel cell cars? Are they a competitive alternative?

Mr Wright: I'm afraid not. Battery cars are unable to satisfy the average consumer's wishes and fuel cell cars face the same dilemma. Although fuel cells provide slightly more engineering potential, neither engine can compete with the technological progress of gasoline cars. Nevertheless, manufacturers must offer zero-emission vehicles to comply with governmental guidelines.

Sharon: Is it correct that zero-emission vehicles limit mobility and make driving more expensive?

Mr Wright: I'm afraid so. All the concepts that we have discussed today have considerable disadvantages.

Sharon: In spite of their shortcomings, do you have a favourite way of powering a car?

Mr Wright: My favourite is the hybrid. Look at the current model policies of car companies, nearly all of them have hybrids in their model ranges. And, there's a great demand for such cars, with their fantastic performance and fuel efficiency. There's a great deal of engineering know-how being invested in hybrid technology, unlike the electric cars with their obsolete concept: "battery plus motor plus body".
Hybrids are state-of-the-art. Who could ignore a car that gets 60 miles to the gallon and is still fun to drive?

Sharon: I certainly couldn't. Thank you for your time, Mr Wright.

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Interviewer: As part of our forum discussion on the impact of automation on SMEs, that's small and medium-sized enterprises, I'm going to talk to Darrell Cunningham, lecturer in Mechatronics at *Leeds College of Design and Technology*. Mr Cunningham, could we start by looking at manufacturing in recent years? How has it changed?

D. Cunningham: Well, after a few difficult years of recession, manufacturing has started to recover. However, any growth will only come about slowly. We predict intense competition and as a result the market itself will change significantly as it develops.

Interviewer: How are small and medium companies in Britain dealing with these changes?

D. Cunningham: To be honest, they are facing tough decisions. Automation is the only way that companies can hope to compete with low-cost manufacturing nations. Unfortunately,

designing, building, installing and commissioning such systems are extremely expensive and this all disrupts production. The payback years on the investment are then correspondingly longer. These factors further increase the cost of automation for many small and medium-sized enterprises to the point where the complete automation of production is out of the question.

Interviewer: So, how do you see manufacturing among SMEs changing in the near future?

D. Cunningham: SMEs have no choice but to monitor costs carefully while maintaining a high quality output. They will also have to stay flexible if they want to meet changing market needs and, of course, the reduction of lead times is always an issue.

Interviewer: That's a lot of criteria to stay competitive. How can all of these demands be met by the companies?

D. Cunningham: As I said, all of these demands can be met by automating production processes. Most SMEs will find themselves automating gradually, as soon as investment capital is available. In this way they can develop new products, keep production going and keep their market share.

Interviewer: But how do these forms of automation differ from current robotic engineering?

D. Cunningham: Robots are crucial for production in high-volume car factories, as we all know. Indeed the engineers there are permanently modernising processes to allow the production of newly developed models, the implementation of up-to-date working practices and of course, new technologies.

Interviewer: But this probably means that quite a lot of money has to be invested, which leads to the question: can small and medium-sized companies achieve the same level of constant modernisation by financial and technical means?

D. Cunningham: They can indeed. Modern systems are way easier to operate and they don't need as much maintenance. They also no longer require end-users to invest heavily in developing high levels of engineering expertise. As a result, companies can focus on the product itself and the customer's needs.

Interviewer: In which fields of manufacturing are automation systems most suitable and practical?

D. Cunningham: The question should be "where can you not find automation systems in manufacturing?" They can be found everywhere, starting with your very basic motor speed control in a pump or fan application. At the other end of the scale you find fully integrated production lines. If OEMs, that's the original equipment manufacturers, and end-users plan realistically and stick to their budgets, they can develop systems that make a huge difference to production without bankrupting themselves.

Interviewer: Thank you Mr Cunningham.

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Larry: Hello and welcome to *Science and You*. I'm Larry Ellison and today I'd like to welcome Mike Romsted, material scientist at *Exto Systems Ltd.* in Birmingham, and Mary Wiley, who has been testing one of your most innovative products, Mike. First off Mary, what's all this about?

Mary: Well, Larry, I had a bad skiing accident some years ago which left me paralyzed from the waist down. Mike developed a custom-made 3D-printed robotic suit so that I can walk tall again.

Larry: That sounds like cutting-edge technology! How did you make the suit?

Mike: We created a three-dimensional suit and integrated the mechanical devices, controls and an aluminum frame. We took a three-dimensional scan of Mary's body and created a CAD drawing.

Larry: Just for our listeners ... CAD is computer-aided design...

Mike: Exactly. Then the data was sent to a printer who used laser sintering technology to build the units layer by layer with a thermoplastic material.

Larry: How does a printer produce a 3D part?

Mike: It starts with the CAD drawing. A UV light beam plots a two-dimensional cross-section of the CAD model into the liquid polymer. Wherever the beam touches the liquid, the resin solidifies giving us one slice of the desired part. The polymer tank is then lowered to a depth equal to the thickness of one slice. This process continues until the part is completed. Some geometries need supports that have to be removed after the resin is fully hardened or 'cured' in a UV chamber.

Larry: What is the whole process called?

Mike: It's SLA, stereolithography. That was the first rapid prototyping process developed using a photocurable epoxy or acrylate resin. We didn't use SLA for Mary's suit though.

Larry: What did you use?

Mike: We used selective laser sintering technology or SLS. SLS uses a powder instead of a liquid polymer which means that tougher materials can be used. SLS also uses a carbon dioxide laser that selectively cures the lines by heating and melting the powdery polymer. This sintering step is repeated in order to bond the successive layers.

Larry: You said that tougher materials are used in SLS.

Mike: Yes, any type of nylon composite is suitable, such as glass-filled, highly durable or flame-retardant nylon.

Larry: How are the two processes, SLA and SLS, similar?

Mike: Both techniques use a tank which is lowered after the first slice of the two-dimensional CAD model has solidified. Both are quite affordable and have good surface resolution. The surface profile of SLS is satisfactory as its roughness is less than a typographic point. Actually, a roughness profile of 130 micrometers is less than a third of such a typographic point.

Larry: How much is that in inches?

Mike: That's 0.005 inches.

Larry: Mike, could you sum up the advantages of SLS for our listeners?

Mike: The main advantages are that highly durable materials can be used, and no support structures or post-curing are required. An SLA finish with a resolution of 0.002 inches is finer. But because the material had to be strong, we chose SLS for Mary's suit.

Larry: Now Mary, maybe we could talk about another ...

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Customer: Good morning.

R. Förster: Good morning. How can I help you?

Customer: I have a question. I've been told that compact fluorescent light bulbs contain mercury. Isn't mercury poisonous?

R. Förster: Yes, CFLs do contain mercury which is a hazardous material. But normally mercury can't escape unless the bulb breaks or is disposed of with household waste.

Customer: Why do CFLs contain mercury in the first place?

R. Förster: Good question. Mercury atoms and noble gases in light bulbs convert electric current into visible wavelengths that produce light. These lamps are also known as fluorescent lamps.

Customer: I see. What did you say about household waste?

R. Förster: Because the lamps contain mercury they have to be disposed of safely and kept separate from household waste. The environmental authority also recommends particular care when handling the lights.

Customer: How much mercury does a CFL lamp contain?

R. Förster: It can be up to 5 milligrams although that's nothing compared to the half a gram

of mercury in old clinical thermometers. If you think about it, half a gram is 500 milligrams, which is a tiny amount.

Customer: That's true.

R. Förster: Furthermore, the mercury is sealed in a glass tube. And research is trying to reduce this to less than 1 mg per light bulb.

Customer: You mentioned thermometers. Is mercury contained in other things in the home?

R. Förster: Yes, of course. Blood pressure devices are one example as are old barometers for pressure measurement. I wouldn't recommend you break one of those as they often contain a huge amount of elementary mercury. Even some skin creams contain mercury chloride and they are thought to be a source of mercury poisoning; apparently the mercury rapidly penetrates the skin, leading to serious health defects.

Customer: What would happen if I broke a CFL or anything containing mercury?

R. Förster: Well, we could be looking at mercury poisoning. The primary concern with elementary mercury is inhalation. The highest rates of mercury emissions have been detected in the first few seconds after a device was broken. Mercury spills can be abandoned in flooring cracks or textiles and when people are exposed over a longer period, particularly through inhalation, the mercury can permanently damage the brain and kidneys. At ambient temperature, exposure of more than a month can produce serious health effects. The problem is that the body removes mercury only slowly, over a long period of time. Children are more sensitive than adults.

Customer: Aren't there standards to restrict mercury emissions?

R. Förster: Different federal public health agencies have recommended maximum exposure limits for residential and occupational standards: The residential limit is 0.0003 mg/m³, as children are likely to be involved. The recommended occupational limit is a concentration of 0.02 mg/m³ as a time-weighted average for eight hours per day and five working days.

Customer: It sounds like we are constantly exposed to mercury emissions.

R. Förster: Well we are, if you think that mercury is a by-product of coal-fired electricity production. Mercury also gets into soil and water, it accumulates in fish and enters the food chain.

Customer: All right. Then I should treat my new CFLs as hazardous waste and dispose of them correctly.

R. Förster: You're right; anything else would be illegal.