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

Евгения Сендова

QED’17, 21.09.2017, София

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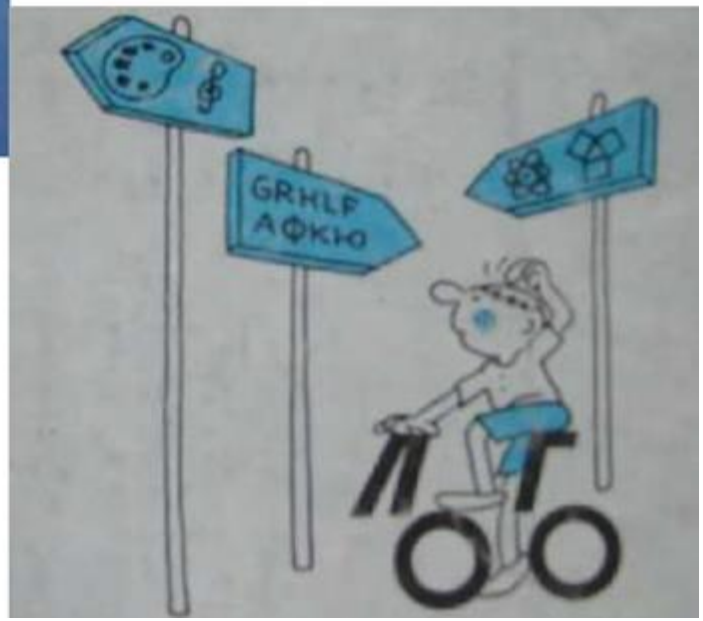
В началото бе…Лого-то



А какво е Лого?

LOGO (λογοσ) 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 начертаем:

- Квадрат
- Окръжност

Детето в ролята на строител на знанията си:

Учи компютъра

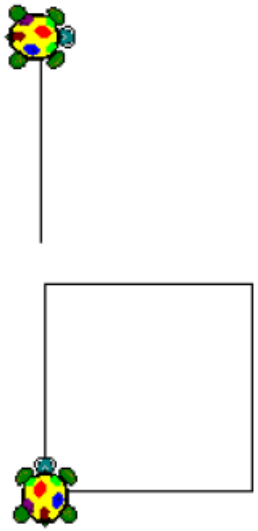
НАПРЕД 100

НАДЯСНО 90

ПОВТОРИ 4 [НАПРЕД 100 НАДЯСНО 90]

КВАДРАТ

КАКВО ЗНАЧИ КВАДРАТ?



Редактира

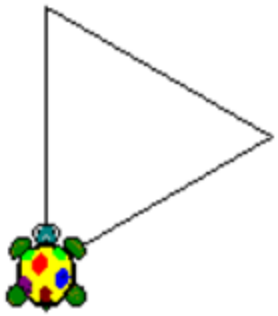
```
ЗА ТРИЪГЪЛНИК
ПОВТОРИ 3 [НАПРЕД 100   НАДЯСНО 60]
КРАЙ
```

Анализира резултата и пак редактира

ЗА ТРИЪГЪЛНИК

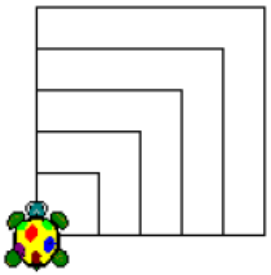
ПОВТОРИ 3 [НАПРЕД 100 НАДЯСНО 120]

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

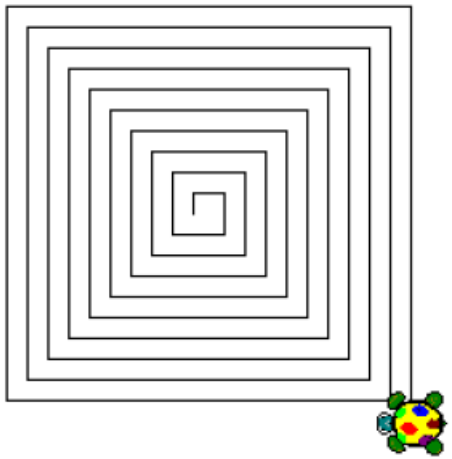
ЗА СПИРАЛА :СТР :ЪГЪЛ

АКО :СТР> 100 [СТОП]

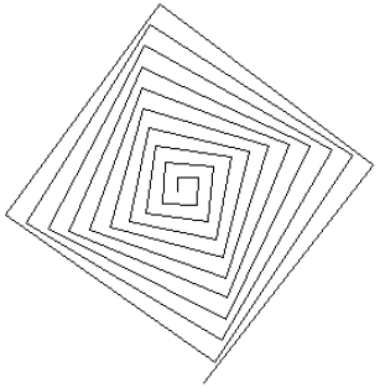
НАПРЕД :СТР НАДЯСНО :ЪГЪЛ

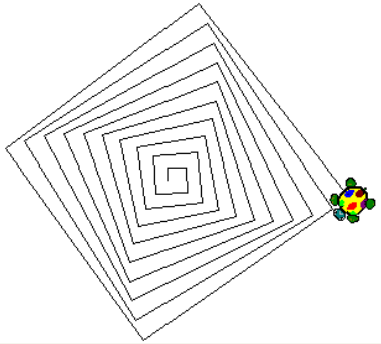
СПИРАЛА :СТР+5 :ЪГЪЛ

КРАЙ

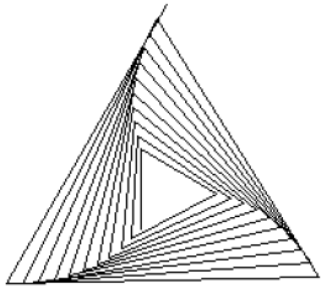


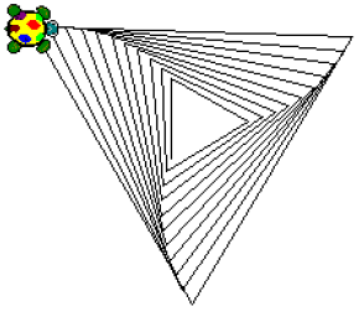
Експериментира и формулира хипотеза





Спирала 10 91
Спирала 10 89

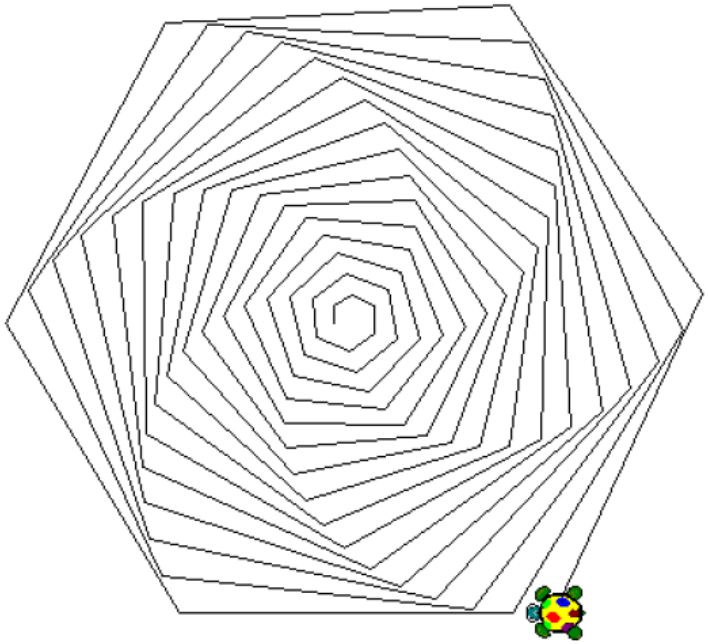




Спирала 50 121
Спирала 50 119

Спирала 10 60
Спирала 10 61
Спирала 10 59

Проверява я експериментално

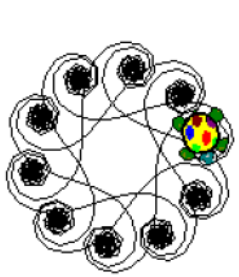


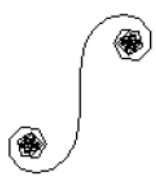
Прилага стратегията:

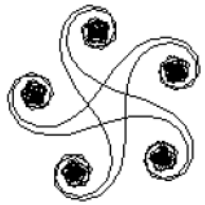
Какво ли ще стане, ако…

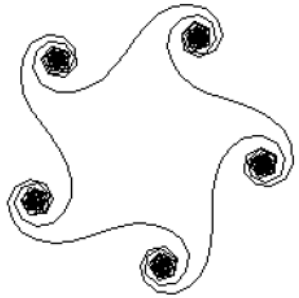
```
ЗА КАКВО?  :СТРАНА   :ЪГЪЛ
АКО :СТРАНА > 100 [СТОП]
НАПРЕД :СТРАНА    НАДЯСНО :ЪГЪЛ
КАКВО? :СТРАНА   :ЪГЪЛ+5
КРАЙ
```

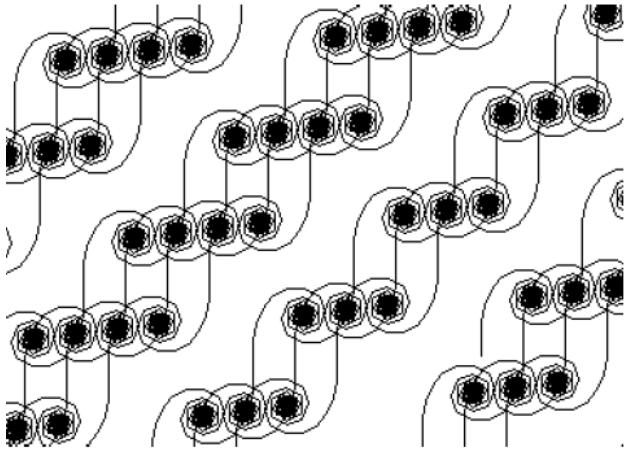
Анализира резултатите „в екип“ с учителя си и споделя откритието си







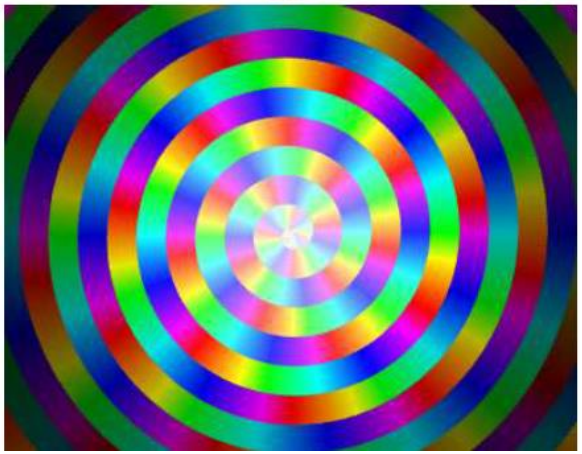


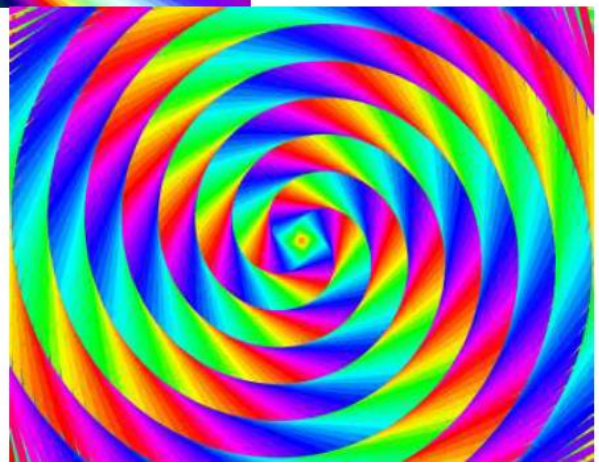


Резултати от командите:

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

SCIENTIX
The community for science education in Europe

http://www.scientix.eu/

Developing by Key Competences Mathematics Education

http://www.keycomath.eu/

Какво предлага Scientix

http://scientix.eu

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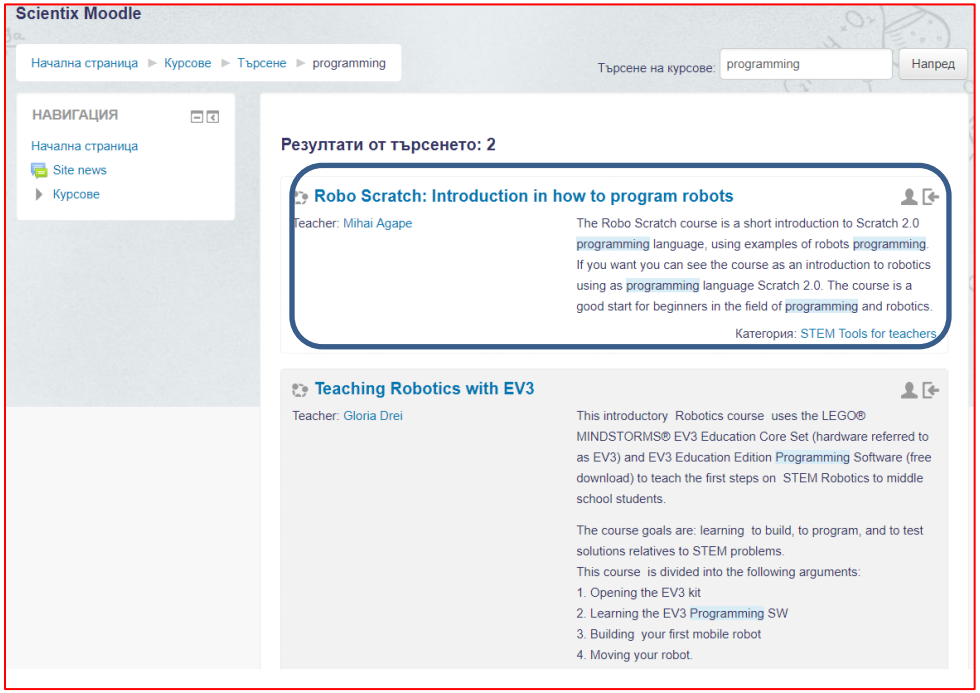

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Какво предлага Scientix

http://scientix.eu

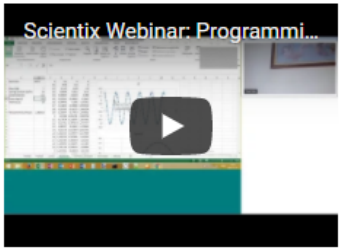
CLOUD BASED SYSTEMS

Author: Alexander Angelov
Date: 30-11-2015
More information

OPEN SOURCE HARDWARE

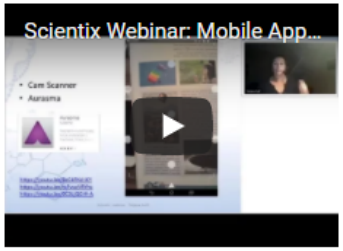
Author: Francisco Pérez
Date: 24-11-2015
More information

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)*

SCIENTIX
The community for science education in Europe

Край на първа част!

European Schoolnet