

# ITFreeTraining



THINK  
ABOUT  
THINGS



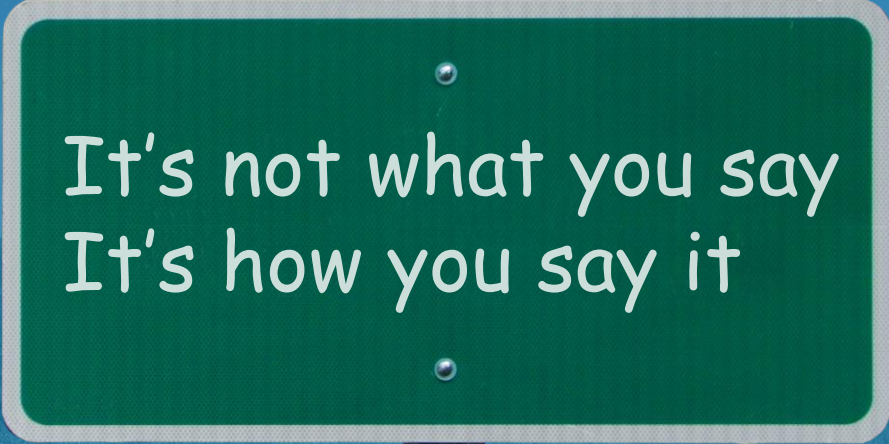
## Problem Solving

For the free video please see  
<http://itfreetraining.com/ap/1e40>

In this video from ITFreeTraining I will go through some tips and tricks on how to solve computer problems. As an IT technician, your job will primarily be to problem-solve. This video will look at some ways to help you troubleshoot problems.

## Be Calm

- Troubleshooting may go beyond your expertise



It's not what you say  
It's how you say it

0:16 One of the first things to consider when working as an IT technician is how you present yourself. The problems you face can be difficult and time critical, however it is important to keep calm. Being a good IT technician goes beyond your ability to troubleshoot problems and your expertise. You may be the most knowledgeable technician in the world, but if you can't control your emotions, people won't want to work with you.

Nowadays, particularly with a lot of workplaces being sensitive to certain issues, it's not what you say, it's how you say it. At times you may have to give news to a customer they may not want to hear. The customer may be angry about something that has gone wrong or if they are missing an important deadline. These things may be out of your control. This does not mean that you can't be empathetic to their situation.

This is different from taking responsibility. However, it is a much better alternative to coming across as rude. For example, consider that you're being asked to fix something under warranty, however, on inspection of the computer you notice that it has been clearly damaged in shipping, which would void the warranty. A poor response from an IT technician would be to say, "You guys broke it, I am not going to fix this" and walk away. A better response would be, "Unfortunately due to the computer being damaged in shipping, the warranty will not be able to cover this. My company won't authorize me to fix this under this circumstance. Maybe you could try contacting the shipping company to see if they have insurance to cover shipping damage."

You can see the second answer is essentially saying the same thing; you are not going to fix the

computer. However, the second answer is essentially giving the reasons behind it. It is also telling the customer it is the company you work for who makes a decision about what gets fixed and what does not. If it is company policy, funding or anything out of your control, explain that this is the reason why you are not fixing the problem, don't just say "No". This comes across as not being personal, but rather, you are just following the rules from the people who pay your wages. Customers will generally understand the reason and that you're not trying to make it difficult for them.

The customer is always free to take it up with your company; the company may say to fix it even under the given circumstances, for example as a customer goodwill gesture. Maybe that customer is their number one customer and they want to look after them, and in cases like these you may be going back to fix the issue – it's a good thing you were not rude to them! Lastly, you have suggested that maybe the shipping company could help. When possible, when you can't help the customer, always offer an alternative if you can have one on how they may get assistance.

## Take Breaks

- Solving problems takes a lot of concentration
- Productivity is reduced after long periods



3:01 Particularly when working long hours, take some breaks. Solving problems takes a lot of concentration. If you are working long hours, your productivity is reduced. When tired, you may be stuck in one mode of thinking. Consider taking a break. Perhaps just getting a drink or having something to eat for a few minutes. Working long hours can often mean you forget to do basic things. This can influence your body and your mind, which in turn affects how productive you are.

Taking too many breaks won't make your boss happy, but even just standing up and walking around for a bit can help. I have found many times that when I have taken a walk to get a coffee, let my mind relax for a few minutes, the solution has come to me. I can't guarantee the solution will come to you if you do this; however, if you become fixated on one way of solving something, taking a break may help to focus on other ways to solve the problem.

# Challenge Assumptions

- Problem may appear the same but be different
- Consider other solutions to problems

*Never assume the obvious is true.*

*When you assume, you make us both look bad.*

THINK  
ABOUT  
THINGS  
DIFFERENTLY

3:57 The next thing to consider is to challenge your assumptions. Many times in IT, the problem may appear the same but is actually different. Often the problem you see is a symptom of something else. For example, you may have a computer that is running out of memory so you increase the memory in the computer. Once you do this, you find that the memory is running out again. The problem is not that you need more memory, the problem is there is software on the computer that is using all the memory regardless of how much memory is in the computer.

When fixing problems, consider other solutions to the problem. Many times, people will get set in their ways. They get so used to fixing something the same way, they don't think there is another way to do it. This is particularly true in IT with software and hardware changes. You may be doing something because that has always been the best way; however, now there is a much better way of achieving the same result.

# Costs and Impacts

- Replacement/reinstall often the fastest solution
- Weigh up time/cost/quality



4:54 When you begin fixing things, you need to start considering how much this will cost the company for you to do the fix. The company wants to save money and one of the considerations is your time. Often you will find a replacement or reinstallation will be the fastest way to fix the problem. For many companies when something goes wrong, they will re-install the operating system and its applications rather than trying to fix the problem in a process called imaging. This is generally faster than trying to figure out what went wrong and trying to fix it.

This also applies to faulty hardware. For example, if you have a network card that is causing problems, replace it with a different network card. I once had a problem where a computer would not receive any Windows updates. I replaced the network card with a different manufacturer's card and the problem was fixed. The problem could have been the network card itself, a software problem or just changing the network card changed something else that fixed the problem. The point is, Windows update was fixed and the computer was working again. Network cards are not that expensive, so this was the easiest and fastest way to fix the problem. Although you may be tempted to spend a lot of time trying to figure out why, your boss will most likely want you fixing other problems. If it is fixed, best to move on and if there is time later on, try and figure out why it happened. The customer does not want you on their computer trying to figure out why the computer is not working for long periods of time. They just want to get back to work on their computer.

When you are looking at the problem, weigh up the time, cost and quality of what you are doing. For example, a low-cost replaceable part should be a no brainer, just replace it. If the

part costs a lot of money, well the company may not want to pay the money to get a replacement. You may need to spend some time trying to work out how to fix the problem another way. This is particularly the case if the computer is a specialized workstation. For a general desktop computer, it is not too hard to justify swapping the hardware out.

## Escalating/Giving up

- Know when to ask for help or escalate the problem
- Know when to give up



6:59 The next thing to consider is when you can't fix the problem. After you have had a go fixing the problem, at some stage you need to consider that you either can't fix the problem or you need to ask for assistance. It is a good skill to know when to do this. Time is money as they say and there is no point spending more time trying to fix something that you are not going to be able to fix.

Now this may seem strange, but you also need to know when to give up. At times you won't be able to fix the problem. In some cases, the company may say you have to stop trying as there are other jobs, and at other times they may say that giving up is not an option. In some cases, the company may have support agreements in place. Under this agreement, an old computer may not be covered by the support agreement. In this case, the company may say give it a go fixing it, but if it takes too long forget about it. Generally, the idea here is that old hardware stops being supported to encourage the company to upgrade it. Older hardware is also generally harder to fix as time goes on. This includes software like operating systems. Companies will often have agreements that don't include old software or hardware as it ends up taking up too much time to support.

It is difficult to know sometimes when to give up, but think about it like this. It all comes down to priorities. If you have a lot of customers waiting with high priority jobs and you are working on a low priority job which is taking a lot of time, consider that you may need to call it quits on the low priority job. So far, I have looked at the mindset for an IT technician. Let's now look at how to approach the problems themselves.



# Problem Identification

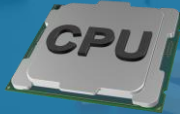
- Work methodically to diagnose the correct problem
- Work on a solution to correct the problem
- Example: Computer randomly restarting



PSU Tested  
O.K.



Memory Tested  
O.K.



CPU not  
over heating



Connected,  
fans spinning



Motherboard  
problem

8:41 The first step is identifying the problem. To do this, work methodically to first diagnose the correct problem. I say the correct problem because often you will see a symptom, but this may not be what the problem is. You don't want to fix a customer's computer then get called back because the same problem has occurred again. Sometimes the problem is not that clear.

Once you have worked out the problem, work on a solution to fix the problem. The problem may be as simple as replacing a part or it may be more complicated. Let's consider an example.

Let's consider that you have a computer that is randomly restarting. Working through the problem you first need to determine what is causing it to restart. In problem identification, if the problem is not clear, a lot of the time the process of elimination will help you work out what the problem may be.

To start with, ask some questions about how the computer is restarting. In this case, the screen goes black without warning, the customer hears a beep noise and the computer starts back up. The first thing that this tells us is the problem is mostly likely a hardware problem. If we got a blue screen, then this indicates a software or hardware problem. In this case, no messages were displayed, and the computer just restarted without warning.

So, let's make a list of everything hardware related that could be causing the problem. You don't necessarily need to make a list; a lot of technicians will start with the most likely hardware problem and work from there. That comes with experience.

To start the process of elimination, I will start with the power supply. Using a power supply tester or a multimeter, it is a quick process to test it. In this case, the power supply appears to be working correctly. In another video I will look at how to do this, but a device like a power supply tester will be able to test the power supply is outputting the correct voltages. If the power supply is not outputting the correct voltages, this can cause a computer to randomly restart.

Keep in mind, the power supply could still be the problem, but so far it looks o.k. With troubleshooting, if you can eliminate the easy things first, this may lead you to the correct problem. If it does not, you can always swap the power supply later to see if this is the problem.

Faulty memory can also cause problems like these. Generally, faulty memory will create a blue screen error message in Windows; however, not always. So, to check this, I will run a memory testing program. In this case, it appears the memory is working correctly.

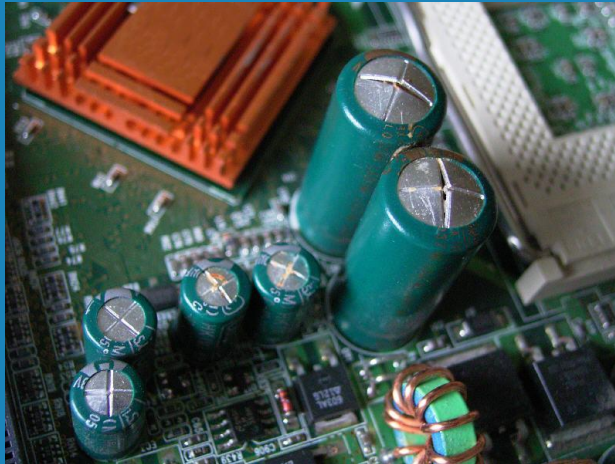
The next thing to consider is the CPU. If the CPU is overheating this can cause a problem like this. So, I checked the temperature of the CPU, made sure the fans were connected, heat sync attached and the computer setup is configured to sound an alarm if the CPU temperature gets too high. At least if this is causing the problem, we will get an alarm and then we will know the CPU is overheating. The CPU may still have a fault; however, the faster we eliminate the simple things, the closer we get to narrowing down what it could be.

The next thing it could be is the video card. A video card that is not seated in the socket correctly can cause this problem, also if the fans on the video card have stopped, it can cause the video card to overheat, restarting the computer. The video card has been checked, the fans are spinning and seem to be seated correctly.

The next thing that I will look at is the motherboard. Looking at the motherboard shows us what the problem is. Let's have a closer look.

# Motherboard Fault

- Check for damaged parts



12:17 In this example, you can see some of the capacitors on the motherboard have swollen up. For the CompTIA exam, they will refer to these as distended capacitors. Capacitors were a big problem around the mid 2000's due to a lot of unreliable capacitors being on the market. The problem still can occur today, but does not seem to occur anywhere near as often.

Capacitors store power, like a battery, but keep charge for generally a few milliseconds to a few seconds. They regulate power in the computer so if they are faulty, this can cause the computer to restart. Generally, if you have a problem like this, as time goes on, the capacitors will get more and more damaged reducing their effectiveness, meaning that the computer will continue restarting more often.

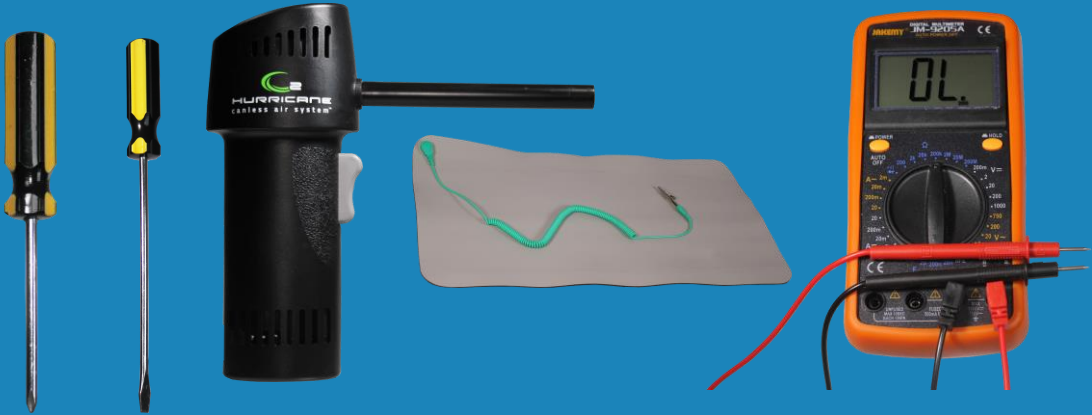
When checking a computer, check for damaged parts. Capacitors are easy to check as they should have a flat top. If you're not sure, run your finger along the top of it. If the capacitor is starting to fail, they generally start bulging at the top.

When checking inside a computer, look for things like this. Burn marks on electronics are also a good indication. Sometimes a computer will have intermittent problems, meaning they seem to occur at random times. These can be difficult to diagnose. When fixing a computer, look for anything that does not look right. Anything from cables not plugged in fully to a cable blocking a fan can all cause problems. Even a cable that is not blocking a fan, if it is too close to a fan, can shift while the computer is on and block the fan, causing it to overheat. Simple things like making sure all the cables are clear and there are no damaged components should be checked. Once you eliminate all the simple things, you can move onto the complex things.

In this example, I could have taken a guess that it was the power supply, as generally with a problem like this, the power supply is probably the cause. However, if I had just replaced it, I would not have fixed the correct problem and the customer would have been calling me back asking me to come back and have another look at their computer.

# Be Prepared

- Have the tools/hardware/software you need
- Anything else (Documents/Access)



14:31 The next thing is to be prepared. At the basic level, have all the tools you need, hardware and software. If you have to go back to the office to pick up something you forgot to bring with you, you are making the customer wait. This is particularly embarrassing if it is something that you should have had with you.

The next thing is to have anything else that you need. This includes things like documentation or to have arranged for any access that you need. If you can't do the job because you did not bring the instructions with you, well that is pretty embarrassing. Before you head out, stop for a moment and think, do I have everything that I need?

# Question the User

- Are you getting any errors or beeps?
- Has anyone else had the same problem?
- How long has the problem been occurring?
- Have there been any recent changes?
- Has anything been tried to fix the problem?

15:11 When you arrive to fix a problem, ask the user some questions about what is going on. Believe me, getting some information from them will save you a lot of time. Remember they may not know a lot about computers and you may take a little time to get the information out of them, so be patient.

Some questions that you can ask are, “Are you getting any errors or beeps?” You may not get the information straight away and you may need to rephrase the questions a few times. They may not understand what an error message is, so you may need to ask them, “Are you getting any message that you don’t normally get?” Some users, when they get an error message, will just dismiss it straight away. At least if they can tell you when they are getting the error message you know where to start. Don’t be afraid to ask them to repeat the steps they did to get the error message.

Another good question to ask is, “Has anyone else had the same problem?” If the answer is yes, the problem may not be with the local computer. It may be a problem with the network; however you can’t rule out a recent software update.

Next, consider asking how long the problem has been occurring. Don’t be surprised if you turn up to a job and you’re asked to fix something that has never been working. Also don’t be surprised if the user is not up front with this information. The user expects you to be able to fix the problem and does not know what information you need. Some will give you information without asking; however, with others you need to ask the right questions to get it. Remember, exercise some patience with them. They may not know that much about computers, but that is

why you have a job.

Consider asking if there have been any recent changes. The most recent change is most likely what caused the issue. Sometimes users will go around changing things on the computer. If they have been changing things and then something stops working, most likely this has something to do with it.

Lastly consider asking, “Has anything been tried to fix the problem?” You would be surprised that they may tell you someone was there yesterday fixing something and then they started having the problem. Sometimes fixing something can then break something else. Also, if something else has been tried, you want to know about it, because if that did not work, you don’t want to waste time trying again.

# Perform Backups

- Think about the importance of the data
- Check when last backup was made
  - Check if the last backup is usable
- Disk imaging is usually the quickest way

17:30 Before you start work, you should backup any data. For the CompTIA exam, we always backup data before we start work. In the real world, you should, but probably won't in all cases. You may first consider how important the data is on the computer in question. Nowadays, a lot of data is kept on servers so if you lose the contents of a computer, it won't matter, unless of course you are working on the server itself. Even so, some software installs have settings on the local computer. Think about if you lost the drive, would you want to lose any of the information on it? Even writing down or taking a screen shot of some settings for a program may save you hours of work if the local storage on the computer is lost.

In some cases a backup may have already been performed. This may sound good, but make sure the backup is actually usable. I once worked on a site where the data grew so large that the backup required more than one tape to complete. No one thought to check, so they changed the backup tape each day without checking that the backup was completed. Turns out, the backup asked for a new tape during the night, and when it did not get one, the backup failed.

Fortunately, after a few months of the backup failing, someone did notice and fixed the problem. Lucky for us we did not find out about the problem when a customer requested a file to be retrieved and had to tell them we could not retrieve it. When you are working on a customer's computer, generally the quickest way to perform a backup is to use disk imaging software. Since these images are quite large, if I don't hear back from the user after a while, I delete the image. I also tell them this, so they know to contact me straight away if they find that anything is missing.



# Sources of Information

- Physical inspection

## Look



Components damaged



Card/Cables loose

## Listen



Stuck fans

## Smell



Burning electronics

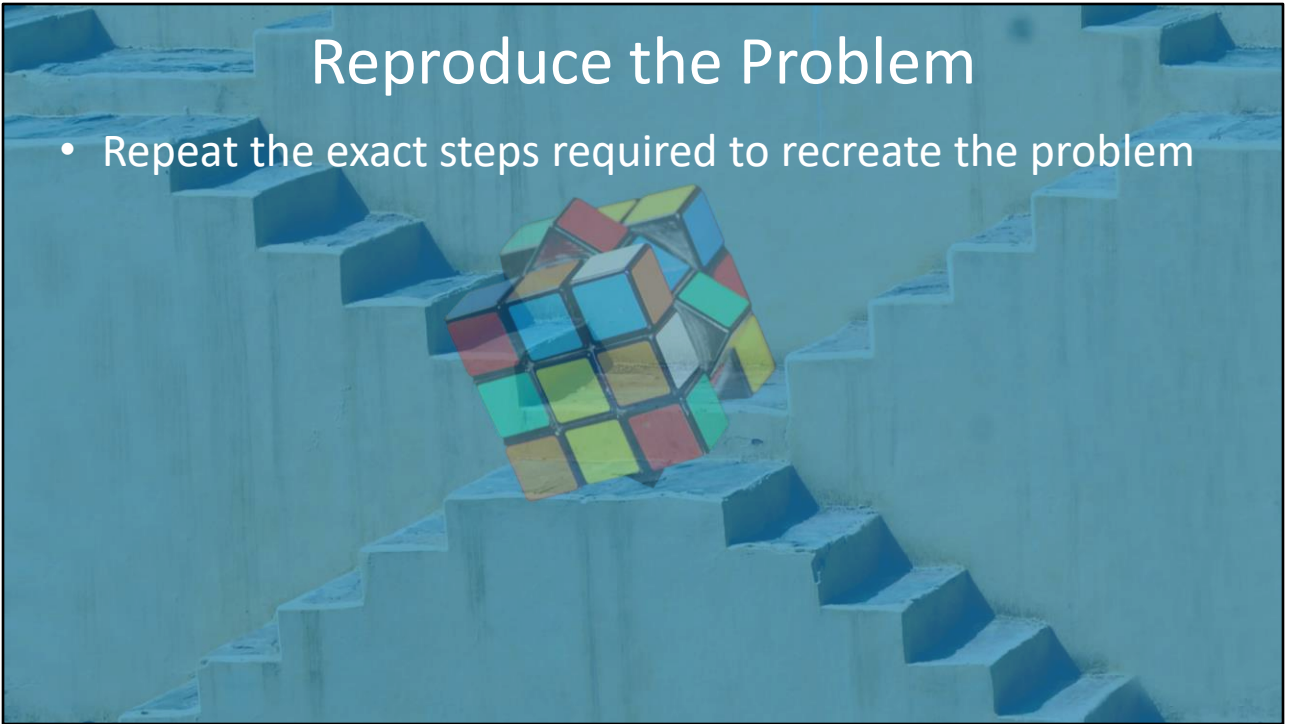
19:19 When troubleshooting, there are places you can go to get information to assist you. The simplest place is by physical inspection of the computer. Firstly, looking at the computer itself. Have a look inside and outside to see if you can see anything that looks damaged. You should look for any cards or cables that are loose or not connected correctly. A simple disconnected cable can prevent a computer starting up. A loose cable can make the computer intermittently crash or restart at random times.

The next thing is to listen to the computer. If the computer has a stuck fan or intermittent spinning fan, you can usually hear or not hear the fan spinning. Fans can be prevented from spinning or slowed down by many different things. It could be a cable blocking the fan, it could be dust in the fan or from wear and tear in the fan. If the computer has a lot of fans, you probably won't be able to hear the absence of one fan, so you will need to look at each fan and make sure it is spinning correctly. If the fan is partially blocked, you should be able to hear what is partially blocking and hitting the fan as it spins. For example, there could be a clicking noise as the fan strikes a cable. A blocked fan will cause the component it is trying to cool to fail, potentially causing the computer to restart or to cause damage to the component.

The last thing you can do is use your sense of smell. Generally, you won't go up and smell a computer because that would be a little strange, but if a component is burning or been recently burnt, you should be able to smell it. If you smell something like that, it is likely that something has shorted in the computer. Most of the time this will stop the computer working, but if the computer is still working, you will want to find out where the problem is. If it keeps burning, the component will eventually fail and may damage other components in the computer.

# Reproduce the Problem

- Repeat the exact steps required to recreate the problem



21:14 In some cases, you may not be able to see what the problem is. In order to find the problem, repeat the exact steps required to recreate the problem. In a lot of cases this will help you troubleshoot the problem. In some cases, the problem may be intermittent in nature, meaning it may not occur all the time. Problems that are intermittent, transitory or difficult to reproduce are often the hardest to troubleshoot. They can also be the most frustrating to fix. This will often have you change something, thinking it has fixed it, and then the customer will call you later on saying the problem has occurred again. The best thing is to try to keep calm, not assume anything is or isn't causing the problem, keep testing and try new things until the problem is fixed.

# Check Logs/Documentation

- Logs on computer and network
  - Application and system logs
- Documentation
  - In house
  - Online (Manufacturer's website/forums)

22:00 In your troubleshooting process, you should also check logs and documentation. Depending on what the problem is, check the logs on the computer and the network. This includes any application and system logs. You never know if the application is causing the problem or if it is something in the operating system.

Have a look through the product documentation, as this may help you work out what the problem is. This includes in-house documentation; you never know, someone may have come across this problem before. Sometimes you may have to ask around the office. IT technicians get pretty busy trying to fix things and don't always take the time to document things.

Also check online, and this includes the manufacturer's website and forums. Often the manufacturer will have a forum to discuss any problems concerning their products. Someone may have had the same problem as you and has posted a fix for it.

To find the information you are after, it is always good to search for an error code if you have one. If you don't have that, try some good keywords. If you are not having any luck, try some different key words, and hopefully this will lead you to some results.

That concludes this video on some of the problem-solving mindsets and techniques that you can use to troubleshoot computer problems. Once you start getting some experience, you will start developing your own methods to troubleshoot problems. I hope you have enjoyed this video and found it useful. Until the next video from us, I would like to thank you for watching.

## References

“The Official CompTIA A+ Core Study Guide (Exam 220-1001)” Chapter 3 Position 16132 - 17244

“Picture: Road and clouds” <https://pixabay.com/photos/road-asphalt-sky-clouds-fall-220058/>

“Picture: Grass and meadows” <https://pixabay.com/photos/field-meadow-nature-grass-green-768601/>

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“Picture: Highway sign” <https://pixabay.com/photos/road-highway-signal-street-traffic-3294966/>

“Picture: Three person holding wicker baskets”

<https://www.pexels.com/photo/three-person-holding-wicker-baskets-with-handles-in-white-pots-1297340/>

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“Picture: Thumbs up” <https://unsplash.com/photos/3KEFp35FVBO>

“Picture: Questions marks” <https://pixabay.com/illustrations/question-mark-important-sign-1872665/>

“Picture: Damaged capacitor”

[https://commons.wikimedia.org/wiki/File:Defekte\\_Kondensatorenn.jpg](https://commons.wikimedia.org/wiki/File:Defekte_Kondensatorenn.jpg)

“Picture: Questions marks” <https://pixabay.com/illustrations/question-mark-pile-questions-symbol-2492009/>

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“Picture: Burnt board”

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