



# Програмиране *без праг и без таван* (I част)

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QED'17, 21.09.2017, София

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# В началото бе...Лого-то





# А какво е Лого?



LOGO (λόγος) е

- Дума, слово, мисъл
- Език за програмиране
- Среда за програмиране
- Философия на образованието
- Вид култура





# Лого като образователна философия у нас



Проблемната група по образованието  
(популярна като “Сендовската система”)

Основни принципи:

- Интегриране на предметите
- Учене чрез действие





# Ново учебно съдържание





# Костенурковата геометрия

свят, в който математиката се учи като  
роден език

Основни команди към робота-костенурка:

НАПРЕД <брой стъпки>

НАДЯСНО <градуси>

Може ли само с тях да начертаям:

- Квадрат
- Окръжност



Детето в ролята на строител на  
знанията си:





# Учи компютъра



НАПРЕД 100

НАДЯСНО 90

ПОВТОРИ 4 [НАПРЕД 100 НАДЯСНО 90]

КВАДРАТ

КАКВО ЗНАЧИ КВАДРАТ?







# Редактира



ЗА ТРИЪГЪЛНИК

ПОВТОРИ 3 [НАПРЕД 100 НАДЯСНО 60]

КРАЙ





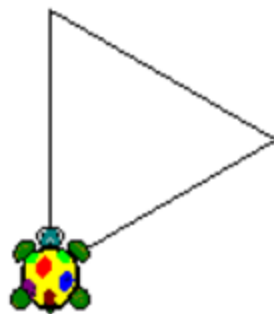
# Анализира резултата и пак редактира



ЗА ТРИЪГЪЛНИК

ПОВТОРИ 3 [НАПРЕД 100 НАДЯСНО 120]

КРАЙ





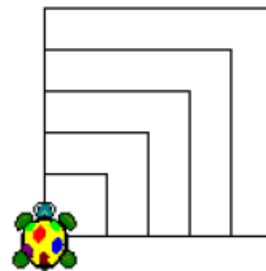
# Обобщава и експериментира



ЗА КВАДРАТ :S

ПОВТОРИ 4 [НАПРЕД :S НАДЯСНО 90]

КРАЙ



КВАДРАТ 30  
КВАДРАТ 50  
КВАДРАТ 70  
КВАДРАТ 90  
КВАДРАТ 110





# Описва структури



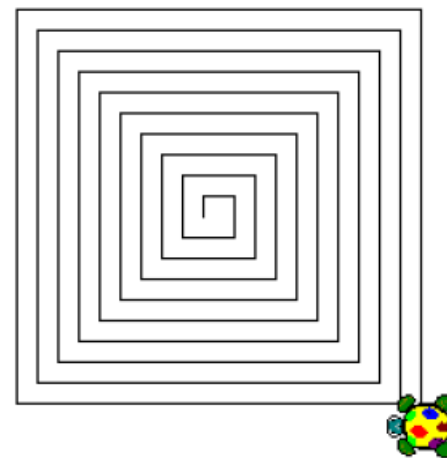
**ЗА СПИРАЛА :СТР :ЪГЪЛ**

**АКО :СТР > 100 [СТОП]**

**НАПРЕД :СТР НАДЯСНО :ЪГЪЛ**

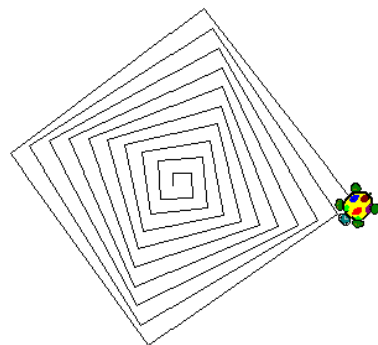
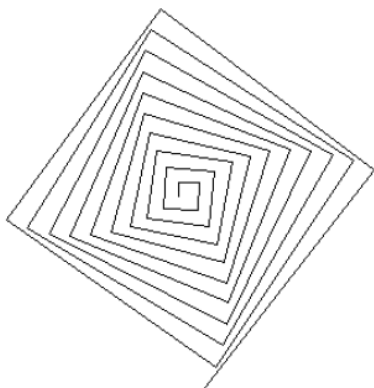
**СПИРАЛА :СТР+5 :ЪГЪЛ**

**КРАЙ**



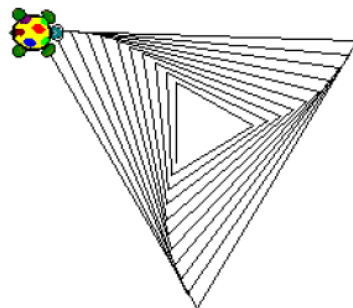
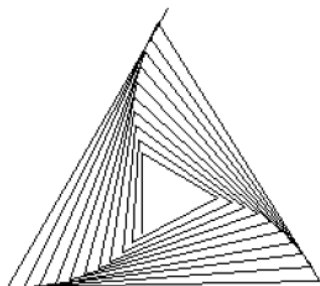


# Експериментира и формулира хипотеза



Спирала 10 91

Спирала 10 89



Спирала 50 121

Спирала 50 119

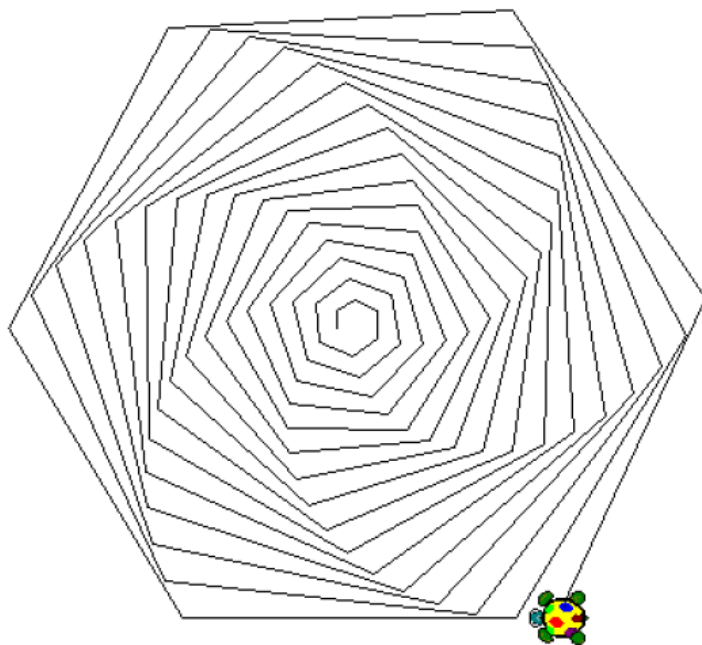
Спирала 10 60

Спирала 10 61

Спирала 10 59



# Проверява я експериментално





# Прилага стратегията: *Какво ли ще стане, ако...*

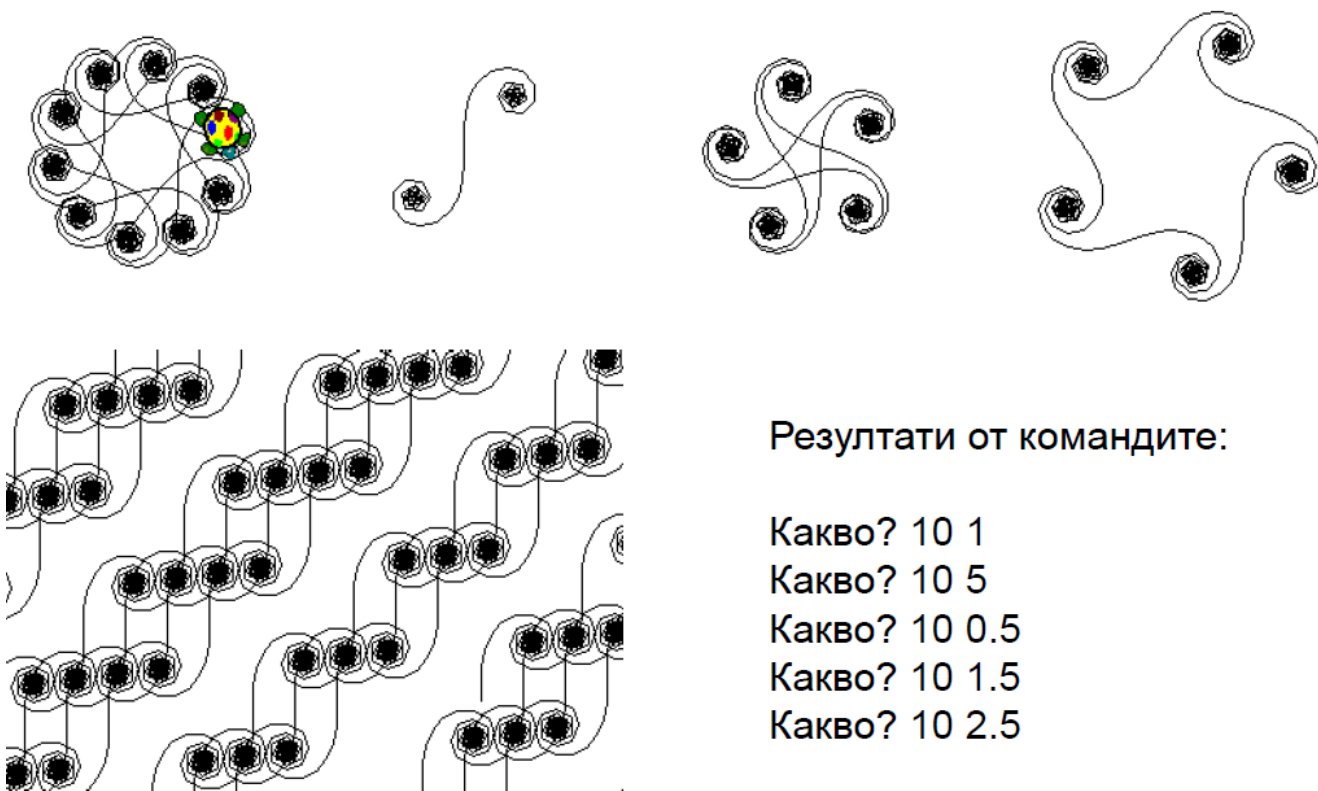


**ЗА КАКВО? :СТРАНА :ЪГЪЛ**  
**АКО :СТРАНА > 100 [СТОП]**  
**НАПРЕД :СТРАНА НАДЯСНО :ЪГЪЛ**  
**КАКВО? :СТРАНА :ЪГЪЛ+5**  
**КРАЙ**





# Анализира резултатите „в екип“ с учителя си и споделя откритието си



Резултати от командите:

Какво? 10 1

Какво? 10 5

Какво? 10 0.5

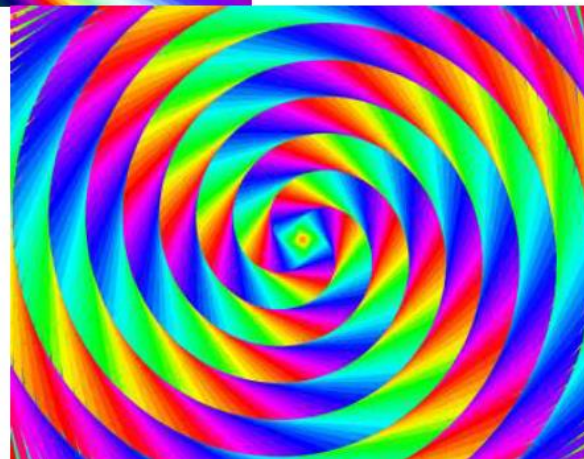
Какво? 10 1.5

Какво? 10 2.5





# Развихря въображението си





# Лого като култура



- Ключов елемент е програмирането от най-ранна възраст
- Програмите са материализирани хипотези
- Грешките не са страшни, напротив!
- Учениците стават строители на знанията си:
  - “чиракуват” при учител, който действа като изследовател
  - Произвеждат продукт, който може да се споделя





# Днешните деца „в кожата на учени“





# Проекти в подкрепа на конструкционизма



<http://www.math.bas.bg/omi/mascil/resources.html>



<http://www.scientix.eu/>



<http://www.keycomath.eu/>





# Какво предлага Scientix

## <http://scientix.eu>



The screenshot shows the Scientix website homepage. The header is blue with the Scientix logo and tagline 'The community for science education in Europe'. Navigation links include HOME, SCIENTIX LIVE, COMMUNITY, EVENTS, PROJECTS, CONFERENCE, NEWS, RESOURCES, and ABOUT. A search bar and 'Sign in' button are also present. The main content area features a large image of students looking at a tablet, with text overlay: 'ONLINE COURSES', 'Massive Open Online Courses: A comprehensive training in STEM education.', 'Webinars: 45 minutes interactive presentations.', and 'Moodle: Subject based science courses.'. To the right, there is a sidebar with links: 'In your country', 'Observatory', 'Scientix Moodle', 'Scientix Webinars', 'Scientix blog', and a 'SIGN UP' button for email updates.

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# Какво предлага Scientix

## <http://scientix.eu>

**Scientix Moodle**

Начална страница ► Курсове ► Търсене ► programming

Търсене на курсове: programming Напред

**НАВИГАЦИЯ**

Начална страница  
Site news  
Курсове

**Резултати от търсенето: 2**

**Robo Scratch: Introduction in how to program robots**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

The Robo Scratch course is a short introduction to Scratch 2.0 programming language, using examples of robots programming. If you want you can see the course as an introduction to robotics using as programming language Scratch 2.0. The course is a good start for beginners in the field of programming and robotics.

**Teaching Robotics with EV3**  
Teacher: Gloria Drei  
Категория: STEM Tools for teachers

This introductory Robotics course uses the LEGO® MINDSTORMS® EV3 Education Core Set (hardware referred to as EV3) and EV3 Education Edition Programming Software (free download) to teach the first steps on STEM Robotics to middle school students.

The course goals are: learning to build, to program, and to test solutions relatives to STEM problems.

This course is divided into the following arguments:

1. Opening the EV3 kit
2. Learning the EV3 Programming SW
3. Building your first mobile robot
4. Moving your robot.

**Robo Scratch: Úvod do programování robotů**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Úvod do programovania robotov**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Uvod u programiranje robota**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Uvod v programiranje robotov**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Wprowadzenie do programowania robotów**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Εισαγωγή στον προγραμματισμό ρομπότ**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

**Robo Scratch: Въведение в програмирането на роботи**  
Teacher: Mihai Agape  
Категория: STEM Tools for teachers

Търсене на курсове: scratch Напред

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# Какво предлага Scientix

## <http://scientix.eu>

### CLOUD BASED SYSTEMS



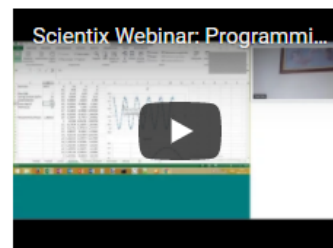
**Author:** Alexander Angelov  
**Date:** 30-11-2015  
[More information](#)

### OPEN SOURCE HARDWARE



**Author:** Francisco Pérez  
**Date:** 24-11-2015  
[More information](#)

### PROGRAMMING AND CODING IN PHYSICS



**Author:** Zsolt Vicze  
**Date:** 12-11-2015  
[More information](#)

### MOBILE APPLICATIONS FOR STEM EDUCATION



**Author:** Tatjana Gulic  
**Date:** 27-10-2015  
[More information](#)

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# Истинската цел на образованието – учениците *да летят* (без праг и без таван)



magnette  
The Collection





Край на първа част!

