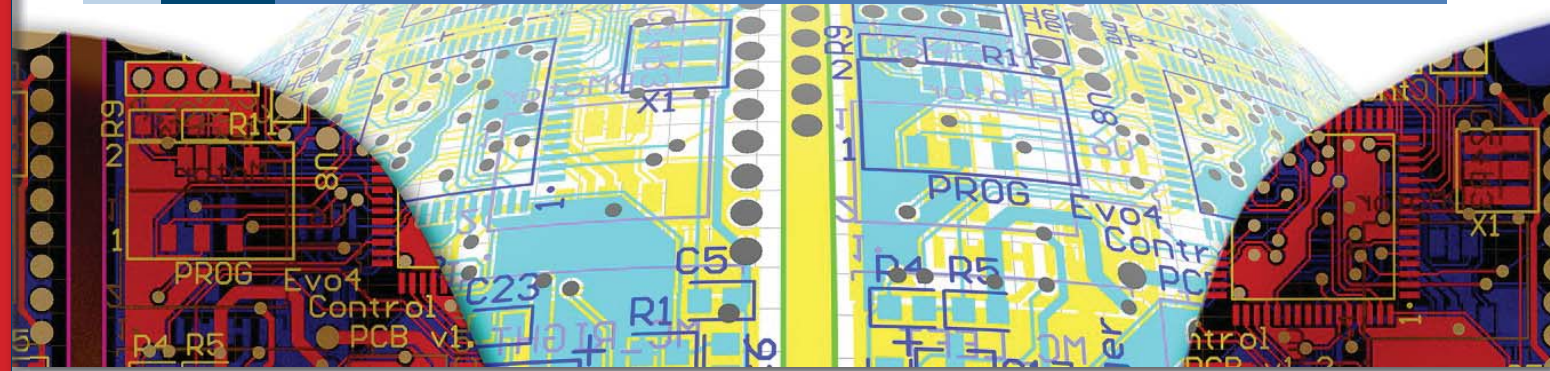# 1

Network Devices and Equipment

1. Do you know the answers to the following questions? Work in groups and try to answer as many as you can (you may use Greek language too). Then, read the text and come back to check or complement your answers.

group work

1.		What do *network devices* do? What are they used for? ....
2.		What does *network equipment* include? Name specific devices. ....
3.		What is the difference between *wired* and *wireless* networks? ....
4.		Why are *protocols* regarded to be fundamental mechanisms for network communications? What do they do? ....

5.		What are the main kinds of *area* networks? ....
6.		What is a network *hub* used for? What are its drawbacks? ....
7.		What is a network *switch* used for? What is its advantage in comparison with a network hub? ....
8.		What does a *modem* do? ....
9.		What does a *router* do? ....
10.		What does a *bridge* do? ....
11.		What does a *repeater* do? ....

2. Read the following text to get the information you need for the previous activity and then do the tasks below.

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Network Devices and Equipment

Network equipment is used to combine, split, switch, boost or direct packets of information along a computer or telecommunications network. This product area includes hubs, switches, routers, bridges, gateways, multiplexers, transceivers and firewalls. In addition to device type, network equipment is defined by protocol (e.g. Ethernet) and port or interface type.

Networking equipment interconnects devices so that data can be shared between them. The layout or topology of these connected devices describes the network's design or structure. Common topologies for computer networks include bus, ring, star, tree and mesh. Hybrid topologies are also used.

In wireless networks, devices communicate via radio waves and do not require physical connections whereas in wired networks, cables are used. These cables are equipped with connectors for a specific port or interface type.

Computer networks handle data according to protocols that are fundamental mechanisms for network communications. Network protocols specify the software attributes of data communications, including the structure of packets and the information contained therein. Depending upon the type of network, packets may be called blocks, cells, frames or segments. Network protocols may also prescribe some or all of the operational characteristics of the network hardware on which they run.

Network equipment may be designed for local area networks (LAN), metropolitan area networks (MAN) or wide area networks (WAN).

If we take a look at the different devices, they work at different layers of the computer networks. These different layers are like different zones of a computer network with specified works, also called 'network protocols'. For example, a LAN cable has got the purpose of connecting a computer to the local area network whereas a Wi-Fi router has got the purpose of sending and receiving data between you and your internet connection.

Types of Network Equipment

Network Hub

This is a networking device used to connect multiple network hosts as well as to do data transfer. The data is transferred in terms of packets on a computer network. So when a host sends a data packet to a network hub, the hub copies the data packet to all of its ports

Modem

A modem, which stands for **M**odulator + **D**emodulator, is a hardware device that allows a computer to send and receive data over a telephone line or a cable or satellite connection. In the case of transmission over an analog telephone line, which was once the most popular way to access the internet, the modem converts data between analog and digital formats in real time for two-way network communication. In the case of the high-speed digital modems popular today, the signal is much simpler and doesn't require the analog-to-digital conversion.

connected to. However, because of its working mechanism, a hub is not so secure and safe. Moreover, copying the data packets on all the interfaces or ports makes it slower and more congested which led to the use of network switch.

Network Switch

Like a hub, a switch also works at the layer of LAN (Local Area Network). While hub just does the work of data forwarding, a switch does 'filter and forwarding' which is a more intelligent way of dealing with the data packets. So, when a packet is received at one of the interfaces of the switch, it filters the packet and sends it only to the interface of the intended receiver. For this purpose, a switch also maintains a CAM (Content Addressable Memory) table and has its own system configuration and memory.

Router

A router, which is a protocol-dependent device, is a physical layer networking device that joins multiple networks together. Typically routers are designed to make decisions about which path or interface to use for network traffic. Generally they perform very little filtering or policing, instead they are optimized for speed.

Bridge

They should be used to interconnect local or remote networks in order to centralise network administration. A bridge connects two subnetworks as a part of the same network. You can think of two different labs or two different floors connected by a bridge.

Repeater

A repeater is an electronic device that amplifies the signal it receives. When it receives a signal, it retransmits it at a higher level or higher power so that it can cover longer distances. Repeaters use regeneration and retiming to ensure then that signals are transmitted clearly through all network segments.

1 Network Devices and Equipment

3. *True* or *False*?

Which of the following sentences is true (*T*) or false (*F*) according to the text?

		True	False
1.	Blocks, cells, frames or segments are all packets of information or data.		
2.	'Network protocols' are layers of a computer network with specified purpose.		
3.	A hub just connects network hosts without being able to transfer data.		
4.	A switch maintains a Content Addressable Memory table and has its own system configuration and memory in order to be able to send packets to the intended receiver only.		
5.	Transmission over an analog telephone line is nowadays the most popular way to access the internet.		

4. Read the text carefully and then choose the correct answers.

1.	What is the aim of the text? a. To list different products for purchase. b. To compare the function of different equipment. c. To provide knowledge about network devices and equipment.
2.	According to the article, why are network devices necessary? a. They facilitate the sharing of information and data. b. They distribute the layout of various interconnected devices. c. They forward information to a wide area network.
3.	Why is the network hub not preferable? a. It provides access to few computer networks. b. A hub is always going to send the traffic everywhere. c. It is based on an old-fashioned technology.

5. Match the words (*1-10*) with the definitions (*A-J*).

pair work

1. _____ Ethernet
2. _____ protocol
3. _____ hub
4. _____ switch
5. _____ interface

6. _____ configuration
7. _____ cable
8. _____ router
9. _____ optimise
10. _____ gateway

A	hardware device designed to receive, analyse and move incoming packets to another network
B	programme that allows a user to interact with a computer
C	wires covered in plastic covering allowing the transmission of power or data between devices
D	to achieve maximum efficiency /make the most effective use of a situation or resource
E	a device which serves as an entry point into another network
F	networking technology consisting of cables which enables local area networks
G	a method of exchanging data over a computer network
H	basic networking device that connects multiple computers or other network devices together
I	a hardware device that filters and forwards network packets
J	an arrangement of functional units according to their nature and performance

6. Choose the answer (*a*, *b*, or *c*) you find most appropriate.

| ♦ protocol | ♦ interface | ♦ attribute | ♦ LAN |
| ♦ transceiver | ♦ analog | ♦ repeater | ♦ networking |

1 A user _____ is a point of interaction between a computer and humans, where data is transferred between the user and the computer system.

2 A user using a cordless keyboard or mouse may have a _____ to send and receive information from the wireless device.

3 A(n) _____ has networking equipment in close proximity to each other, capable of communicating, sharing resources and information.

4 _____ is an electronic communication sent as signals of varying frequency instead of ON or OFF like a digital data transmission.

5 Each _____ has its own method of how data is formatted when sent and what to do with it once received.

6 _____ are commonly used with networks to help the lines running between network devices reach farther destinations.

7. Complete each blank in the following pairs of sentences with the correct word.

1.	**device / equipment**
	a. The newly-designed _____ will not appear on the annual technology exhibition.
	b. Thieves broke into the offices and stole €15,000's worth of computer _____.
2.	**router / hub**
	a. A _____, which connects multiple computers or other network devices together, has no routing tables or intelligence on where to traffic information.
	b. Within a LAN environment the _____ provides local address resolution services and may segment the network using a subnetwork structure.
3.	**configuration / interface**
	a. _____ refers to what kind of hardware is connected, and how those connections are set up.
	b. In computing, a(n) _____ is a shared boundary across which two or more separate components of a computer system exchange information.

☑ *Word formation. Look at the following table how we form nouns from verbs adding a suffix.*

Vocabulary building	forming nouns from verbs		verb + suffix ⇨ noun		
Adding affixes to existing words is a way to form new words. Suffixes usually change the class of the word.	-tion -sion	action	communicate admit	⇨ ⇨	communication admission
	-ment	action	equip develop	⇨ ⇨	equipment development
	-ence -ance	result state / quality	prefer maintain	⇨ ⇨	preference maintenance
	-ant -ent	person	assist depend	⇨ ⇨	assistant dependent
	-age	result	pack waste	⇨ ⇨	package wastage
	-er	person object	drive compute	⇨ ⇨	driver computer
	-ery / -ory -ry	action place	rob bake	⇨ ⇨	robbery bakery
	-al		arrive	⇨	arrival

8. Complete the sentences using the correct noun from the verbs in parentheses.

1 This _____ (*route*) has been specially designed to improve its overheating _____ (*resist*).

2 The networking equipment needs further _____ (*improve*) before launched in the market.

3 _____ (*convert*) is a term used to describe the ability of _____ (*transfer*) of a file or a segment of data from one format to another format.

4 Staying at a suspicious website in unsafe mode may lead to the loss of personal data and computer _____ (*break*).

5 A _____ (*use*) may setup a _____ (*serve*) to control access to a network, send/receive e-mail, manage _____ (*print*) jobs, or host a website.

6 What is the _____ (*differ*) between a _____ (*direct*) and a _____ (*fold*)?

7 A criminal _____ (*hack*) is any individual who illegally breaks into computer systems to damage or steal _____ (*inform*).

8 A _____ (*direct*), which is found in a hierarchical file system, is a _____ (*locate*) for storing files on your computer.

Modal Verbs

9. The following sentences appear in the text about network devices and equipment. Underline the modal verbs and match them with their functions below.

a. When it receives a signal, it retransmits it at a higher level or higher power so that it **can** cover longer distances.

b. Depending upon the type of network, packets **may** be called blocks, cells, frames or segments.

c. They **should** be used to interconnect local or remote networks in order to centralise network administration.

1 obligation	2 ability	3 possibility	4 permission	5 advice

Remember!

Modal Verbs

Modal verbs do not have all tense forms.

They are followed by the bare infinitive (infinitive without to)

They do not take -s / -ing / -ed suffixes

They form the interrogative and negative form without an auxiliary verb.

☑ *In the following table you can see the meanings and different uses of modal verbs.*

Modal verbs	Use
can / be able to could was able to	**ABILITY** ability in the present / future ability in the past ability on a specific occasion
can / may could / might	**POSSIBILITY / PERMISSION** possibility in the present / future possibility on a specific occasion
should / ought + present infinitive should / ought + perfect infinitive	**PROBABILITY** probability in the present / future something was expected to happen but it did not happen
should / ought to	**ADVICE** general / strong advice
must mustn't have to / had to should / ought to	**OBLIGATION / DUTY / NECESSITY** duty / strong obligation prohibition strong necessity / obligation duty / weak obligation
don't have to / don't need to / needn't didn't have to / didn't need to needn't + have + past participle	**ABSENCE OF NECESSITY** it is not necessary in the present / future it was not necessary it was not necessary but it was done
must + present / perfect infinitive can't / couldn't May / might / could	**DEDUCTION / LOGICAL ASSUMPTION** Almost certain that it is / was true Almost certain that it is / was impossible Possible that it is / was true

10. Complete the sentences in the following router user guide choosing the correct item and providing justifications for your answers.

1	When using this guide, please notice that features of the router **may / must** vary slightly depending on the model.
2	This guide aims at allowing you to use your router so that all of your connected devices **will be able to / should** take advantage of the service.
3	The product **should not / may not** be located where it will be exposed to moisture or excessive heat.
4	Place the router in a location where it **can / might be** connected to devices as well as to a power source.
5	In a domestic environment, this product **needn't / may** cause radio interference, in which case the user is required to take adequate measures.
6	You **must have / should** follow the instructions on the page to continue the configuration.
7	If the router works, you **must have / may have** followed the right instructions.
8	You **don't need to / mustn't** run the setup CD included with the router.
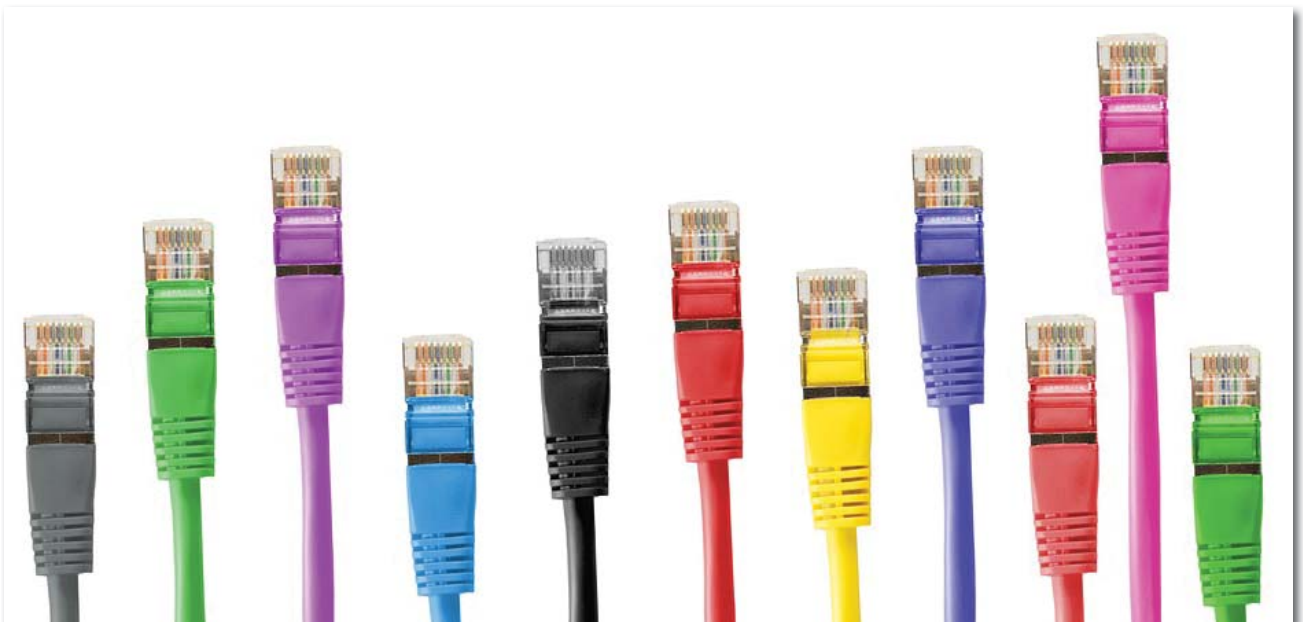
11. Complete the sentences in the following guide with the correct modal verb in the right form.

How to Build and Maintain the Best Home Network

With just a little time and effort, anyone _____ set up a basic home computer network. Simple home networks, though, _____ provide only a small fraction of the capability that an advanced network does. In order to get the most out of your home network you _____ invest in better hardware and additional software. With the movement to cloud computing continuing, families _____ use reliable, fast access to all of their online accounts and data. Most Internet providers nowadays _____ offer a range of service plans at different prices. Subscribing to your provider's basic plans _____ save a few euros each month but you _____ also consider time and convenience. Even small increases in data rates _____ shave valuable minutes off of long download. You _____ upgrade your Internet service plan to the best available and _____ change providers if necessary. Note that the best home Internet service _____ not be provided by the one with the largest Mbps rating. If you still have problems with accessing all points at home, you _____ followed the above instructions. You _____ a computer expert to follow these rules.

12. Match the verbs in bold to their meanings.

_____	1.	You **didn't need** to buy a new router since you didn't wish to upgrade your home network.	a	You are not allowed to...
_____	2.	We **had to** unplug our router due to overheating.	b	It's against the rules...
_____	3.	You **can** get the router IP address from the manufacturer's documentation.	c	We were obliged to...
_____	4.	You **might** as well buy a modem if you have an up-to-date router.	d	Is it OK if...
_____	5.	You **mustn't** reset your router, if there are no problems.	e	It wasn't necessary...
_____	6.	You **can't** use your neighbour's IP address.	f	It's possible...
_____	7.	**Could** I please use your laptop?	g	Perhaps you can...

♦ *You are going to hear a talk by a Tech enthusiast about technology innovations and the impact on our lives. Then do the following tasks.*

TED | Ideas worth spreading
Kevin Kelly | EG 2007
The next 5,000 days of the web

http://www.ted.com/talks/kevin_kelly_on_the_next_5_000_days_of_the_web

13. Choose the most appropriate title for the talk.
   a. What is technology about?
   b. Predicting the future of the World Wide Web.
   c. The impact of technology on our lives.

14. Listen again and complete the missing words in the following sentences.

1	If I told you it was all _____, you would say, this is simply _____ you're dreaming.
2	One of the things that we're learning from this era, from this last decade, is that we have to get good at believing in the _____.

3	There's almost no other machine that we've ever made that _____ of hours, the number of days.
4	But to a first _____, the size of this machine is the size and its complexity, kind of _____ to your brain.
5	Thirdly, we're going to become completely _____ upon it.
6	The cloudbook doesn't have any storage. It's _____. It's always connected.
7	All the cameras, and the microphones, and the _____ in cars and everything is connected to this machine.
8	Every item, every artifact that we make, will have _____ in it some little sliver of Webness and connection.

15. Work in groups and:

a. name some things mentioned in the talk that were thought impossible 10 years ago. What other things we have today were thought impossible?

b. Kevin Kelly asks: "How can we predict what's coming in the next 5,000 days?". What do you think is coming?

TED Ideas worth spreading

Kevin Kelly | EG 2007
The next 5,000 days of the web

http://www.ted.com/talks/kevin_kelly_on_the_next_5_000_days_of_the_web#t-98088

16. Brainstorm reasons why you should upgrade your home computer network and decide which devices and equipment to use. Write them down in the following table.

Reasons	Devices
•	•
•	•
•	•
•	•
•	•

Mindmap

17. What are the similarities and differences among routers, switches and hubs? Work in groups to prepare a presentation about the key characteristics of each of the devices.

18. Your school's principal has asked you to improve the school's computer network. Discuss the importance of the following or other needs and decide on the priority of works to be undertaken.

class discussion

- hardware required to build a network
- wired Ethernet networks

SETTING UP A NETWORK

- wireless access points
- how to troubleshoot connection problems
- use a bridge to expand your LAN
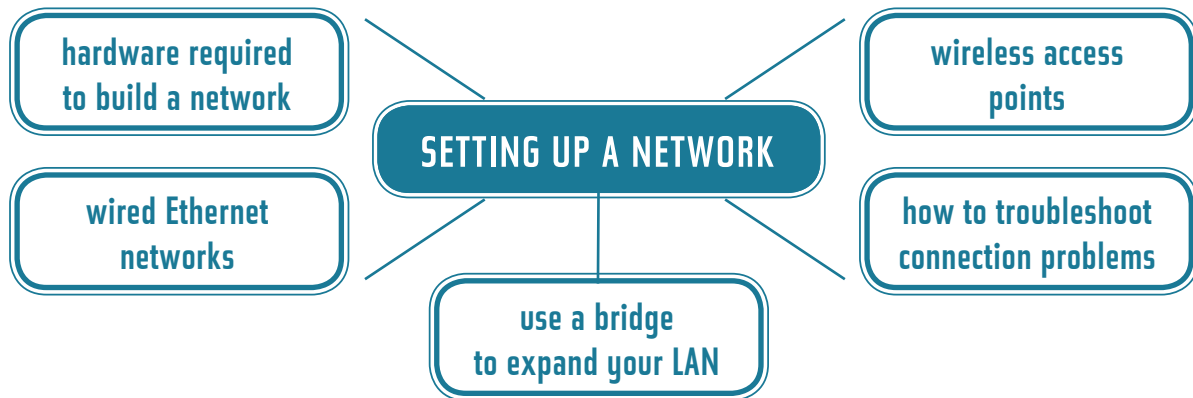
a. How do network devices and equipment contribute to interaction and communication?

b. How does a computer network facilitate the operation of a school / office / business?
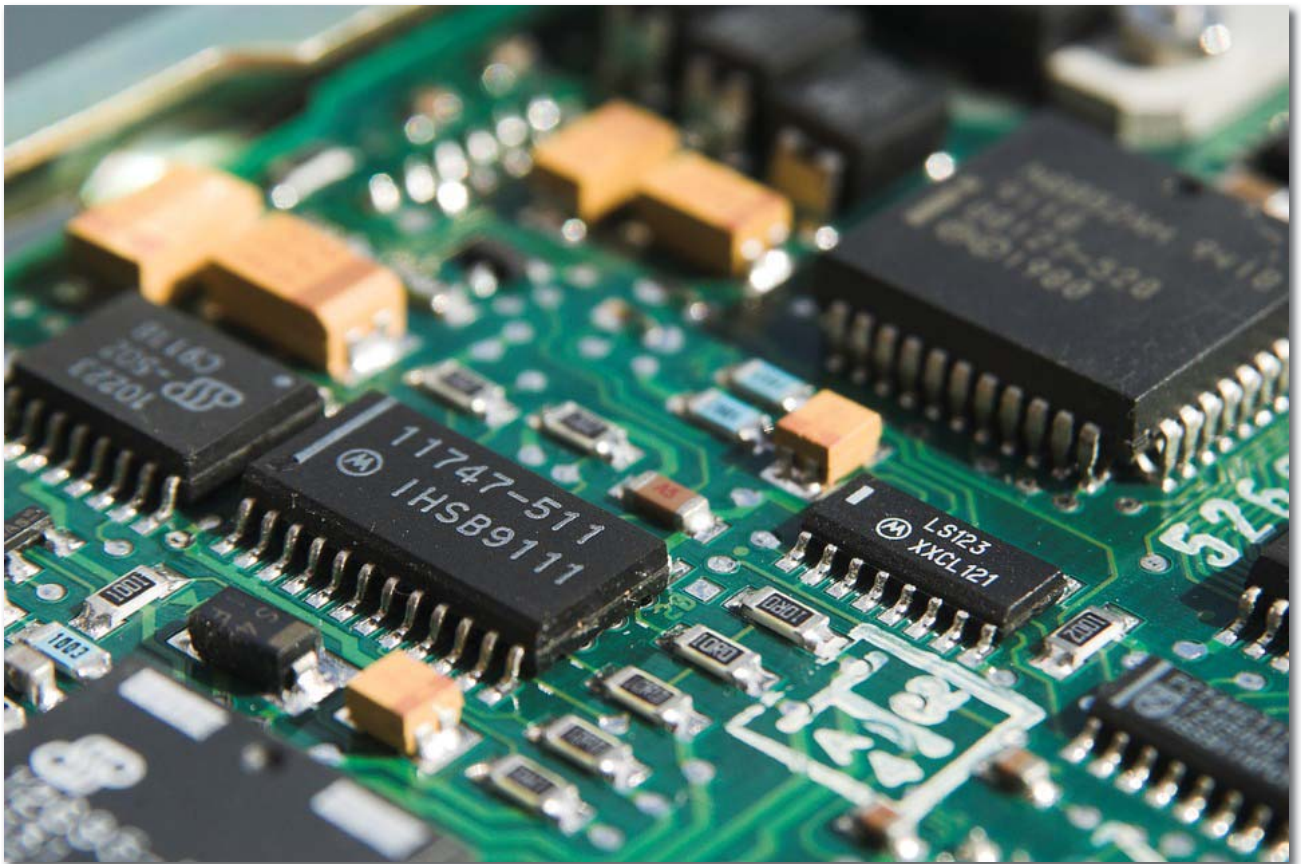
19. Use the information from the article to write instructions, in steps, about how to improve and upgrade the reliability of a home computer network. The instructions will be uploaded in the Tech-how-to website (100-140 words). There are some points below to help you:

Tech How-To Guides & Tutorials

- ✓ Use broadband routers
- ✓ Add Wireless Capability to Home Networks
- ✓ Improve the Performance of a Home Network
- ✓ Expand the Size of a Home Network
- ✓ Add More Features to a Home Network
- ✓ Increase Home Network Security
- ✓ Add any other features you consider necessary

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