



ITEC102 – INFORMATION TECHNOLOGIES

LECTURE 1 – COGNITIVE THINKING AND INFORMATION TECHNOLOGIES

EASTERN MEDITERRANEAN UNIVERSITY



SCHOOL OF COMPUTING AND TECHNOLOGY

The aim of the course

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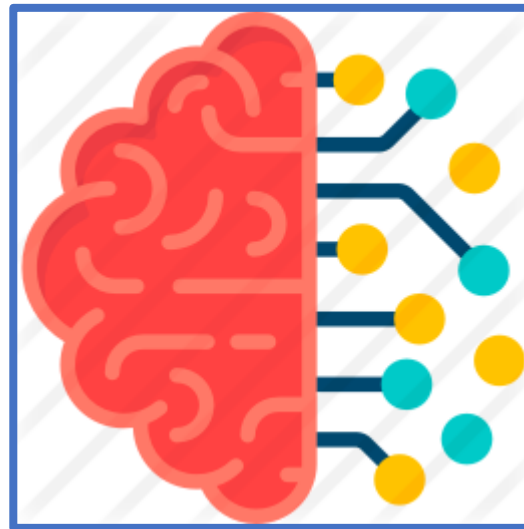
- Cognitive thinking skills,
- Use of tools in problem solving,
- Logical data analysis and organization,
- Efficient use of digital resources,
- Definition and importance of programming,
- Basic applications used in programming,
- Emerging technologies

To be informed the students about the topics.

*Bu ders notunda kaynak gösterilmemiş tüm görseller flaticon.com adresinden alınmıştır.

Cognitive Thinking

- **Cognitive Thinking** (computer thinking or computational thinking), It is defined as using the information technologies to solve the problem or to explain the classification of information through codes
- The aim of gaining computational thinking skills for the students in the process is to prepare them for the world of today and the future.





Cognitive Thinking

- Teachers are developing new learning techniques to enable new generations to keep up with the times they live
- Computational thinking is a learning method that aims to understand and solving the problems of the century we live, to understand critical thinking and human-computer interaction.



Cognitive Thinking

- When the computational thinking method is examined, it can be said that the first of the gains is to learn coding. **Interdisciplinary linkage** and the use of acquired coding knowledge in the ability to **generate algorithms** are the main objectives.
- Information processing skills will not only add to the competence in the field of information technology, but will also contribute to basic areas such as mathematics and science.

Cognitive Thinking Skills

- A student with computational thinking skills;
 - To be able to express the problem faced by using computer technologies,
 - To be able to analyze and organize data when necessary,
 - To be able to express data on simulations using models,
 - The use of algorithms should allow for faster response to similar problems.



Programming

- **Programming** is defined as arithmetic operations or scripts that regulate and manage the actions of computer hardware.
- A **programming language** is required to write a program.
- Programs are written and run on a **compiler** and binding system.



Programming

- **The compiler** is a platform that detects the language of the written program, examines the program, detects logical and typographical errors, reports errors to the user, and runs the program and displays the result
- Programming is also called **coding**.
- The program to be written is called the **source code**..



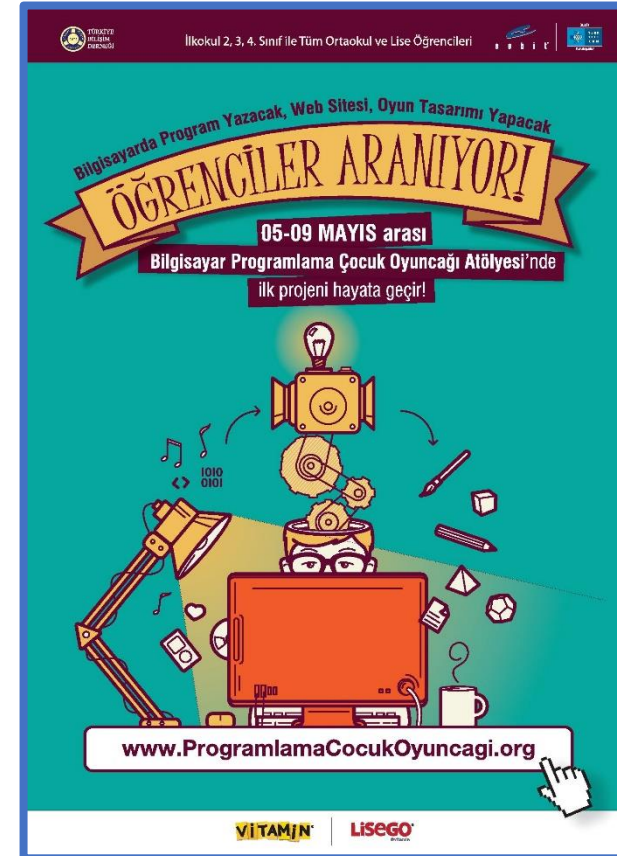


Programming

- In many countries, **different levels of programming** or alias coding are offered to **all age groups** from preschool to high school education.
- In many countries, programming courses are included in national education programs along with grammar, mathematics and history..

Programming

- Informatics Association of Turkey
"Programming Children's Toys" event has been held since 2014. All students at primary and high school level can participate in the event.
- In 2015, the UK started to provide basic programming training for primary school students.
- The CoderDojo Foundation that providing services in 57 different countries, organizes basic programming trainings with the support of Microsoft.



Programlama Çocuk Oyuncuğı etkinliđinin tanıtım posterini

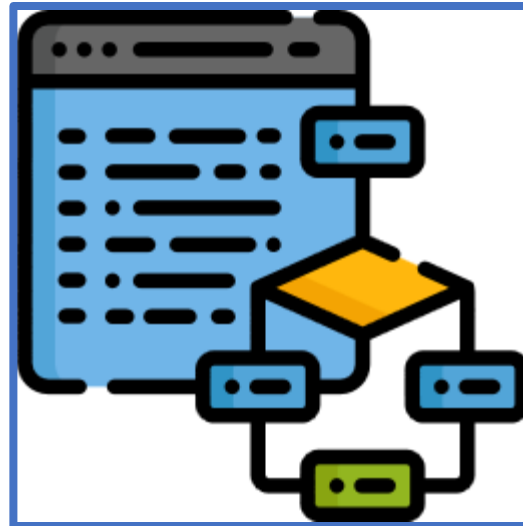
Programming

- The achievements in the 21st century;
 - Identify problems,
 - To be able to analyze determined problems,
 - To produce solutions for problems,
 - Critical thinking ability to look at events from different angles and to make meaning,
 - To follow the innovations in related fields,
 - To be able to see opportunities, to do research and to understand entrepreneurship
- It is listed as.



Programming

- **Students of the 21st century** should be able to read, understand and use computer algorithms and programs in problem analysis and solution.



Programming

- Students;
 - Improve reasoning and logical thinking skills.,
 - To develop problem solving skills.,
 - To explore and develop the capabilities of programming,
 - To be aware of information and technology need to use algorithms for programming and programming.



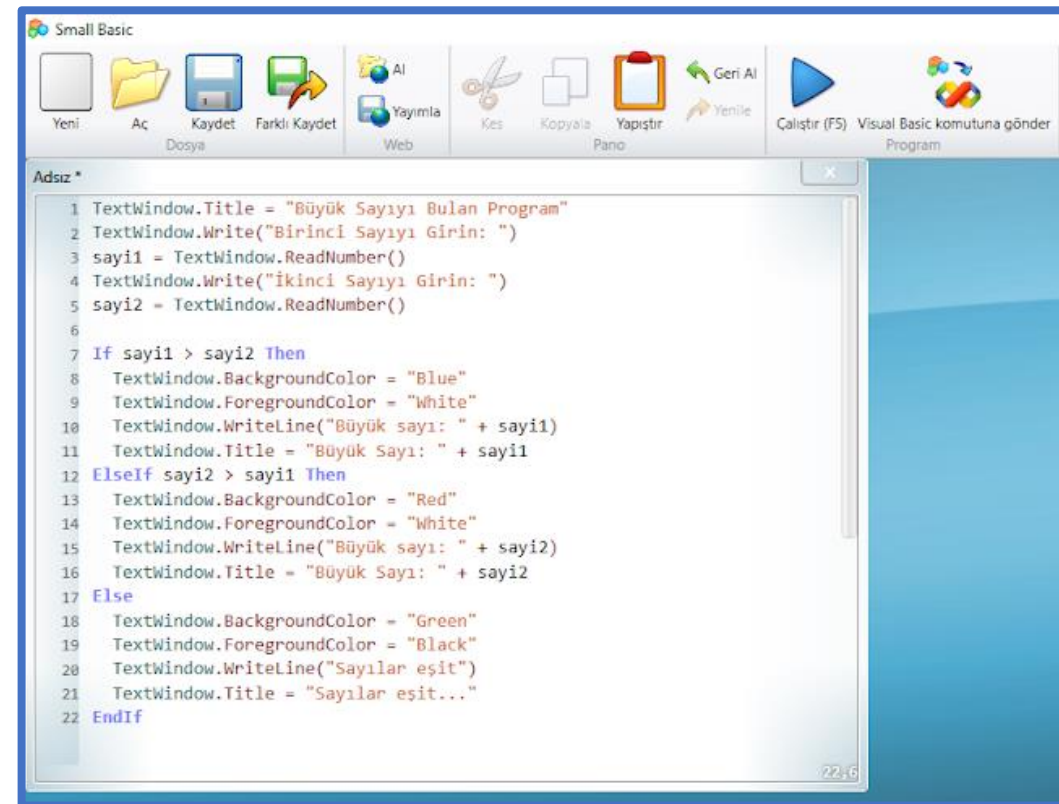


Programming

- Nowadays, programming education is given not only in the fields of engineering or information technology, but also in very basic areas such as mathematics.
- Designed programs express how machines behave and therefore students will be able to observe; more importantly, students who use algorithms develop problem-solving skills and learn to think systematically

Programming

- **Microsoft Small Basic** is an open source program developed by Microsoft.
- Small programs and projects can be designed using the Basic programming language.
- It is a very efficient platform to access programming, because the programs designed can be shared over the Internet and other programmers can be shared.
- The Microsoft Small Basic interface is also available in Turkish.

A screenshot of the Microsoft Small Basic programming environment. The window title is "Small Basic". The menu bar includes "Yeni", "Ac", "Kaydet", "Farklı Kaydet", "Yayımla", "Kes", "Kopyala", "Yapıştır", "Yenile", "Çalıştır (F5)", and "Visual Basic komutuna gönder". The main area shows a code editor with the following code:

```
1 TextWindow.Title = "Büyük Sayıyı Bulan Program"
2 TextWindow.Write("Birinci Sayıyı Girin: ")
3 sayi1 = TextWindow.ReadNumber()
4 TextWindow.Write("İkinci Sayıyı Girin: ")
5 sayi2 = TextWindow.ReadNumber()
6
7 If sayi1 > sayi2 Then
8   TextWindow.BackgroundColor = "Blue"
9   TextWindow.ForegroundColor = "White"
10  TextWindow.WriteLine("Büyük sayı: " + sayi1)
11  TextWindow.Title = "Büyük Sayı: " + sayi1
12 ElseIf sayi2 > sayi1 Then
13  TextWindow.BackgroundColor = "Red"
14  TextWindow.ForegroundColor = "White"
15  TextWindow.WriteLine("Büyük sayı: " + sayi2)
16  TextWindow.Title = "Büyük Sayı: " + sayi2
17 Else
18  TextWindow.BackgroundColor = "Green"
19  TextWindow.ForegroundColor = "Black"
20  TextWindow.WriteLine("Sayılar eşit")
21  TextWindow.Title = "Sayılar eşit..."
22 EndIf
```

Microsoft Small Basic program interface

Programming

- **Alice** is a 3-dimensional, object-oriented programming platform designed primarily for storytelling.
- Using Alice software, animations can be prepared, stories can be told and games can be designed.
- With its 3-dimensional and colorful interface, this program aims to make children love programming and is the meeting point of children's imagination and the digital world.



Alice 3.2 programının arayüzü

Use of Technology in Education

- Computer technology, which is used in almost all fields, is used extensively in the field of education.
- One of the most important aims of education is to educate individuals in line with the needs of society.
- Therefore; Nowadays, education systems are obliged to educate individuals who have the characteristics of the information society member according to the information age.



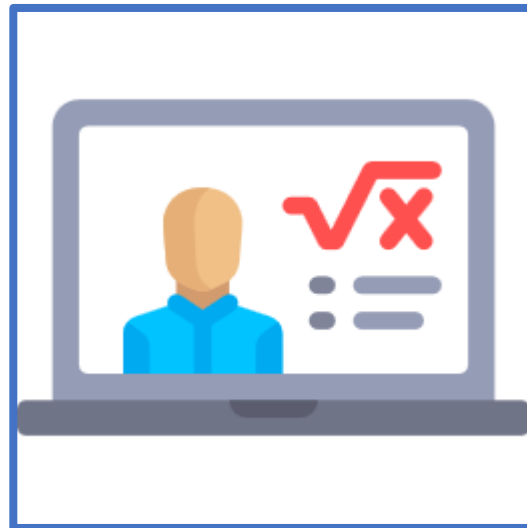


Use of Technology in Education

- In schools, lessons are taught in **computerized environments**.
- **Electronic books** and **electronic lecture notes** are used.
- In particular, universities have **wireless areas**.
- In this way, students can connect to these networks with their personal laptops or other smart devices.

Use of Technology in Education

- Another example of computer use in education is **distance education**.
- In the most basic terms, using communication technologies is to provide students with education **regardless of time and place**.
- This facility is particularly aimed at those who have limited educational opportunities in the places where they live and who are unable to devote time to their personal development



Personal Computers

- Small computers designed to be used by one person at the same time.
- Also known as **microcomputer**.
- They can be of different sizes and shapes.
- They are divided into two as **desktop** and **portable computers**.



Personal Computers

- **Personal Computers**
 - Designed to fit on the table.
 - They are not portable due to power requirements.



ASUS PRO D320MT Enterprise desktop



Dell XPS 27 all-in-one

Personal Computers

○ Portable Computers

- Designed to be easily transportable.
- They are fully functional computers.
- Laptops, tablet computers, netbooks, smartphones, etc.



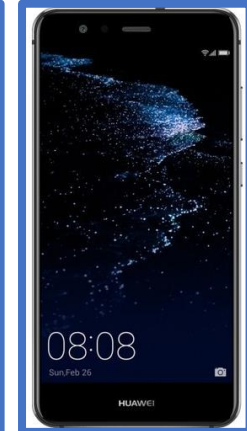
Casper Nirvana C600 laptop



Dell Inspiron Mini 10 netbook computer



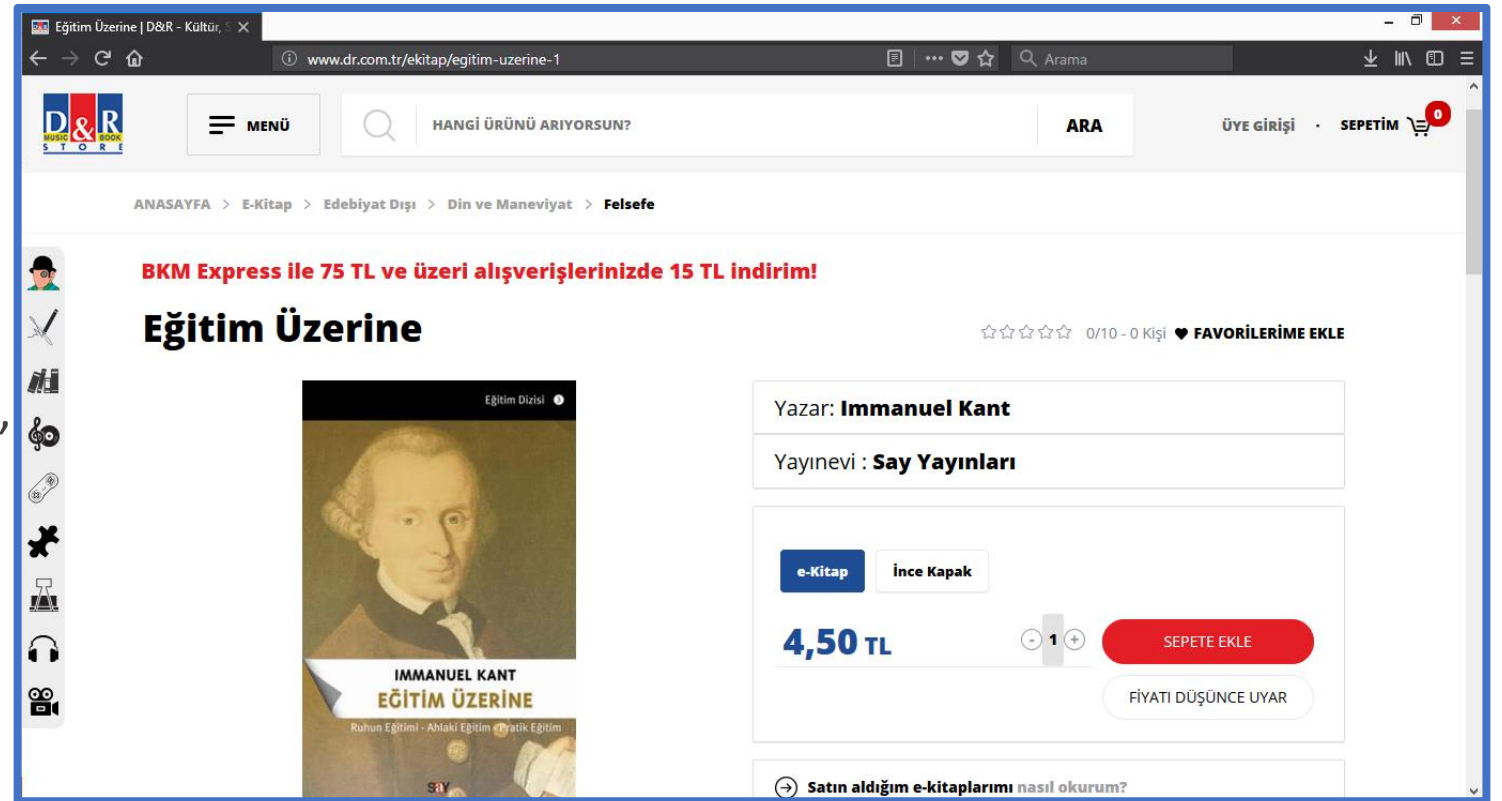
Samsung Galaxy Tab S3 tablet computer



Huawei P10 Lite Smart Phone

Electronic Book

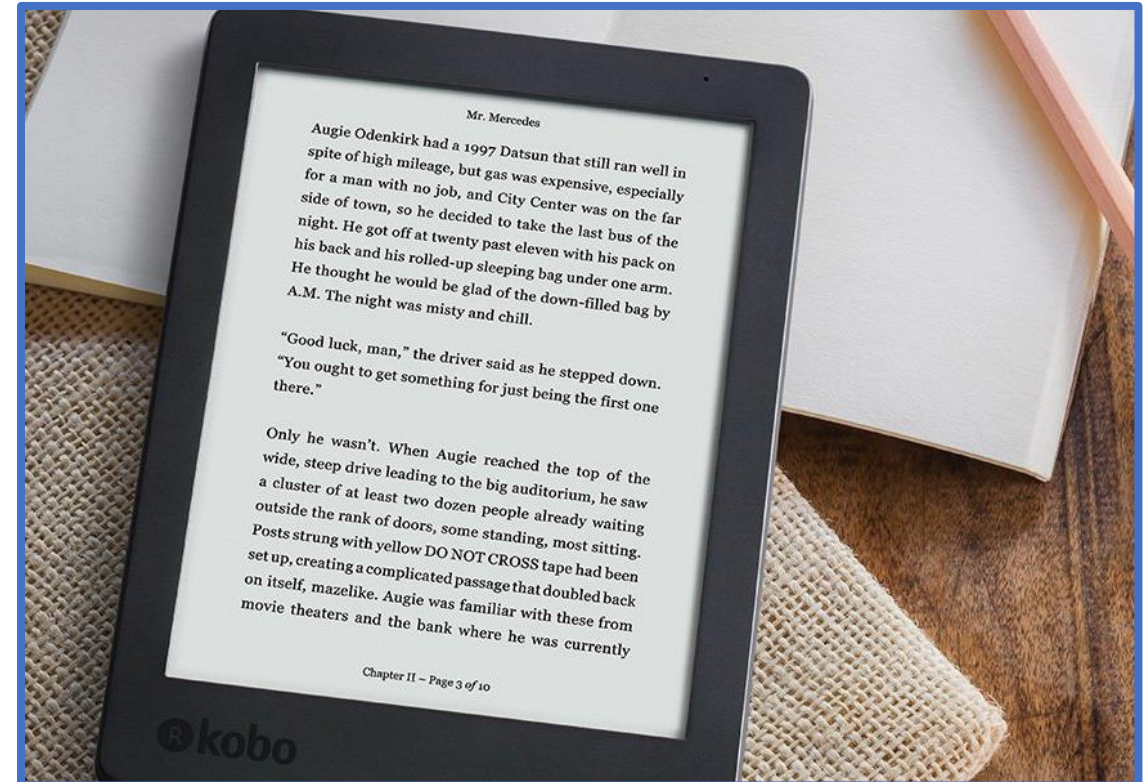
- An **electronic book** (e-book) is a document format designed to read books on a variety of computer equipment.
- Unlike a book printed on paper, electronic books may contain attachments such as **audio, video,** and **web address** extensions..
- Electronic books can be distributed within the legal way and can be sold for commercial purposes..



An e-book on the D & R Book House's internet sales site

Electronic Book

- Electronic ink (e-ink) is a display technology used in electronic book readers (e-book reader).
- The most important factor that highlights electronic ink technology is that light reflected in the reading of a text, unlike smartphones and tablet computers, does not tired the eyes.
- While monitors such as LCD and plasma are emitting light behind the screen, screens with electronic ink technology reflect the ambient light and offer a healthier reading.



Kobo Aura 2 electronic book reader

Projection

- **Projectors** are devices that provide the ability to share the computer screen image on surfaces such as curtains, walls or boards.
- Projectors with different size, feature and image quality are available and can work with some software designed for educational purposes.



EPSON EB-U05 Projection

Smart Projection

- **Smart projection devices**, such as other projection devices on the surface of the computer screen, as well as the user to the computer's many functions to manage the surface of the image provides the opportunity to reflect. A signal receiver is located parallel to the surface in order to detect surface touch action.
- Usually, the intelligent white projections that come with the **interactive whiteboard application** offer many features such as writing and visual design with a special pen or similar object.



EPSON BrightLink 695Wi Smart Projection

Smart Board

- **Smart board** is a technology product that can perform the functions of the connected computer via a touch board..
- The working principle of the smart board is to project the image on the computer screen onto the board with a projection hardware and to detect and process the touch operation using various mechanisms.
- Smart Board Models is listed as;
 - With pen,
 - With Resistive surface,
 - With capacitive surface,
 - Infrared,
 - With Camera

Smart Board

- **Pencil board models use ultrasonic sound waves.**
- In a corner of the smart board, there is a device in which the electronic pen device provides communication using sound waves..
- Generally, when the surface of the battery-driven electronic pen is applied to the surface, the device starts emitting sound waves..
- The device located in the corner of the board detects the sound waves emitted and monitors the position of the pen on the board and all subsequent movements.



EPSON V12H667010 interactive board pen

Smart Board

- **Resistive surface board models** are the most commonly used touch screen systems.
- In resistive systems, **pressure is applied to the board surface** and the intended action is performed with the response of the screen to the signal generated by the applied pressure.
- On the resistive surface board, there are two layers separated by a thin gap.
- The individual layers contact each other together with the applied pressure and the touch action is processed as a signal by the electricity generated at the contact points..
- In resistive board models, any object such as a pen, an electronic pen or a finger can be used for applying pressure to the surface.



SMART 660 interactive board with resistive surface.

Smart Board

- **Capacitive surfaced board models** consist of an **insulating layer such as glass**. There is a **transparent conductive material** in this layer.
- As the human body is conductive, when the conductive surface is touched, the electric current on the board surface flows towards the point of contact, ie the electrical field at the board surface changes.
- Horizontally and vertically, the position of the contact point is determined and sent to the computer.
- Although the technologies of the designed devices are changed, the working principle is similar in all.
- Capacitive screens are often used in small devices such as mobile phones and tablets, but their use in smart boards is not yet widespread. This is because of production costs increase as the size of the screen grows.



SMART 7000 capacitive screen interactive board.

Smart Board

- **The infrared board models** have electronic boards surrounding the edges of the board. These cards are called transmitters and have **LED lamps** at the end points of the transmitters
- There is a receiver led lamp opposite each led lamp that acts as a transmitter.
- When an object contacts the surface, the signals sent and received in the horizontal and vertical axes are interrupted and the position of the object is determined. This was the same as when you pressed a button on the remote to change the channel on your home television.
- Not all transmitters and receivers work simultaneously, but each transmitter and receiver works in sequence in very short time interval such as few mili seconds. Thus, the entire surface is continuously scanned.
- **Infrared boards** are known as the **fastest in smart board** models in terms of processing speed.



IdeaMax R5-1000 infrared interactive board

Smart Board

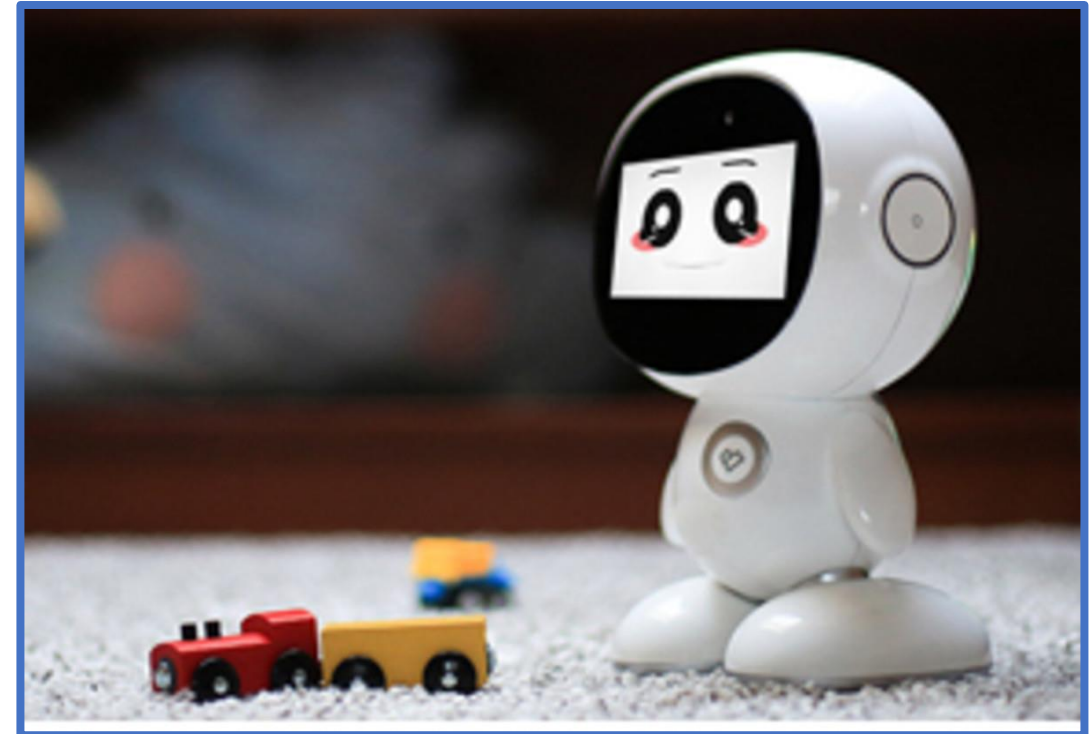
- **The camera models boards** have a special camera that connects to a smart board or projection.
- This camera is called a **document camera**.
- Because of the software supported by the system, educational materials can be processed and projected to students in the form of photographs, video and audio..



Smart 450 Document camera

Robot

- **Educational robots** are designed to support children's learning..
- Educational robots are generally supported by **artificial intelligence**. These type of robot is called personal robot assistant. These robots are used for the students whose lessons weak in their schools.
- Because different users will have different needs, different software downloads can be made to training robots.
- In addition, many educational robots are connected to the internet and parents can watch their children instantly because of the camera on it.



Honeybot training robot

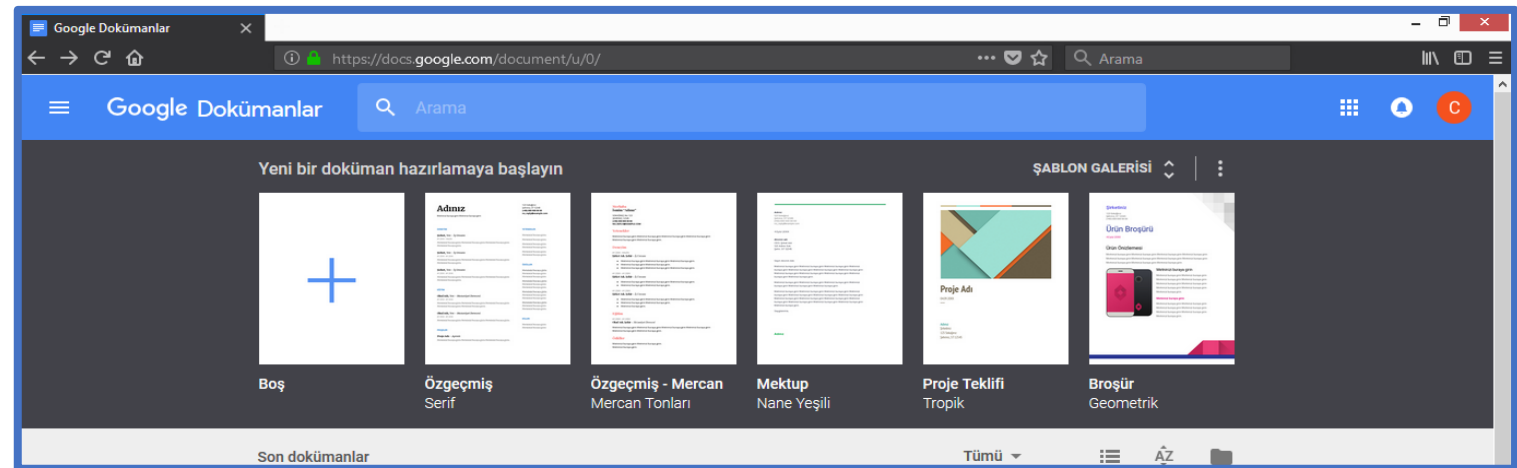
Cloud Computing

- The system of storing all your applications, programs and data on a virtual server is called **Cloud Computing**.
- Everywhere you have an internet connection, all of the services that you can easily access these information and data through your electronic devices are called **Cloud Computing** or **Cloud Technology**.
- Cloud computing, which allows you to work from anywhere without installation; software, hardware and data hosting services in a single structure on the Internet and employees can access the data at the same time facilitates the operation.



Cloud Computing

- Because of **this technological development**, which is think to be one of the most popular applications of the near future, operations will be done on **powerful internet connections** and **devices** that can be connected to the internet via the Cloud System **without the need for powerful computers**
- It should be noted that this will have its advantages and disadvantages; the biggest advantage is the fact that the devices we will use can be cheaper (we will not need to pay for strong hardware).



Document can be created and shared over the internet with Google Docs.