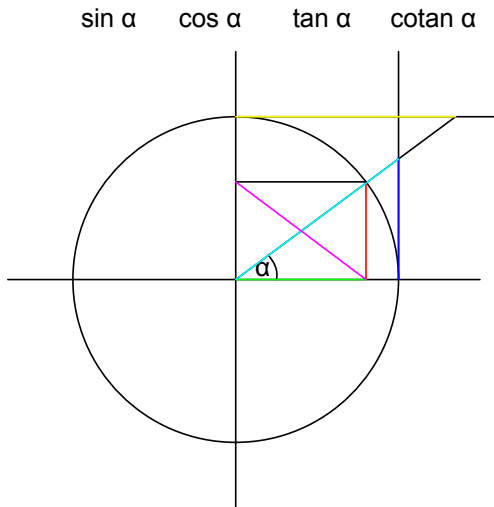


Geometrie 1: úhly, goniometrické funkce, želví grafika

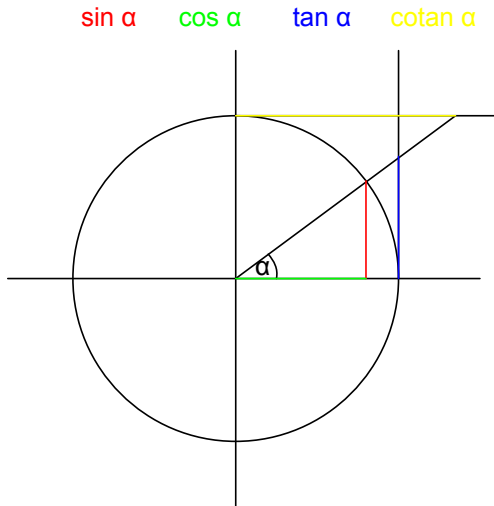
Radek Pelánek

IV122, jaro 2013

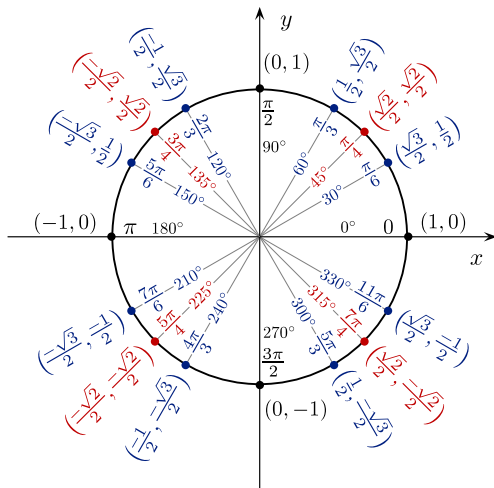
Jednotková kružnice a goniometrické funkce



Jednotková kružnice a goniometrické funkce

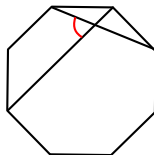
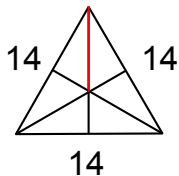
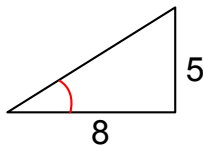


Jednotková kružnice



Zdroj: Wikipedia

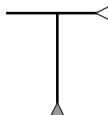
Určete úhly, délku



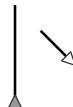
Želví grafika

- forward, back – posun dopředu a dozadu o zadanou vzdálenost
- left, right – otočení o zadaný úhel
- penup, pendown – zvednutí a položení pera

```
forward 80  
left 90  
forward 40  
back 80
```



```
forward 80  
right 45  
penup  
forward 30  
pendown  
forward 30
```



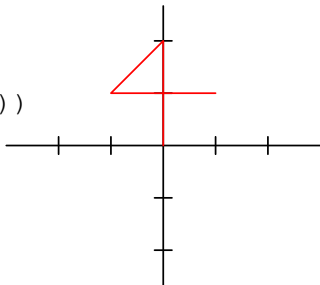
Úkol: Knihovna pro želví grafiku

Vytvořte vlastní knihovnu pro práci s želví grafikou.

- přirozená objektová realizace (třída `Turtle`)
- metody pro pohyb: `forward(step)`, `right(angle)`, `penup()`, ...
- uložení obrazce do SVG souboru

Relativní vs absolutní vykreslování

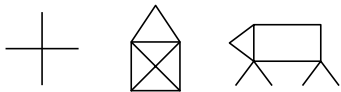
```
forward(2)  
left(135)  
forward(sqrt(2))  
left(135)  
forward(2)
```



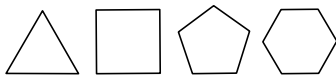
```
line(0,0,0,2)  
line(0,2,-1,1)  
line(-1,1,1,1)
```

Želví grafika – jednoduché obrazce I

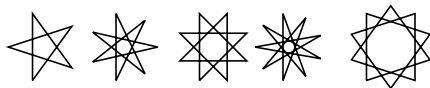
jednoduché kreslení



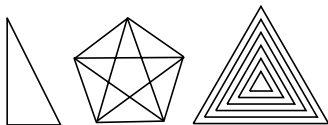
mnohoúhelníky



hvězdy

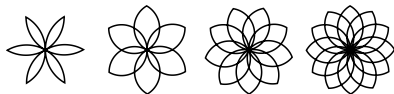


trocha goniometrie

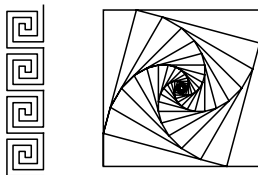


Želví grafika – jednoduché obrazce II

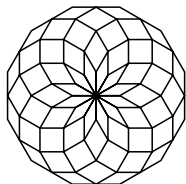
kytky



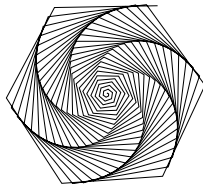
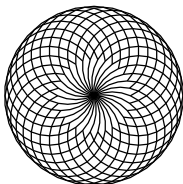
spirály



diamant

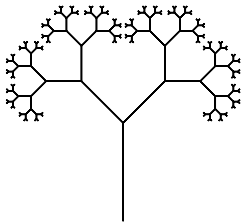


koule

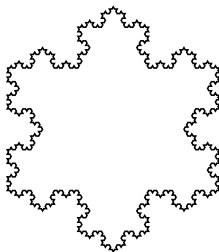


Želví grafika – fraktály

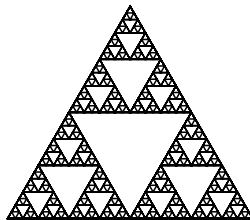
Keř



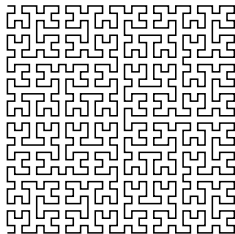
Kochova vločka



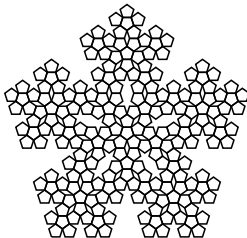
Sierpińského trojúhelník



Hilbertova křivka



Pětiúhelníková vločka



Krishna Anklet

