



Erasmus+

IT 101 Box

Head In The Clouds Consortium

<https://brainsintheclouds.eu>

English



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Verein Offenes Lernen



SZS Galakticka



25. April 2018



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You will notice that the QR codes used for the hand-in application are not present in these tasks. To use the tasks with the hand-in application the collaboration with the project team is necessary, so please contact us by mail.

Table of Content

Introduction to the IT101 Box	2
Working with Raspberry	2
Starting the Raspberry PI	3
Preparation:	3
Use the Raspberry:	3
User	5
Troubleshooting	5
Boot Problems	5
Network Problems	5
Restore Raspberry	5
Tasks Overview.....	6
Task 2a1 - Assemble the Raspberry Pi	6
Task 2a2 - Connecting Raspberry Pi.....	7
Task 2a3 - Connect to WiFi	8
Task 2a4 - Start and Stop Programs.....	8
Task 2b1 - Browsing the Internet.....	9
Task 2b2 - How to use Google.....	9
Task 2b3 - How to use Google maps	9
Task 2b4 - What else Google can do	9
Task 2b5 - Wikipedia.....	10
Task 2b6 – YouTube.....	10
Task 2b7 - Do’s and don’ts on the web	10
Task 2b8 - How to rate Information found on the web.....	10
Task 2c1 - Folders and Files	11
Task 2c2 - Write a Letter	11
Task 2c3 - Draw a picture	11
Task 2c4 - Calculator	12
Task 2d1 - Introduction to Scratch.....	13
Task 2d2 - Changing Costumes	14
Task 2d3 - Movement and Turning.....	15
Task 2d4 - Add Sprites.....	15
Task 2d5 - Create your own Story	15

Introduction to the IT101 Box

In the IT101 Box the Children will be using a Raspberry Pi and discover some Basic about using Office Software, Services of some Websites (google, Wikipedia). The concept is the same as with the other Boxes, a self-organized learning environment (sole). There are two different kinds of Raspberry used by us, the Raspberry 3 and the raspberry1b. As the older Raspberry1b doesn't has WIFI functionality included there are small WIFI-Dongles connected to these devices.

Working with Raspberry

The Raspberry Pi is an Credit Card sized Computer based on an ARM-Processor which is sold by the Raspberry Pi Foundation (www.raspberrypi.org). Up till now there were 3 Major Version released, from Raspberry 1(a,b),2 , to Raspberry 3 with a 2GHz 64-bit quad-core ARMv8 CPU, 1Gb or RAM, four USB-Slots, 1HDMI Port ,one Network Interface , WIFI (802.11n) and Bluetooth (4.1 low Energy) capability's.

There are many different Linux Distributions available for Raspberry Pi, but one of the easiest to use is the Raspbian (<https://www.raspbian.org/>) , a Debian Based Linux distribution especially designed for the Raspberry Pi.

The Raspbian has only been little changed for this Project. Some extra Software has been installed, besides some language files and Logos. This ensures that's easy replaceable in the case of a destroyed file system or some Hardware SD-Card damage.

Starting the Raspberry Pi

Preparation:

You need the following Items to use the Raspberry Pi:

The Raspberry Pi itself (not necessarily with an encasement), 1 HDMI cable, 1 Display (with HDMI-Port), 1 Keyboard, 1 Mouse, 1 Power Supply, 1 Micro-SD Card and optional 1 Network Cable (or 1 Wifi Dongle in the case you are using the Raspberry 1b) to connect the Raspberry to your Internet.

Use the Raspberry:

Just connect the HDMI Port to the Display

, the Mouse and Keyboard to the USB-Ports of the Raspberry.

Check that the Micro-SD-Card is inserted in the Raspberry Pi.

And as the last thing to do connect the power Supply to the Raspberry. It will turn itself on

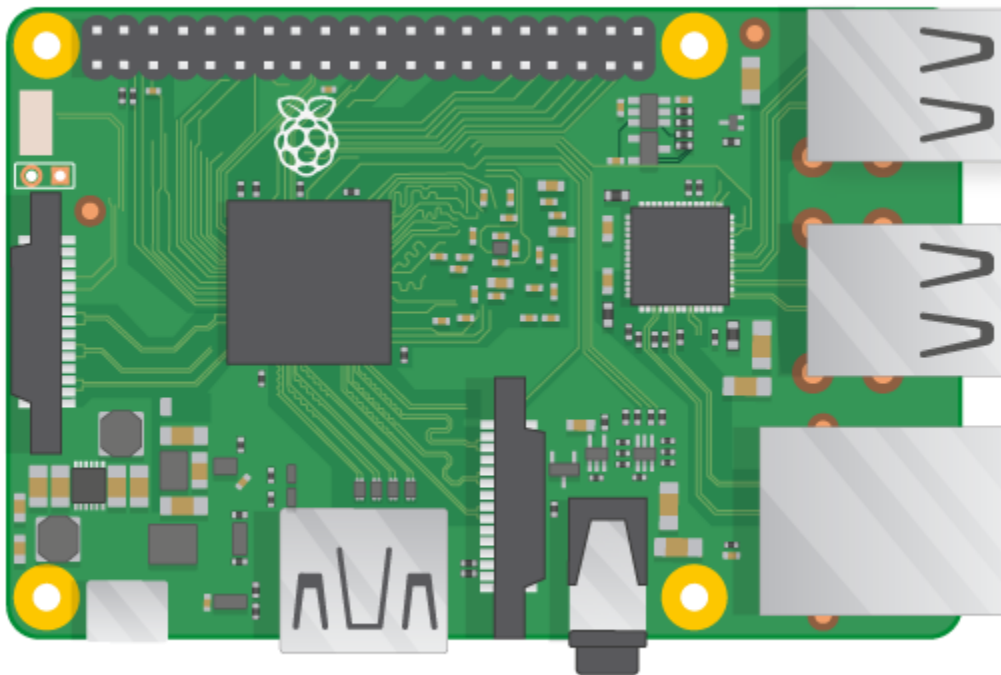


Figure 1: The Raspberry Pi

The Raspberry will be booting the Raspbian Image which is stored on the SD-Card. After a short time you will see the Desktop Screen of the Raspian.



Figure 2: Raspian Desktop

In the Screenshot you see the default Desktop Image of our Raspbian. In the top left corner you can find the Menu Button (with a big red Raspberry) where you can select the different programs which are already installed.

In the top right corner are the network icon, the sound icon, a little Icon to show the system load and a button to eject USB-drives and other external drives (if they have been connected to the Raspberry).

To start a program just left click on its icon. To close a program click on the X-Button, it is in the top right corner. There are a lot of programs installed already, but of course it's possible to install additional Software. To see how you do that look at the troubleshoot section of this document

User

The Raspbian can be used with more than one user-account, but for the purpose of the IT101 Box it's best to leave it as it's already configured. After some short boot time it will auto-login as the user pi (which has the password raspberry) and show the Desktop screen. Essentially all the task will be done as the same Raspbian user.

Troubleshooting

As always with complex systems there can be unexpected troubles. Usually the Raspbian and the Raspberry Pi itself are quite good build and robust so they usually work fine in not so good working conditions. But please keep in mind that the Raspberry isn't designed to be operated outside, or in to humid or hot environment.

If one of the Raspberry Pi's isn't working correctly you can always swap the micro-SD-Cards. Each of these cards stores an identical image. Try to swap the not working card with a card from one of the working Raspberry Pies. If the device works now it's most likely a defective card. Please don't throw it away but store it, there's a warranty on those SD-cards.

Boot Problems

If you experience a boot problem in one of the Raspberry Pies please send me a screenshot of the boot screen, or a short video so that I can look into what's happening. Try to disconnect and connect the power supply and see if something changes. Also try to remove and reinsert the SD-Card. Maybe the connection got lose, and that's why there are some problems.

Network Problems

If there are some problems with the network connection its best to send me some Information about your Network infrastructure (how was the raspberry connected to the Network (WiFi or cable). Is it working with the other Raspberries or not? Are there any other WiFi-Clients? What was the SSID (Name) of the WiFi. Where there any Error Messages?) That will help me immensely to trace the Error back to its root cause.

Restore Raspberry

If something destroyed the filesystem, or the micro SD-Cards needs a replacement but you already have another one onside it's easy to create a new working micro SD-Card Image. I can send you the instructions to it, or help you doing it but I need some Information first. What Operating System are

you using? (Where you want to create a new micro SD-Card image) and how much storage is available on the SD-Card.

Please keep in mind that creating a Raspberry micro SD-Card will delete all Data which is already stored on it.

Tasks Overview

Task 2a1 - Assemble the Raspberry Pi

This Task is about the Raspberry Pi itself. The children should learn that there are a lot of different ports, cables and Connectors available, and each of them is designed for some specific tasks.

Just let them discover by themselves which Ports and Devices fit together.

For Example:

HDMI Port: is to connect a device which generates videos to a display.

USB Port: a default connection port used to connect a variety of devices like input- (keyboard, mouse) or storage-devices (USB-stick, USB-drives) or even network-devices (Wifi-Dongle, Bluetooth,)

Micro-USB Port: Often found in smartphones uses to connect them to the power supply (as it does with the raspberry)

Task 2a2 - Connecting Raspberry Pi

In this little Task the children should try to connect the different Ports to the corresponding devices.

One correct solution is:

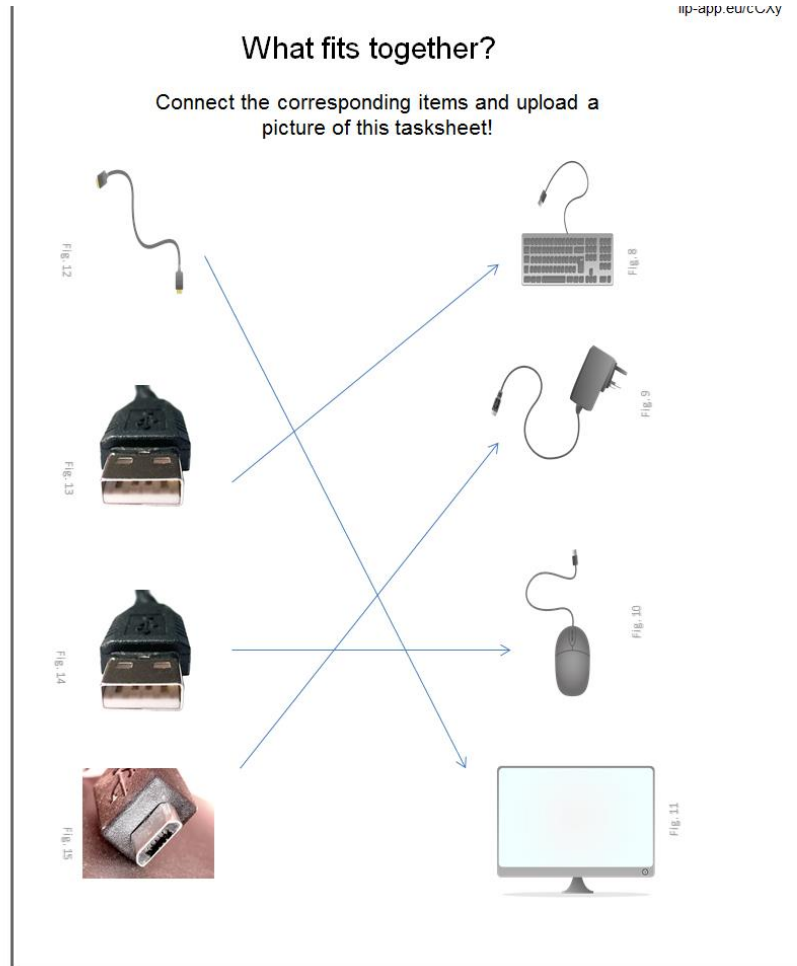



Figure 3 Solution

Task 2a3 - Connect to WiFi

This task is very important as a working WiFi connection is needed for a lot of the follow up tasks.

To connect to the WIFI the children just need to left click on the Network icon  in the top right corner, select the right WiFi by Name and enter the Password (if there is one). If there is no WiFi-password the Raspberry Pi will connect to the select WiFi after the children select the right Wifi-Name.

The teacher has to provide the correct WiFi Name and the corresponding password to the children.

Alternatively, the Raspberry Pi can also be connected through a normal Network (Ethernet) Cable. Just insert one End on the Raspberry's side and the other one in the free Port of your router or switch. The Raspberry Pi will usually configure by itself and after a short wait it's connected to the Internet.

It's possible to change the language and default country of the Raspbian. To do so you have to start the "Raspberry Pi Configuration" program, and select the language and country you want. Afterwards a restart is required.

Try to discuss with the kids what they know already about the Internet and how they think it can be used to help them (learning, searching for specific knowledge, connecting with others,)

Task 2a4 - Start and Stop Programs

This task sheet is about the different kind of programs which come already installed on the Raspbian. The children should be learning about the concept of programs. Each program is designed to help with a specific task. For example there is installed the LibreOffice Writer program, which is another word processor like Microsoft Offices Word. Another example would be the paint program which is also already installed. Let them figure out why all these applications are categorized.

Task 2b1 - Browsing the Internet

Here the children should come into contact with the basics about the World Wide Web. What a web browser and a link are. If the children themselves don't know any websites you can provide them with some examples, but give them some time, maybe they have already heard of some and want to find out how they look, or what they are for.

Task 2b2 - How to use Google

This task is about the search engine google. They should be using google to search and find information about a variety of topics. The task sheet questions are about their home town, the European Union, about Google and the internet itself

Task 2b3 - How to use Google maps

Another good example a service provided by Google is Google Maps. Here they can find a lot of information about their immediate geographical environment but they also can see how big (or small) the world is in reality. The task sheet questions them about their daily walking distances, and lets them compare them with other, much bigger distances (like their home town to the capital city and the distances between the European cities.

Task 2b4 - What else Google can do

On this task sheet the children can learn some of the other features the search engine of google offers. If they need some help learning on how to proper pronounce a number in English they can use it, or for learning word definitions. They should see that not all is about learning, some of them are just about fun (or history, as when you type Atari breakout inside of google.com/images a game of breakout starts. It's an old game first released on Atari computers in the mid-70s). Of course this is only a small example of the hidden features google offers, but the children should see that there are a lot of services available that are not directly advertised, you have to search for them. Not only Google does offer some more or less unknown features, but also programs like MS Word, other Google sides, WhatsApp, Facebook.

Task 2b5 - Wikipedia

Here the children should learn about the website Wikipedia.org. It's an online encyclopedia which is still expanding every day in a multitude of different languages. To let them familiarize with the website some example questions are on the task sheet. Some of them are easier than others. Maybe encourage the children themselves to think of things they want to know about and search in Wikipedia for them. Please keep in mind that most of the localized versions of Wikipedia are smaller than the English speaking one.

Task 2b6 – YouTube

Here the children should learn that there are a lot of tutorials in video form available on YouTube. They should familiarize themselves with the term how-to and use the provided information. As Example use this task sheet lets them search for “how-to s” about building paper planes. So please provide them with some A4 paper to build some planes.

Task 2b7 - Do's and don'ts on the web

This task is about some elementary rules about using the internet or any other kind of online services. Let them discuss about this. Why are these rules important? Do they already know them, or some other rules? Let them compare these rules to real live situations. Are these do's and don'ts also apply outside the Internet? Discuss these topics with your children afterwards.

Task 2b8 - How to rate Information found on the web

The children should be learning about the importance of rating the information which is provided by the Internet. As everybody can create a website or blog, not all provided Information on the internet is true. Let them discuss how they know whether articles in magazines and newspapers are providing valid Information.

Then let them see what they can find out about the creators of some websites, who's responsible for the provided information, how other users rate this information (on third party websites, or in the discussion section or blog of the website.

The children should be able to use the services provided by google and Wikipedia to find these things out and rate the website.

Task 2c1 - Folders and Files

This task sheet is about the concept of folders and files, and how this more abstract idea can be transformed in the real world simply by applying the same to wardrobe drawers. Each drawer represents a special type of content stored in it. For example a drawer for cloths, another one for manuals or one for knives. They should learn to organize files into different folder, for example save pictures drawn by them in the already pictures folder.

The Raspbian has a program to manipulate the folders and files already installed, it's called nautilus or just simply files. After they open this program they are provided with a view similar to Microsoft File Explorer. They can create Folders and files by right clicking on the folder of their choosing or the white space inside the folders to open a little menu where they can choose what they want to do. Create a new file (a document, or only a text file,..) or if they want to create a new folder.

Please keep in mind that the Raspbian lets users only store files and create new folder (or delete already existing folders) inside their home folder (*/home/pi/*). Of course here the user can create whatever they want.

Task 2c2 - Write a Letter

Here the children are introduced to the LibreOffice's writer program, a word processor which is free and compatible to Microsoft Office. Let them discover some of the provided features by writing a simple letter, or any other document. Encourage them to use the save command to let them store their created work.

On the task sheet the children are encouraged to use some of the usual provided features of word processors, like character- size, -color, font, bold, italic and underline functions.

Task 2c3 - Draw a picture

Here the children should see that computers provide help to a lot of different Task, like drawing a picture. Remind them to save their work. If they have accidently deleted or created something that they don't want any more, the program provides "do" and "undo" functions.

Task 2c4 - Calculator

This task sheet is about using the provided calculator software to solve some math problems.
Encourage them to create new work sheets and upload them afterwards

Task 2d1 - Introduction to Scratch

This task is about the introduction to Scratch, which is an easy to use, graphical programming language where you can easily create programs and short animations.

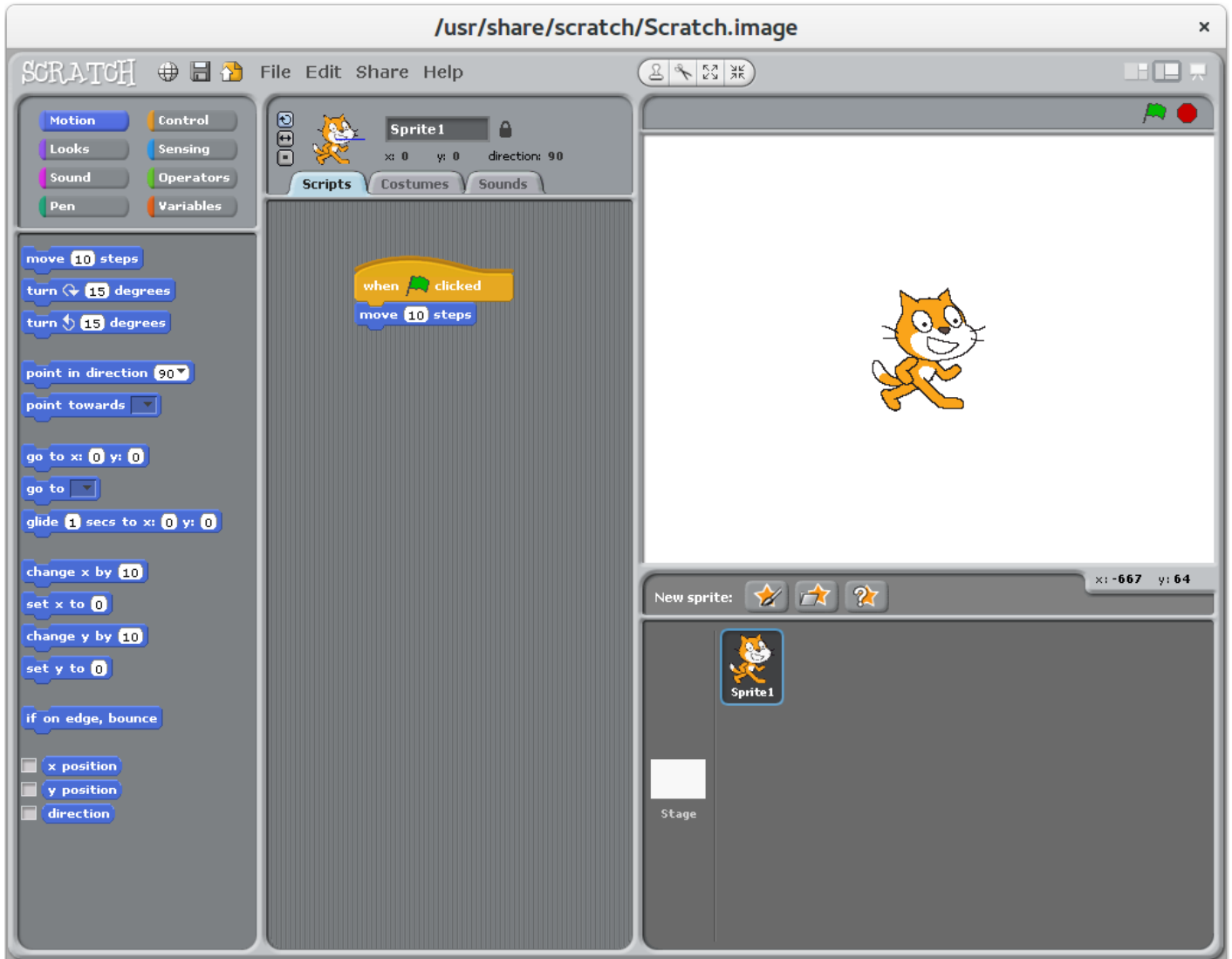


Figure 4 Scratch Screenshot

The main window of Scratch is separated into three main areas. On the left side are the provided script parts the user can choose from. In the middle area the user can combine these parts (by dragging them from the left side in the middle area and dropping them there). On the right side the user has to choose the sprite he wants to manipulate with the code (or double left click on the background if you want some code to manipulate it). To start the program click on the green flag in the top right corner.

To write a program the user has to select a sprite on the right side and double click on it.

Start the script with the “when the green Flag clicked” script part. Now he can create a little script for this sprite by dragging the script parts in the middle area. Each of the parts snaps together before and after it, with the exception of the first and last part of a script.

In this example the orange Scratch cat goes 10 steps to the right when you left click the green flag. Afterwards the program stops its execution and has to be started again. The moving direction is visible by the little blue line of the sprite, visible in the top, middle area of the programs window.

Scratch is translated to many different languages, you can choose another language by clicking on the little world icon in the top left corner of the program. All the script parts change their language too, so this can be an easy way to learn some basic words in English or any other of the provided languages.

Scratch has been created by the MIT (<https://scratch.mit.edu/>), and is used in many code-learning programs. There are also a lot of example scratch programs available on the website so check it out.

The next four Tasks are all about different aspects of Scratch. The last task is the combination of those before it, so that the kids create stories themselves.

Task 2d2 - Changing Costumes

This task sheet is about the ability to create and manipulate different costumes (or backgrounds, if you haven't select a sprite) in scratch. Each of the Sprites can have a multitude of costumes, which the user can easily switch with a script part. To modify a costume the user has to select the sprite by double clicking on it in the right window (usually after the program start the first sprite is already selected) and then go to the costumes tab, which is in the middle area of the scratch window.

There you can choose between the different costumes, or create new ones and edit them. Of course you can always name them yourself, scratch defaults to just calling them costumes and a number.

Task 2d3 - Movement and Turning

This task is about the movement and turning setting of a sprite and introducing the children to a wider selection of the script parts. Each one of the three provided scratch programs has a different setting of how the sprite can turn. In the first program the sprite can rotate 360 degrees freely. In the second program the sprite is limited to turn left or right, but it can't rotate. The third program changes one of the numbers of steps and limits the sprite completely from turning. To select one of these settings the user has to left click on one of the three buttons, which are in the middle window, over the Script Drawer.

Task 2d4 - Add Sprites



Figure 5 Scratch Buttons

This task is about adding sprites to the scratch program. The first button lets the user draw a sprite themselves. The second button loads an already saved sprite from the sprites that are being shipped with scratch. The third button loads a random sprite of all the saved ones. The sprites are usually stored in the folder `/usr/share/scratch/Media/` where they are grouped by different categories.

Encourage the children to create their own sprites or backgrounds in scratch.

Task 2d5 - Create your own Story

This last task is about the combination of all those scratch features learned and shown till now. The children should use their already created sprites, or create new ones to make a little short movie (it can be interactive or not, however they like to do it). Keep in mind that the children may be forgetting to save their work, so please remind them to save it.



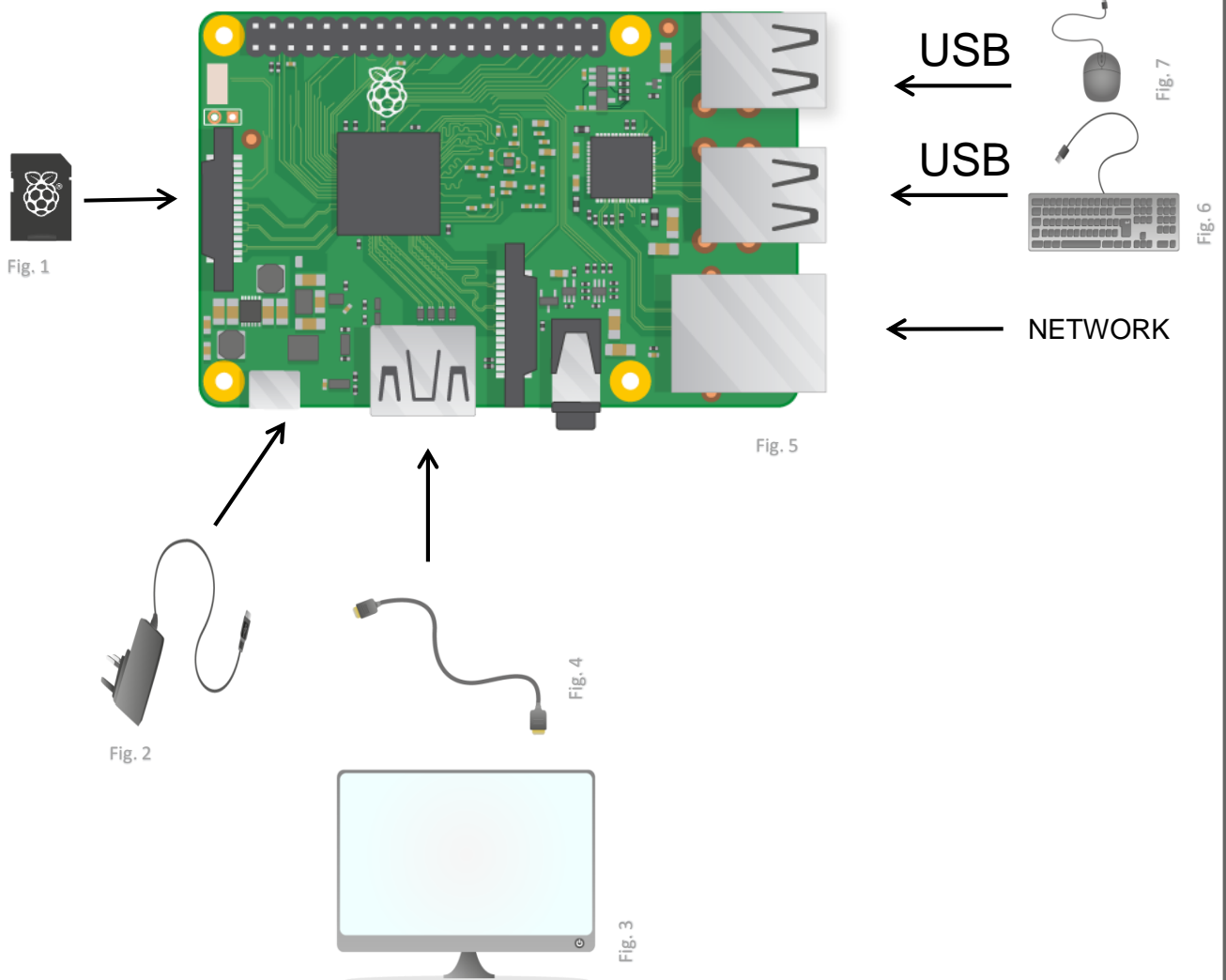
Box:
IT101

Topic: The RaspberryPi

2a1

Assemble the RaspberryPi

The RaspberryPi is a very small Computer



Make a video of your group assembling the RaspberryPi and upload it!



Box:
IT101

Topic: The RaspberryPi

2a2

Connecting RaspberryPi

What fits together?

Connect the corresponding items and upload a picture of this tasksheet!

Fig. 12



Fig. 13



Fig. 14



Fig. 15



Fig. 8

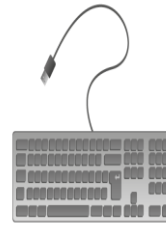


Fig. 9



Fig. 10



Fig. 11





Box:
IT101

Topic: The RaspberryPi

2a3

Connect to WiFi

1) Connect to WiFi:




Search on your screen for  and  Fig. 17

Fig. 16

Select the WiFi you want by  Fig. 18

TEST IT: Try to find  and  Fig. 20

Fig. 19

2) Change the Language and Country:



Try to find:  **Raspberry Pi Configuration** +  Fig. 22

Fig. 21

3) Restart the Raspberry: + Fig. 24

Fig. 23

4) Discussion:

Do you know what a Network is? Discuss it with your friends!

Have you already used the Internet?

Write down a list of things where the Internet can help you.

What do your friends think?



Box:
IT101

Topic: The RaspberryPi

2a4

Start and Stop Programms

1) Start a program:

- opening the Menu (top left), then
- click on the programm's picture (icon)

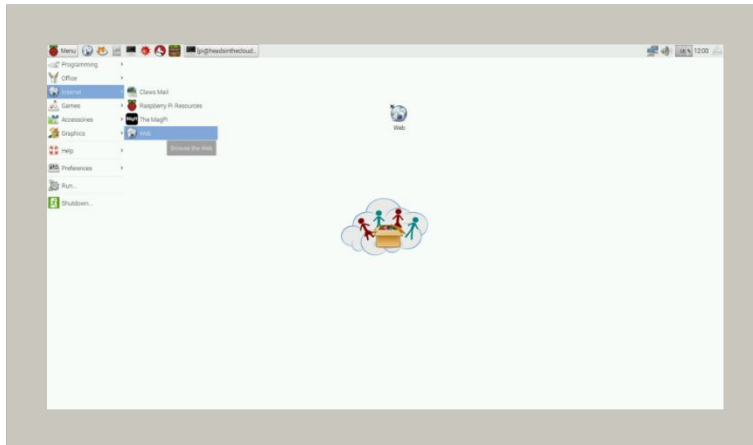


Fig. 25

For example:  Fig. 26 and  Fig. 27
starts an Internet **Browser**


2) Stop a programm:  on the X in the right top corner

Fig. 28

3) What programm's do you find on your raspberry?

What can they do?

Are they in categories?



Box:
IT101

Topic: The Web

2b1

Browsing the Internet

1) Start the webbrowser:



Fig. 29

and



Fig. 30

... and enter a website in the addressbar, like:


en.wikipedia.org/wiki/Main_Page



Fig. 31

2) What is a link?

A link (<https://youtu.be/Nld52xYpW8Q>), is a reference to something: a website, a picture, a video, a programm, a folder, ...


Usually you can click on links with  and it opens in another window.

Fig. 32

3) So many websites ...

Do you know some websites?

Make a list of the websites you know.

Let us know about the best websites you know!

What happens if you enter the link from this tasksheet (lip-app.eu/e7A5) in the addressbar?



Box: IT101	Topic: The Web
2b2	How to use Google

1) Start Google:



Fig. 33

+



Fig. 34

+

www.google.com in the addressbar

+ „Enter“


- Google is a search engine.
- It helps to find information in the internet.
- Enter a search criteria, then press “Enter”.
- Search results are ranked from the first (best) to the last (worst) match.
- To open the website just click on it 

Fig. 35

2) Use Google for your research:

- Search for your town’s name in Google.
- What websites did you find?
- Search for “European Union”.
- What did Google show you?
- Search for “Google”.
- What did you get now?

Try to answer some questions with the help of Google:

- What is the European Union?
- Who created Google?
- How old is the internet (WorldWideWeb)?
- How old is your home town?



Box:
IT101

Topic: The Web

2b3

How to use Google maps

1) Start Google maps:  Fig. 36 +  Fig. 37 +

maps.google.com in the addressbar + „Enter“

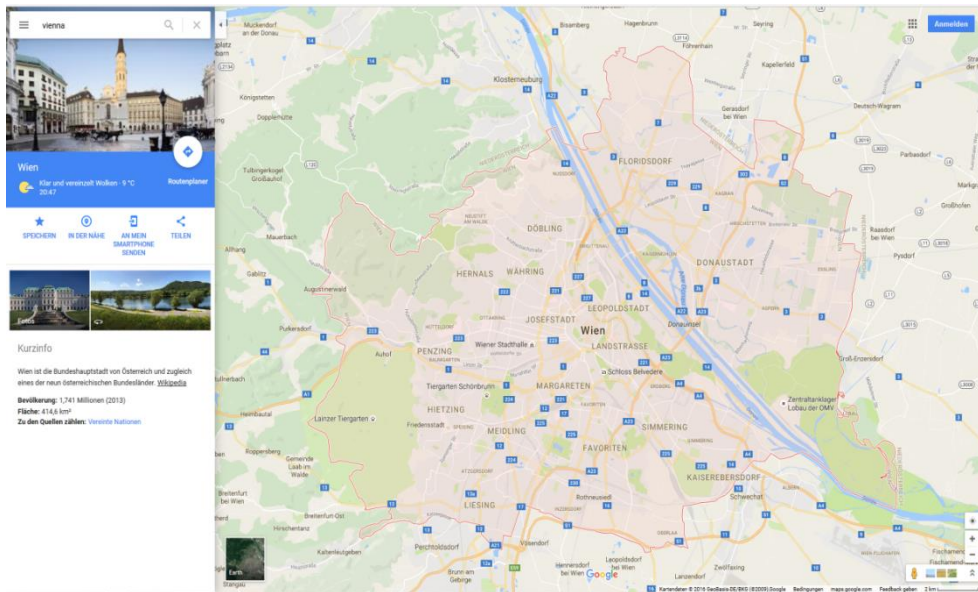


Fig. 38 Screenshot of Google Maps © GOOGLE

2) Working with Google maps:

- Search your home city.
- Switch to Earth view (earth icon, bottom left of the screen).
- Try to find your home and school.
- When you right click on any point of the map you can select the distance measuring tool.
- Try to find out what distances you walk daily!
- Measure distances between your home town and the capital of your country.
- Measure the distance between your city and some other capitals like Athen, Paris, Rome and Vienna.
- Which European capital is closest to your home town and which is furthest away?



Box:
IT101

Topic: The Web

2b4

What else can Google do ?

Google can do more than just search the internet!
Go to www.google.com and try it out:

1) Translate numbers to English

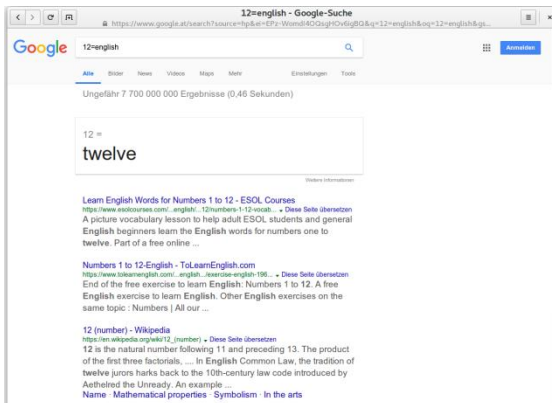


Fig. 39 Screenshot of Google Search © GOOGLE

Enter into google: *12=english*

What happens?

Try it out now with: *782=english*

How do you say 782 in English?

2) Define Words

Google can help you to understand words!

Type: *define learning*

What happens?

What is the definition of Computer”, ”Internet”, “Network“?

3) Exploration:

- Go to www.google.com/images
- type „atari breakout“ in the search bar
- press Enter

What happens?



Box:
IT101

Topic: The Web

2b5

Wikipedia

Open the Web Browser and enter <https://www.wikipedia.org>

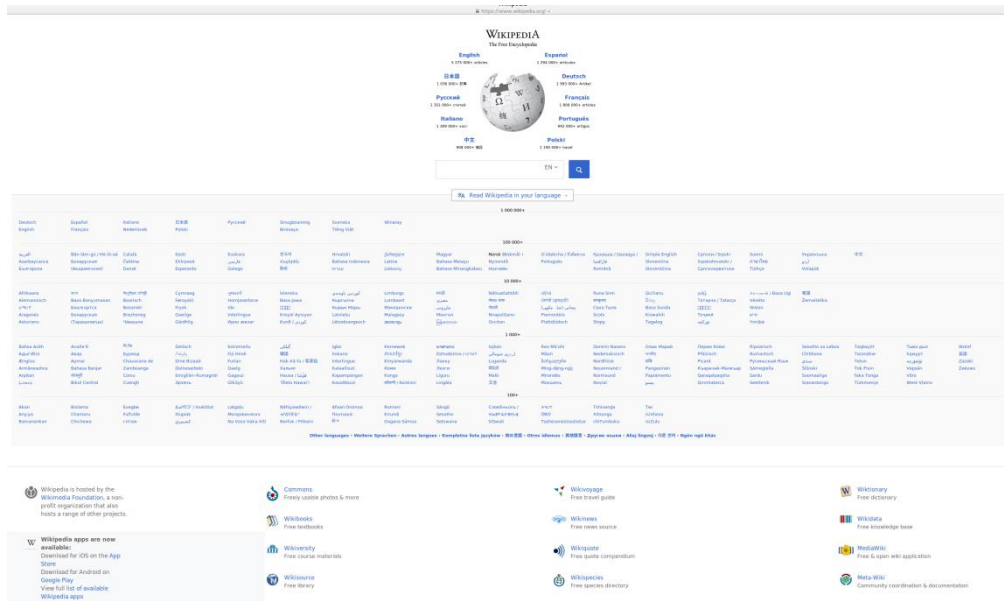


Fig. 40

Wikipedia is a free encyclopedia, which is written by many different people all over the world in a variety of languages

Search for the following Words in Wikipedia:

1. encyclopedia
2. Raspberry Pi
3. Minecraft
4. Scratch



Box: IT101	Topic: The Web
2b6	Youtube

1) To Start youtube: Open the Web Browser and enter: www.youtube.com

2) youtube is a big online-school !

- On youtube, you can find many videos that show how to do something
- For Example: watch the video “How to make a paper airplane” (<https://youtu.be/AljTDb2cyhc>)
- Can you now make a paper airplane? Make a video of your paper airplane and upload it!
- Search for other “How to’s” about paper airplanes! What else can you learn?



Box:
IT101

Topic: The Web

2b7

Do's and don'ts on the web

Rules for using the internet

- **Protect your Identity** - don't tell anyone your real name, home address and phone number !
- **Never post anything you could be ashamed of later** - the internet doesn't forget things !
- **Remember that everything that you read online may wrong** - anybody can write anything on the Internet
- **Always be courteous online** – as well as offline; the same rules apply to both.

Discuss these rules.

Do you have any experiences with applying or not-applying those rules ?

Is there anything we should add to the list?



Box:
IT101

Topic: The Web

2b8

How to rate Information found on the web

1) How do we know, if something is true?

- How do you know, if a website tells the truth?
- How do you know if articles in newspapers or magazines tell the truth?
- Discuss these question with your colleagues!

2) You can use these criteria to rate a website:

- Who is responsible for the website (legal Info, about us, impressum)?
- Who created the content of this site?
- How up-to-date is the website?
- How do other users rate the website?
- Does it tell, where its information comes from?

3) Find out who created ...

www.google.com

www.wikipedia.org

theguardian.com



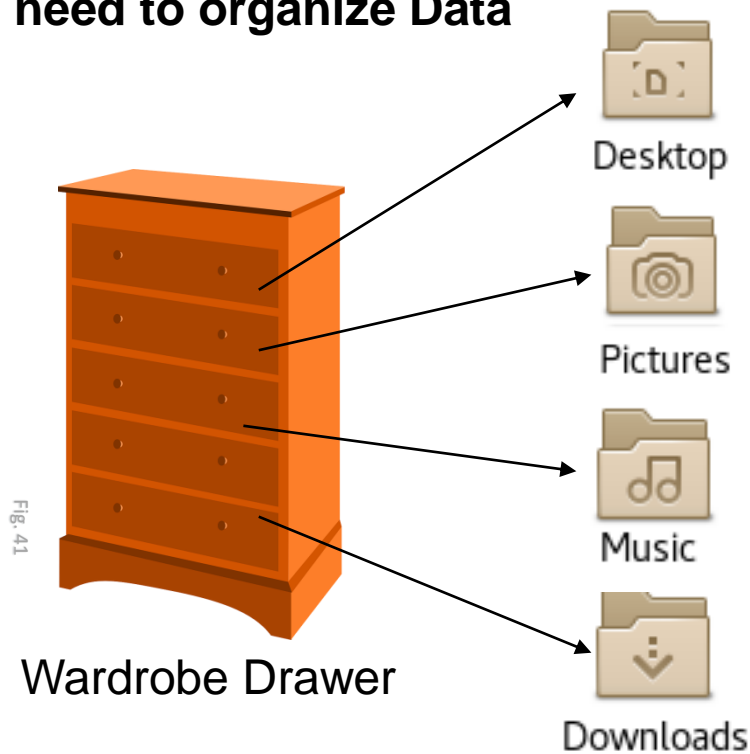
Box:
IT101

Topic: Office

2c1

Folders and Files

Computers need to organize Data



Folders and Files Fig. 43

Data is stored in files. Files are stored in folders. Folders have names, that tell which files are stored, e.g. „music“ or „pictures“.


On the Raspberry Pi the home folder is:  /home/pi

Fig. 44

Find out what folders and files are inside the home folder.

Can you make a new folder for your files?



Box: IT101	Topic: Office
2c2	Write a Letter

1) LibreOffice Writer – a great program for writing documents

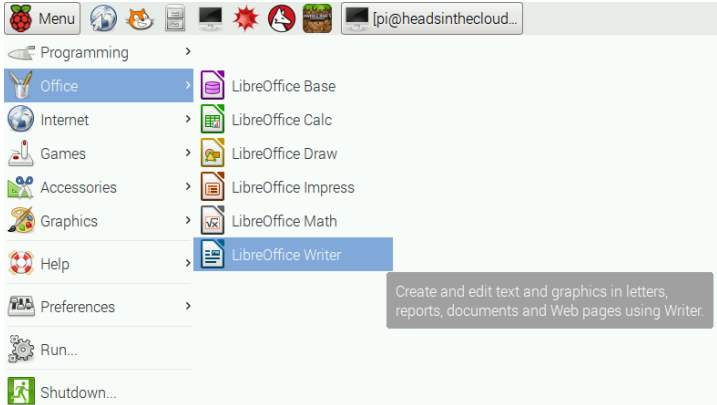


Fig. 45

2) What do these symbols mean?



Fig. 46

Type a few letters..
Press any of the above symbols
What's did that symbol do?

3) Write a document!

It can be about whatever you want. Just don't forget to save it after you are finished.

To save a document you can press the **File** icon and enter a name, or you can try to save it by pressing



Fig. 47

Send us what you have written!



Box: IT101	Topic: Office
2c3	Draw a picture

1) GNU Paint – a great program for painting:



Fig. 48

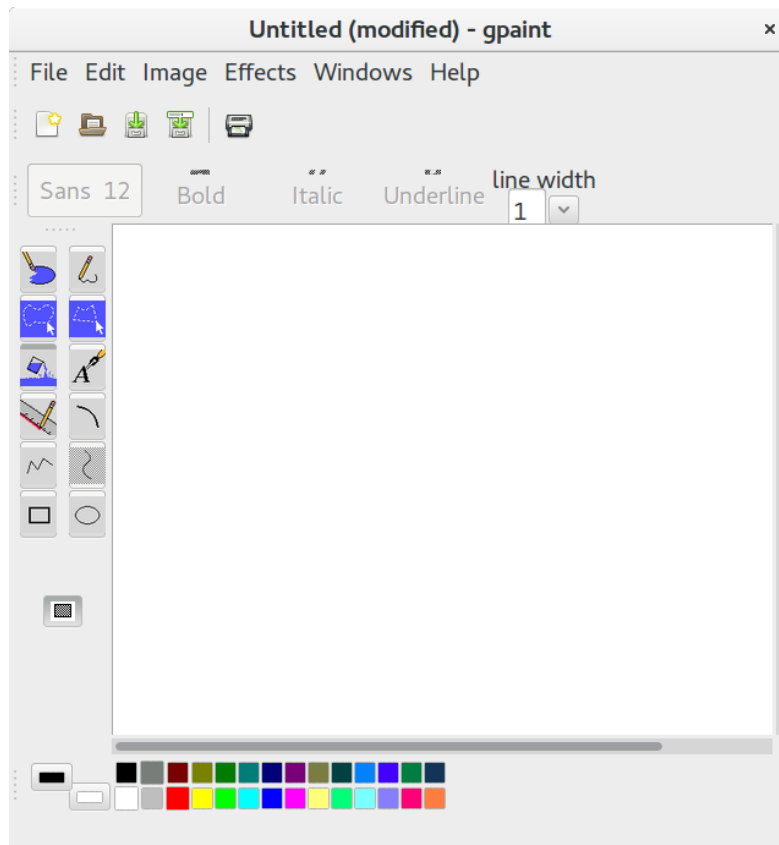


Fig. 49

- On the left side see all the tools you can use.
- Click on the color table in the bottom row of the screen to select a color.

2) Draw a picture!

Don't forget to save you creation (File – Save) and give it a name.

Upload the picture you liked most.



Box: IT101	Topic: Office
2c4	Calculator

1) The Calculator helps with math:

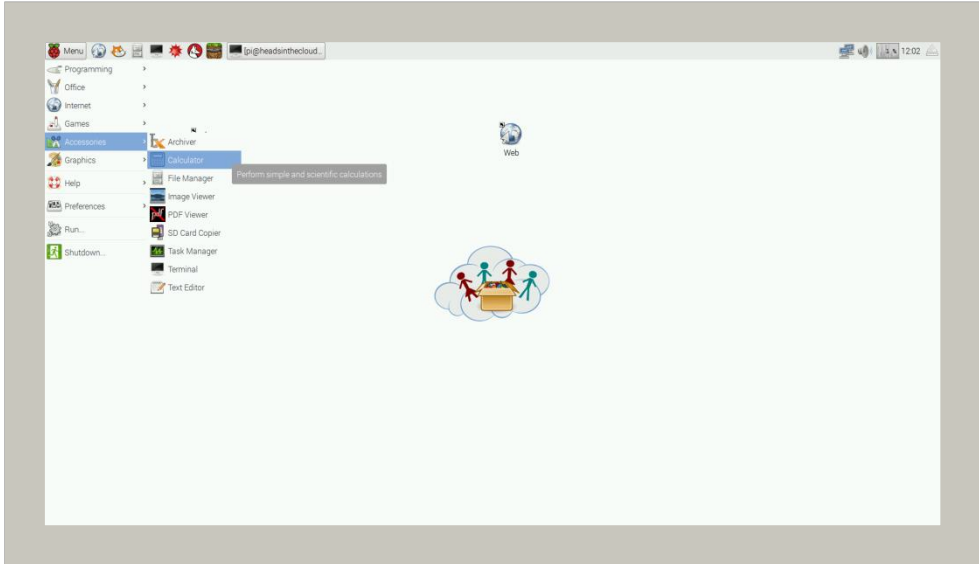


Fig. 50

2) Solve some math-problems:

$12+7 =$	$5*4 =$	$7+ ? = 54$
$22-14 =$	$7*3 =$	$88-?= 66$
$5-17 =$	$12*5 =$	$41+? = 77$
$144+7 =$	$8*8 =$	$?-28 =109$
$111-22 =$	$9*9 =$	$108 / 12 =$
$1022+918=$	$6*8=$	$12* ?= 72$
$512-513=$	$60*60=$	$3600/?= 60$

3) Create a worksheet with some math problems!

What program would you use?
Make some math worksheets together and upload them afterwards.



Box:
MakeyM
akey

Topic: Starting with Scratch



2d1

Introduction to Scratch

1) Start Scratch:

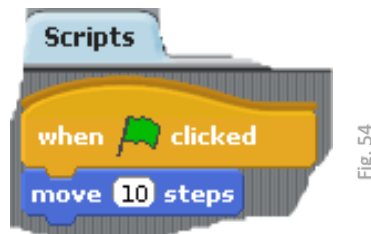
Search for  and  Fig. 51



2) Change Language:

Look for  Fig. 52,  Fig. 53 and select the language

3) A first program:

Try to
copy:



then:  Fig. 55 on  Fig. 56

What happens???

Try to change the number of steps
What will happen?



Box: Starting with Scratch

Makey Makey

2d2

Changing Costumes

1) Some more Scratch - programming:



Fig. 57



Fig. 59

Fig. 60

Fig. 61

Fig. 62



Fig. 63

2) Try:

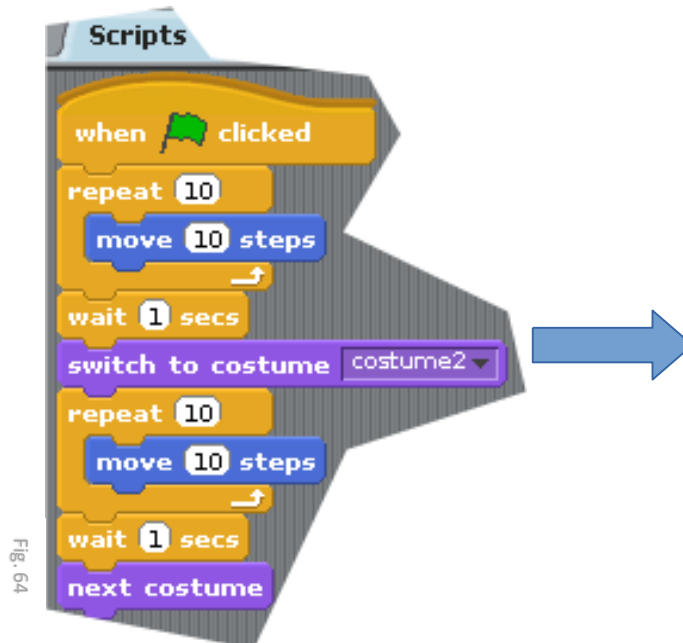


Fig. 64

What happens



Try out the other costumes and show us what you found out by sending a screenshot



Box:
MakeyM
akey

Topic: Starting with Scratch

2d3

Movement and Turning

Start Scratch

Try out these 3 programs:



Fig. 65



Fig. 66



Fig. 67

What's the difference?



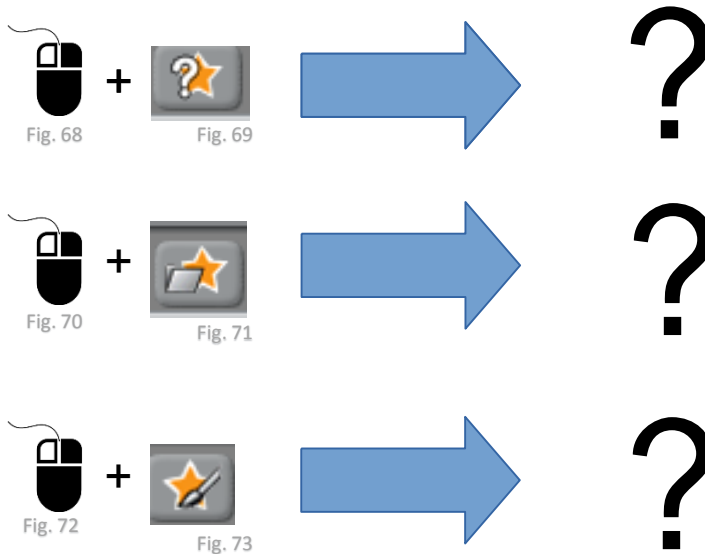
Box:
MakeyM
akey

Topic: Starting with Scratch

2d4

Add Sprites

Start Scratch



What happens if you press these buttons?

Can you explain what these button do?

Create some Sprites of your own and send us pictures of them!



Box:
MakeyM
akey

Topic: Starting with Scratch

2d5

Create your own Story

Start **Scratch**

Create your own short program:

- Drawing some sprites
- creating a plot (that can be an meeting between friends,.....)
- trying to programm the plot
- saving your programm

When you are finished, make a short movie (with your cellphone) of your running programm and upload it to us!

List of Figures - Tasksheets

Figure -Nr.	Copyright holder (if applicable)	Reference / Source	Last accessed
Fig. 1	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/hardware-guide/components/noobs-card/	2018/4/25
Fig. 2	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/hardware-guide/components/power-supply/	2018/4/25
Fig. 3	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/hardware-guide/components/monitor/	2018/4/25
Fig. 4	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/hdmi-cable.png	2018/4/25
Fig. 5	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/raspberry-pi.png	2018/4/25
Fig. 6	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/keyboard.png	2018/4/25
Fig. 7	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/mouse.png	2018/4/25
Fig. 8	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/hardware-guide/components/keyboard/	2018/4/25
Fig. 9	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/power-supply.png	2018/4/25
Fig. 10	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/mouse.png	2018/4/25
Fig. 11	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/monitor.png	2018/4/25
Fig. 12	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/hdmi-cable.png	2018/4/25
Fig. 13	André Karwath CC BY-SA	https://upload.wikimedia.org/wikipedia/commons/2/27/USB_Male_Plug_Type_A.jpg	2018/4/25
Fig. 14	André Karwath CC BY-SA	https://upload.wikimedia.org/wikipedia/commons/2/27/USB_Male_Plug_Type_A.jpg	2018/4/25
Fig. 15	Mexxin Public Domain	https://upload.wikimedia.org/wikipedia/commons/thumb/8/89/Micro_USB.jpg/716px-Micro_USB.jpg	2018/4/25
Fig. 16	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/e/ec/Gnome-network-idle.svg/48px-Gnome-network-idle.svg.png	2018/4/25
Fig. 17	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 18	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 19	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/5e/Gnome-web-browser.svg/48px-Gnome-web-browser.svg.png	2018/4/25

Fig. 20	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 21	Head in the Clouds - Consortium	Cropped Desktop Screenshot from Raspian PI	---
Fig. 22	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 23	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/4/41/Gnome-system-log-out.svg/48px-Gnome-system-log-out.svg.png	2018/4/25
Fig. 24	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 25	Head in the Clouds - Consortium	Desktop Screenshot from Raspian PI	---
Fig. 26	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/5e/Gnome-web-browser.svg/48px-Gnome-web-browser.svg.png	2018/4/25
Fig. 27	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 28	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 29	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/5e/Gnome-web-browser.svg/48px-Gnome-web-browser.svg.png	2018/4/25
Fig. 30	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 31	Head in the Clouds - Consortium	Cropped Browser Image	---
Fig. 32	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 33	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/5e/Gnome-web-browser.svg/48px-Gnome-web-browser.svg.png	2018/4/25
Fig. 34	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 35	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 36	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/5e/Gnome-web-browser.svg/48px-Gnome-web-browser.svg.png	2018/4/25
Fig. 37	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 38	Google	Screenshot of google Maps – Full Screen	2018/4/25
Fig. 39	Google	Screenshot of google Search – Full Screen	2018/4/25
Fig. 40	Wikipedia Foundation CC BY-SA	Screenshot of www.wikipedia.org – Full Screen	2018/4/25
Fig. 41	CC0	https://pixabay.com/en/furniture-drawers-wardrobe-cupboard-148796/	2018/4/25
Fig. 42	Head in the Clouds - Consortium	Cropped Screenshot –Raspian File Browser	----
Fig. 43	GNOME Desktop icons GNU GPL2	https://upload.wikimedia.org/wikipedia/commons/thumb/5/55/Gnome-system-file-manager.svg/48px-Gnome-system-file-manager.svg.png	2018/4/25
Fig. 44	Head in the Clouds - Consortium	Cropped Screenshot – Raspian File Browser	---
Fig. 45	Head in the Clouds - Consortium	Desktop Screenshot	---
Fig. 46	Head in the Clouds - Consortium	Cropped Screenshot of LibreOffice Writer	---
Fig. 47	Head in the Clouds - Consortium	Cropped Screenshot of LibreOffice Writer	---
Fig. 48	GNOME Desktop	https://upload.wikimedia.org/wikipedia/commons/thumb/f/fe/Gn	2018/4/25

	icons GNU GPL2	ome-applications-graphics.svg/48px-Gnome-applications-graphics.svg.png	
Fig. 49	Head in the Clouds - Consortium	Screenshot of gpaint	---
Fig. 50	Head in the Clouds - Consortium	Desktop Screenshot	---
Fig. 51	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 52	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 53	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 54	Lifelong Kindergarten Group, MIT Media Lab	Software - Screenshot	---
Fig. 55	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 56	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 57	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 58	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 59	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 60	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 61	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 62	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 63	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 64	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 65	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 66	Lifelong Kindergarten Group, MIT Media	Software – cropped Screenshot	---

	Lab		
Fig. 67	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 68	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 69	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 70	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 71	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---
Fig. 72	Sarfraz Shoukat – CC BY	Icons made by https://www.flaticon.com/authors/sarfraz-shoukat from https://www.flaticon.com	2018/4/25
Fig. 73	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---

List of Figures - Teacher Handouts

Figure -Nr.	Copyright holder (if applicable)	Reference / Source	Last accessed
Fig. 1	Raspberry Pi Foundation CC BY-SA	https://www.raspberrypi.org/learning/images/components/raspberry-pi.png	2018/04/25
Fig. 2	Head in the Clouds - Consortium	Desktop Screenshot	---
Fig. 3	Head in the Clouds - Consortium	Tasksheet	---
Fig. 4	Lifelong Kindergarten Group, MIT Media Lab	Software - Scratch Screenshot	---
Fig. 5	Lifelong Kindergarten Group, MIT Media Lab	Software – cropped Screenshot	---