



Scratch as a glue for funny programming, curiosity and music creation

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About Scratch

- developed & managed by the Lifelong Kindergarten Group at the MIT Media Lab, led by Mitchel Resnick
- follower of Logo culture, supporting constructionist approach to learning, “imagine, program, share”
- satisfies good properties for programming language for pupils – low-floor, high-ceiling, and wide-walls
- online community (<http://scratch.mit.edu/>), Scratchers can public share, discuss and remix their artifacts (interactive stories, games, animations, and simulations) each other



Learning objectives (1)

- to understand commands in Scratch for playing sounds, setting and getting sound parameters and to apply them for programming of sound and music projects,
- to strengthen basic programming concepts (e.g. variables, loops, branching, procedures, lists, recursion, concurrent execution of code, broadcasting),
- to develop musical skills and creativity of pupils by creation of useful and valuable musical artifacts,



Learning objectives (2)

- to develop inquiry skills and understanding of basic concepts of physics, music, languages by development of tools in Scratch for data visualization and audialization,
- to learn more about pupils' abilities in perception and making of sounds and music,
- to develop communication and team skills, thanks to publishing, commenting, sharing and remixing projects in Scratch community.



Conditions for Learning (1)

- inducing creative, open and pleasurable atmosphere in a class, where pupils can solve their own problems with none or little help from a teacher and discuss freely,
- preparing collections of interesting and valuable projects which are suitable for ordinary pupils not only for audio and music enthusiasts,
- preparing various types of teaching aids, e.g. motivational video, stories and ready-made projects, half-baked projects, worksheets,



Conditions for Learning (2)

- using heuristic dialogues which support pupils' understanding of subject matter and also their inquiry skills,
- establishing of Scratch studios on Scratch portal where teacher and pupils can publish, comment and remix projects with sounds and music.

	Výučba programovania v Scratch Created: 21/03/2014 Owner	9	0	Delete
	Klub učiteľov informatiky Created: 28/11/2013 Owner	21	0	Delete
	Let's do music Created: 01/11/2013 Owner	9	0	Delete
	Informatický krížok Created: 14/10/2013 Owner	20	0	Delete



Sound and music projects

- Motivational
- Bridging programming & musical concepts
- Inquiring pupils' abilities in perception & making sounds
- Creative





Motivational projects

- Animated and musical greetings cards
- Jokes and stories
- Multimedia dictionary (with Makey-Makey)
- Musical instrument
- Multimedia visit card
- ZOO
- Multimedia encyclopedia of musical instruments
- Jukebox





Projects bridging programming & musical concepts

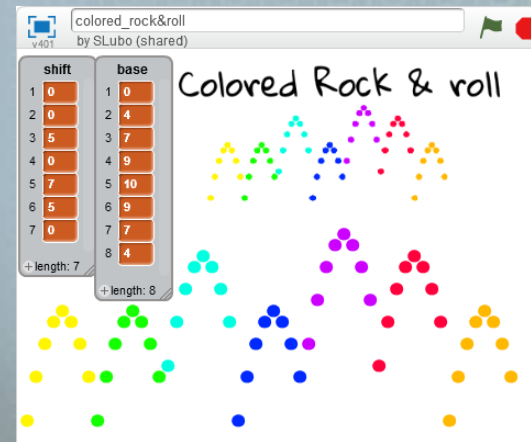
- Pairs: playing chords – threads (parallelism), sequences of notes – data structure list, repetition of notes – loop, prima/seconda volta – branching, song refrain – procedure

- Jingle – parallelism.

- Karaoke of a children song – procedures.

- Colored rock-n-roll, visualized own song in style of toccata – loops, lists.

- Singing binary tree (audialization) – recursion.



mf

mp

$\text{♩} = 80$

1. *decresc.*

2. *cresc.*



Projects inquiring abilities in perception & making sounds

- What is my vocal range?
- Vocal warm-up
- Sound pexeso
- Sound quizzes
- Rhythmic clapping game

vocal_range
by SLubo (shared)

What is your vocal range?

midi 47
H2
H
123.5
Hz

lowest note 41
highest note 77
your vocal range 36 halfnotes = 3 octaves

SOPRANO: C4-C6, 60-84
ALTO: F3-F5, 53-77
TENOR: C3-C5, 48-72
BASS: E2-E4, 40-64

Playing a note - up, down, right arrow
Your vocal range - click on a cat



Musical & programming creative projects

- [5-voices song](#) – song with 5 harmonized voices which can be selected for playing.
- [Jingle](#) – midi-like composition with 1 leading melody and 3 drums.
- [DJ](#) – song with 4 scratching sound effects.

5voices_song2
v401 by SLubo (shared)

5-voices song - Wake up Susie (in Slovak)

Choose voices for playing by clicking on singers.
Play a song with chosen voices by clicking on a cat.

Let's do music

Projects (9) Comments (0) Curators Activity (0 Followers)

Add projects Allow anyone to add projects Sort by ▾

DJ scratching
Green flag - playing music
Arrow keys - scratching music by 4 sounds
DJ_scratching by SLubo

5-voices song - Wake up Susie (in Slovak)
Choose voices for playing by clicking on singers.
Play a song with chosen voices by clicking on a cat.
5voices_song2 by SLubo

Jingle
For best playing set TDR30 mode
Accounted by half-clicking the Green flag
jingle by SLubo

Piano with 3 way of control
c d e f g a h c1
webcam_piano by SLubo

Vocal Warm Up
Up Arrow - play a sequence of keyboard notes
Down Arrow - play a sequence of keyboard notes
Right Arrow - play a sequence notes
Space bar - when playing in sequence
vocal_warm_up by SLubo

My toccata
my_toccatata by SLubo

Colored Rock & roll
colored_rock&roll by SLubo

What is your vocal range?
Playing a note - up, down, right arrow
Your vocal range - click on a cat
vocal_range by SLubo

Singing binary tree



Conclusions

- Our methodology – not only pure programming, development of musical and programming creativity, connections with physics, music
- Constructionistic approach – useful artifacts creation
- Online community – learning and living collaboratively
- Designing of methodology in design cycles – studying, programming, preparing teaching aids, teaching, discussing and publishing results

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