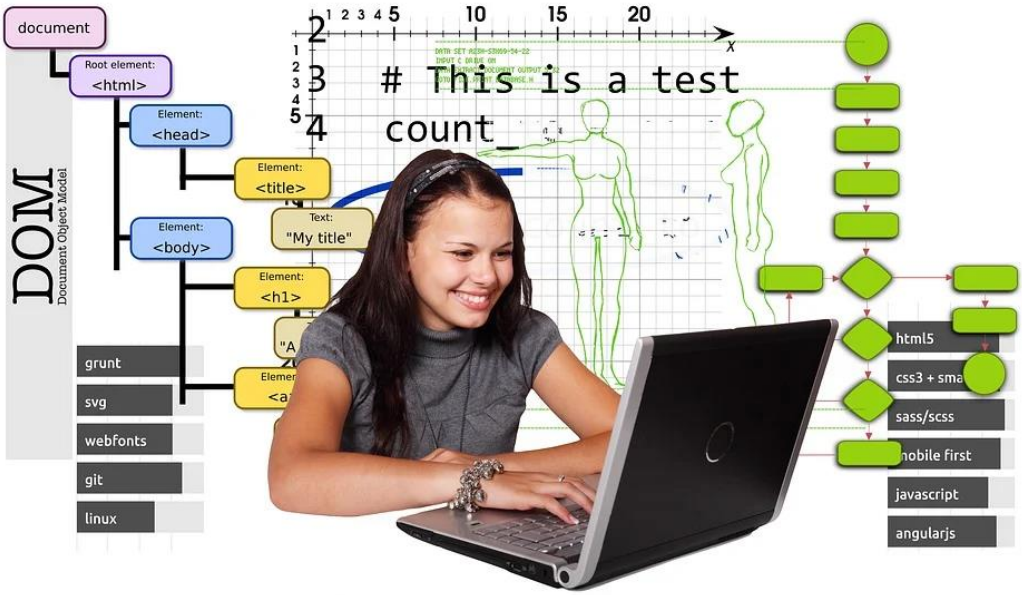
Programming



School subjects
Informatics
Age of students
12 - 18
Aim of the activity
Especially ICT knowledge is being imparted. Girls learn how to code and produce digital escape activities for (digital) escape rooms.
Background
This activity belongs to a series of learning how to design and print a (3D) escape box which was the main subject of a summer school for girls “can you escape” (https://icse.ph-freiburg.de/gem/gem2022/.) Nevertheless, this particular activity can be used in a school class, school project week or in an out-of-school activity, since the complexity of the task can get adjusted to the time resources you have.

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Activity

Designing an escape box necessarily includes a story that is being told as one solves riddles. Solving a riddle gives the player of the escape box (one player or a team) a code to get to the next level.

To make the start in programming easier, the girls learn through this learning unit how to prepare a riddle.

Input

Introduction in Geogebra:

- Easy programming and visualisation for mathematical problems
- Simple design and free of charge-> possible to use at home on their own

Give visual examples what is possible with geogebra with minor and advanced knowledge.

Participants have to log into the site: https://www.geogebra.org/an

Give one example that shows how to insert pictures, texts and input fields for programming. It is possible to direct them using Java-Syntax (demonstrate how to make them appear or disappear, activate read-aloud of texts).

Task

Task for the participants: think of a riddle for your escape box.
Tip for participants: Here you can find a list of instructions where you have to find the right instructions for an exemplary task: https://wiki.geogebra.org/en/Reference:GeoGebra_Apps_API

Give an exemplary task to girls to demonstrate the next thing you want them to learn:
EXAMPLE

"Suddenly, loudly squeaking the door behind you is closing. You appear to be in an old and empty house. It appears not be used for a long time. You discover a bright red parrot, sitting between the dusted furniture lively moving its head. You approach him…. "

Task

Participants have to open the examplary task:
https://www.geogebra.org/m/wt8w6fsb

Questions to the participants:

1. Which instructions from Geogebra do you recognise from the list of instructions?
2. What kind of structure can you recognise? (what happens if you answer wrong?)

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Input
Give input on how to combine instructions

If (condition)
{ } <- then
Or if
{} <- then

Explain logical operations based on the exemplary task. In this case three options:

1. Temperature was guessed correctly
2. Temperature was guessed too low
3. Temperature was guessed too high

Then

1. If (entry = 22.5), you are correct
2. If (entry <22.5), then have guessed below the correct answer
3. If (entry > 22.5), then have guessed above the correct answer

Time necessary

45 minutes input
≈ 2 hours of individual work (depends on the product the participants must develop)

Learning outcomes

Basics of programming.

At the end of the summer school ready to use escape boxes are presented. The girls must demonstrate their knowledge in programming as they are developing the riddles for the online escape boxes.

If not the whole summer school is implemented but one session, then the participants can develop and demonstrate programming knowledge with completing one minor task.

Costs

Only in the case of an out-of-school activity an hourly rate x3 for teacher as well as mentors that are guiding the girls during the working phase.
The number of mentors involved is depending on the size of the group. We consider 1 mentor per 4 girls to be the optimal.

Materials

A power point presentation and online escape rooms that serve particularly to support the presentation are available in German. Contact: icse@ph-freiburg.de

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ICSE
International Centre for STEM Education

GEM
Empower Girls to Embrace their Digital and Entrepreneurial Potential

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