DIGITAL WELCOME

PROGRAMME CONTENTS AND GUIDELINES

1. CODING WITH SCRATCH AND OTHER TECHNOLOGIES

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Project Acronym	DIGITAL WELCOME
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Keywords	Easy Coding, Scratch,
Abstract	This module is dedicated to learning coding with the online tool Scratch. Through it, participants will acquire basic coding techniques in a non-formal way of learning through exploration and experimentation with Scratch. This will lead to the creation of participants' own game or interactive video which can easily be shared online through the Scratch platform. Other apps and technologies like robots are also touched upon in this module as a possible addition.
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Project n°	776128
Agreement n°	776128
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LIST OF FIGURES

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1. MODULE OVERVIEW

This module describes how trainers can use Scratch as an easy way to teach young people about programming. This methodology can be used in education, youth work and adult education. Because of its simplicity it can also be used to train the language skills of people who are still learning your language.

Scratch is a free online and on multiplatform installable application that allows everyone to learn and play with the basics of object-oriented programming. As no real code is used, but everything is built up with blocks, it is a very low barrier approach to coding that can result in very impressive games and animated videos.

In this methodology you will find various exercises and challenges, not one-size-fits-all solutions. In programming there are multiple ways to reach your goal. The best way to learn this is through experimentation. Think about the way of teaching in a kindergarten. Children are experimenting and learn that way. That's the idea of the developers from scratch: they want to make a lifelong kindergarten: https://mitpress.mit.edu/books/lifelong-kindergarten

Because of these reasons we are structuring this module very loosely: we start with a **warm-up** and some **basic exercises** that show the different games and interactive videos that could be made with Scratch (Introduction cards). After that we continue with some **more challenging exercises** (Experienced Cards). Once these are finished, we experiment with Remixes; you can edit and add things to existing projects on the Scratch website (Remixes)! This brings us to a discussion on what makes a good game good to end up in **making our own game from scratch**… with Scratch (2.2.4. Make your own game… from scratch on Scratch!).

1.1. Learning hours

Total: 30 hours

Face-to-face: 20 hours

Self-study: 10 hours

Assessment: ongoing

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1.2. Learning objectives

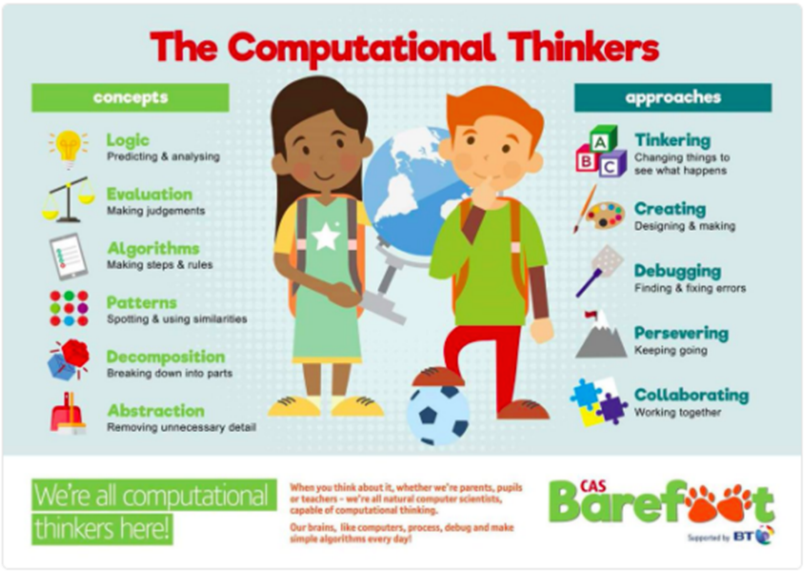
1.2.1. KNOWLEDGE

- sequence: identifying a series of steps for a task
- loops: running the same sequence multiple times
- parallelism: making things happen at the same time
- events: one thing causing another thing to happen
- conditionals: making decisions based on conditions
- operators: support for mathematical and logical expressions
- data: storing, retrieving, and updating [1]

1.2.2. SKILLS

- MATH: Coding helps learners visualize abstract concepts!
- WRITING: Learners who code understand the value of concision and planning.
- CREATIVITY: Learners learn through experimentation and strengthen their brains when they code, allowing them to embrace their creativity.
- CONFIDENCE: Many teachers have noticed that learners build confidence as they learn to problem-solve through coding

1.2.3. COMPETENCES



[1] http://scratched.gse.harvard.edu/ct/defining.html

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2. ACTIVITIES DESCRIPTION AND IMPLEMENTATION

2.1. Lead up to Scratch

2.1.1. ENERGIZERS / WARM-UPS

Fun games that teach some principals about coding without actually using a computer or any other device: **The Blind Robot**; **The Chair Robot; The Sun.**

(N.B. more info on these activities in EN are available in the full version of the module).

2.1.2. APPS THAT INTRODUCE CODING

After these off-line games your students will understand the basic concepts of instructions and commands, which are the basic concepts of coding. To close the gap between these off-line energizers we recommend trying the following apps:

Run Marco: https://www.brainpop.com/games/runmarco/
Lightbot - Code Hour: http://lightbot.com/flash.html

2.2. Scratch

2.2.1. IMPORTANT NOTE ON SCRATCH AND ITS FUTURE

As this programme is written over the course of 2018, we're presenting the Digital Welcome programme with the current version of Scratch (being 2.2). However, the new version 3.0 is just around the corner and will change how the platform looks. The essence and how it's used will, however, stay very similar: https://scratch.mit.edu

2.2.2. EXPLORING THE SCRATCH PLATFORM

It is fun to realize what is possible with Scratch, and the best way is to go and explore the website of Scratch on your own. So, let your participants roam on the website of Scratch (https://scratch.mit.edu/) and give them 1 hour to experiment and try some games that are already made by other young coders.

2.2.3. IMPLEMENTATION: BASIC INTRODUCTION

Getting started

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You can choose to use Scratch (1) online at https://scratch.mit.edu/ or (2) offline by installing the offline editor (https://scratch.mit.edu/download). Follow the instructions at https://scratch.mit.edu/educators/faq to help you create a teacher and individual student accounts.

First view on the program

You first want to show your students what Scratch is. If you need inspiration on which coding blocks to show first, you can check some introduction instruction videos on Youtube. There are many, but we suggest one made by a student http://bit.ly/intro-scratch or one where a student teaches his mother: https://bit.ly/2LnJXgo.

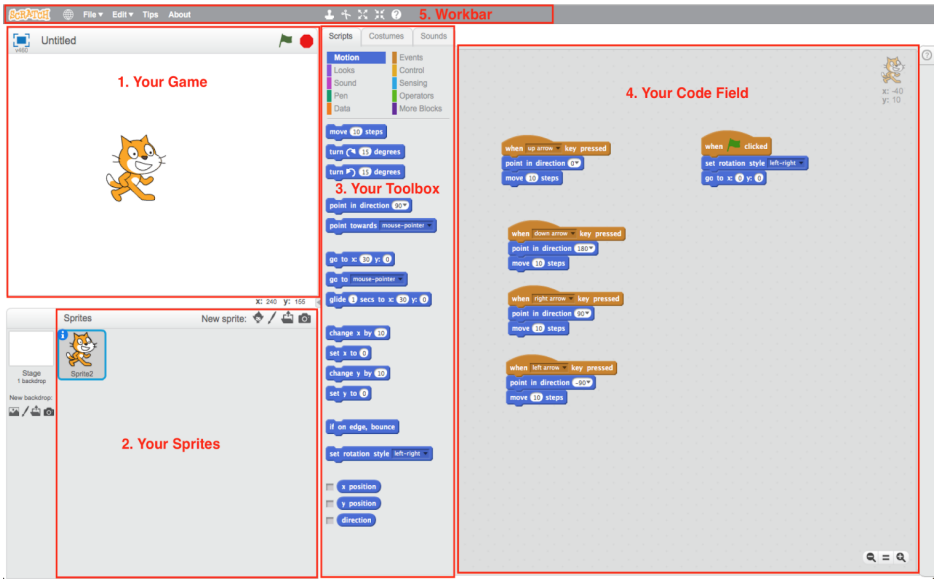

Figure 2. The Scratch 2.0 platform

2.2.4.INTRODUCTION CARDS

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photo © 2012 ScratchEd Team, Flickr

Figure 3. Introduction cards

There are some basic exercises to get used to all aspects of Scratch and the different categories of coding blocks:

- Making and editing the looks of sprites
- Adding sound effects and music
- Creating movement
- Creating interactive environments

These cards can be found here:

https://resources.scratch.mit.edu/www/cards/en/Scratch2Cards.pdf

2.2.5. EXPERIENCED CARDS

Once all the introduction cards have been resolved, we can move on to make real interactive games. These can be found here: https://scratch.mit.edu/info/cards/

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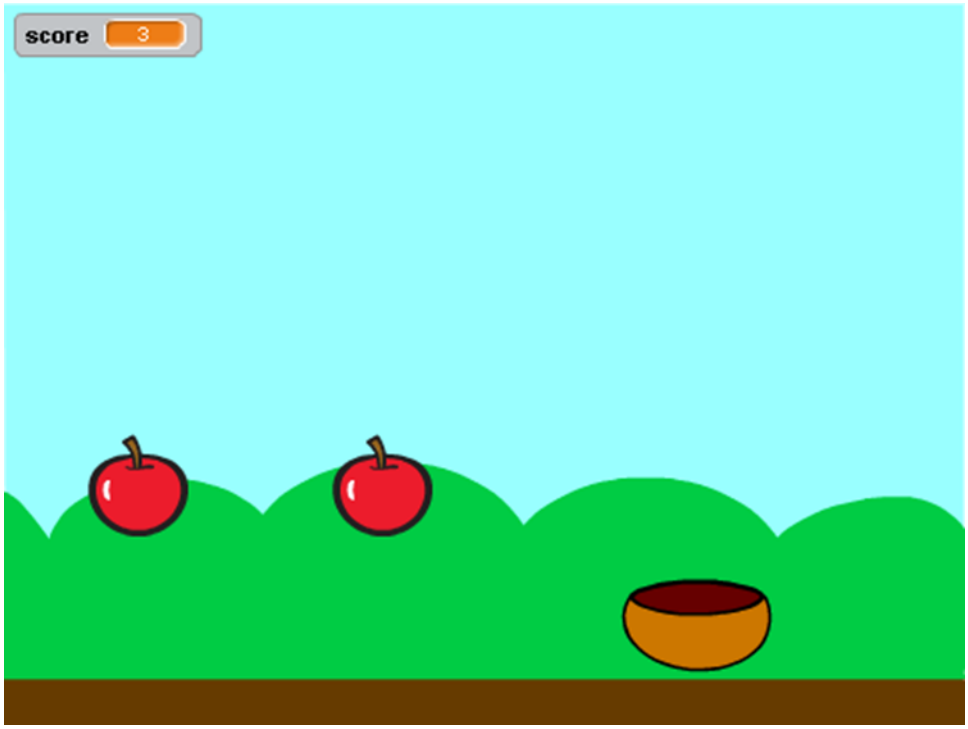

Figure 4. Experienced cards

2.2.6. REMIXES

There are already thousands of cool games on Scratch. But most of the games can be remixed! This means participants can put any game on their own account and add or change the code to remix the original game. The credit of the original author is automatically added.

Just click on the 'See Inside' button on the top of each project:

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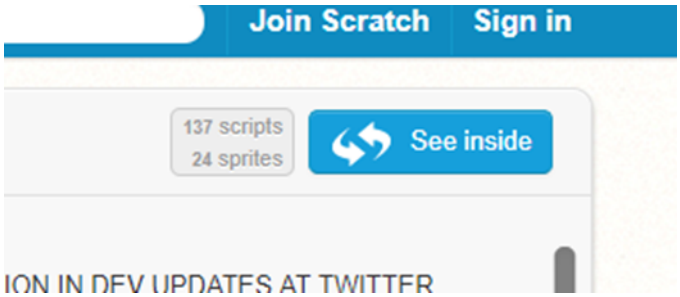

Figure 5. See inside

And click on the 'Remix' button and happy editing!

Figure 6. Remix

It is fun to just mess with someone else's code but it is even more fun to enhance and add new cool things to an already cool game!

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2.2.7. MAKE YOUR OWN GAME… FROM SCRATCH ON SCRATCH!

We have been feeding our participants with many ideas for a while now but now it is time to come up with something themselves.

2.3. After the basics of Scratch

2.3.1. MAKEY MAKEY

Makey Makey is an invention kit for the 21st century that ignites curiosity, challenges problem-solving ability, and fosters creativity. With Makey Makey everyday objects are transformed into touchpads empowering students to interact with computers as creative tools. The computer becomes an extension of their creativity, fostering imaginative play and discovery.

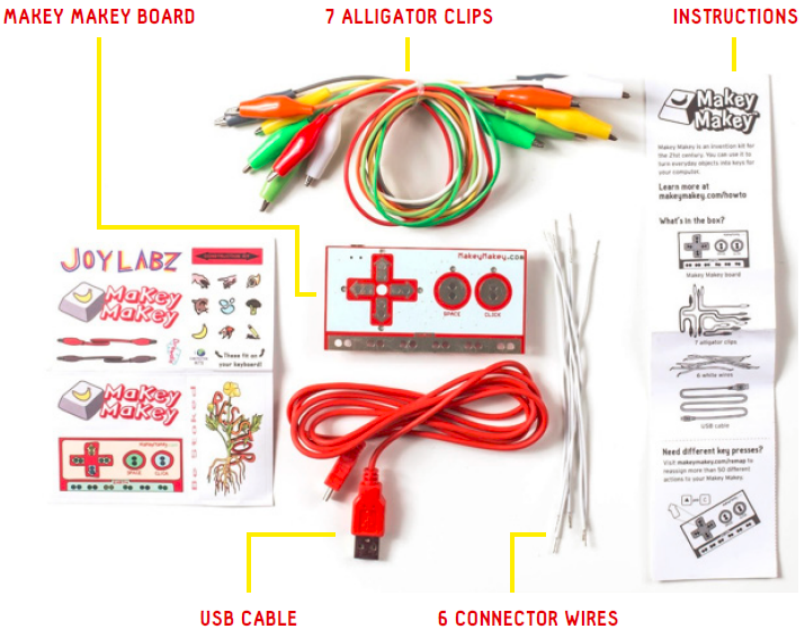

Figure 7. Makey Makey standard kit

2.3.2. HOUR OF CODE

Hour of Code is an online platform with many exercises in coding. The exercises have many different difficulty levels and the easy ones could also be uses before using Scratch. Some Hour of Code applications have popular themes like Star Wars or Frozen:

- Minecraft themed: surf to https://code.org/minecraft
- Star Wars themed: surf to https://code.org/starwars

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- Frozen themed: surf to https://code.org/frozen

2.3.3.LEGO® WEDO AND MINDSTORMS® NXT

LEGO® Education WeDo is an easy-to-use set that introduces young students to robotics. Students will be able to build models featuring working motors and sensors; program their models; and explore a series of cross-curricular, theme-based activities while developing their skills in science, technology, engineering, and mathematics, as well as language and literacy.

LEGO® MINDSTORMS® NXT allows even more customizable programming, combining the unlimited versatility of the LEGO building system with an intelligent microcomputer brick and intuitive drag-and-drop programming software. The new 2.0 toolkit features everything you need to create your first robot. The activity includes building the model following the step-by-step instructions, or create your own model.

To program the model, exploring sensors functionalities, it is possible to follow the step-by-step instructions based on drag-and-drop icons.

2.3.4.DIGITAL FABRICATION

Laser Cut, 3D printer, etc. are digital making hardware that associated with software allow experimental design through the use of digital fabrication technologies and most of all to learn to turn codes into things.

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2.4. Participants (profile, number)

Coding with Scratch is possible for participants of all ages, but it is most fun for 7 – 15-year olds. It might be for younger people than our target group of young migrants and refugees of 16-30 years old in general but having in mind the language barrier of this target group we like to use more playful methods of language acquisition and we think it fits.

2.5. Required materials

- For each participant, a laptop with Scratch installed or Internet connection.
- Projector & PC for trainers
- Per two participants: recorder, Makey Makey, Graphic tablet; Material: foil, cable, material for crafting

2.6. Assessment

The essence of this module is learning by doing and the end result, a game or an interactive video, is proof of their learning progression. A fun way to assess and present the final results is to let everyone play each other's game and test it out. If necessary, everyone can help each other with finding bugs or errors in the code.

2.7. Limitations, which need to be considered

- Technical issues: you should provide all the materials (Computers, Makey Makey's, Prints of the games, materials for energizers, ...)
- Age adaptation: considering the ages, you should adapt exercises. The beginning exercises are a bit easy and childish for teenagers. Scratch however is easily adaptable to different ages. You could start with the more complicated exercises and introduce more challenging tasks and problems to youngsters.

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3. USING SCRATCH AS AN EVALUATION TOOL FOR THE ENTIRE PROGRAMME

Similar to the assessment part (2.6) in this programme you can make an (interactive) animation in Scratch that tells what and how your young mentors experienced the entire Digital Welcome programme.

4. RESOURCES AND REFERENCES

https://www.youtube.com/watch?v=jXUZaf5D12A

Nice platform to inspire more coding activities:
https://www.flocabulary.com/unit/coding/

Ten reasons why kids should code: https://www.youtube.com/watch?v=S95o5icpDu4

What is computational thinking and how does it work with Scratch?
http://scratched.gse.harvard.edu/ct/defining.html

5. LEARNING OUTCOMES

By the end of this course, the participants will be able to:

- code a small game with Scratch
- identify a series of steps for a coding task
- run the same sequence multiple times with loops
- modify and/or enhance existing Scratch games
- share self-made games on the Scratch platform
- share their coding knowledge with peers

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