



Od klika mišem do umjetne inteligencije u Scratch-u

10. Kongres nastavnika matematike RH

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Uvod

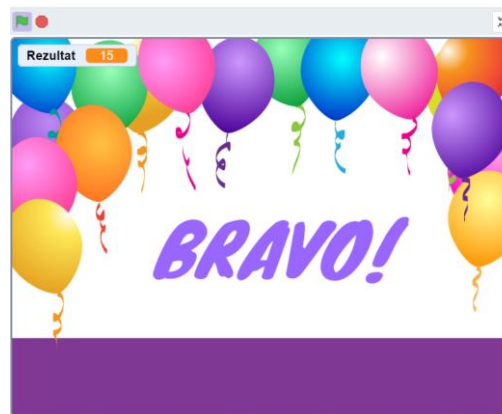
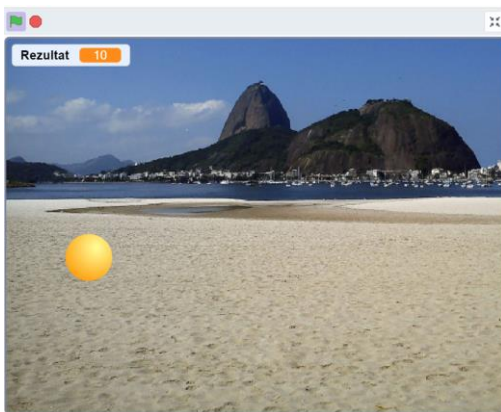
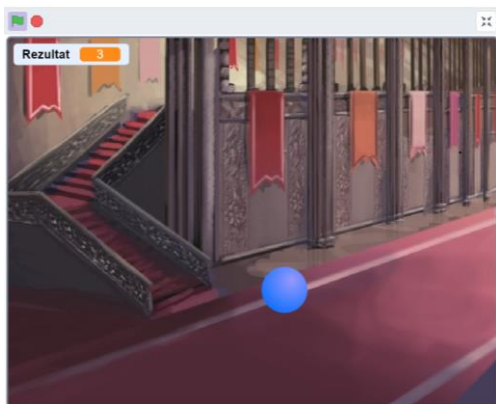
- Scratch omogućava učenicima da steknu osnovno razumijevanje logike programiranja na interaktivan i kreativan način
- Suvremeni pristupi, poput umjetne inteligencije (AI), donose novu dimenziju učenju kroz igru, potičući učenike da razvijaju naprednije projekte i stječu vještine koje su relevantne u današnjem digitalnom dobu

Sadržaj radionice

<https://machinelearningforkids.co.uk/scratch/>

- Dva dijela:
 - prvi dio će se fokusirati na osnovne naredbe korištenjem Scratch platforme
 - drugi dio će se usredotočiti na primjenu umjetne inteligencije za dodatnu interaktivnost i dinamiku – dodavanje funkcionalnosti kao što su prepoznavanje pokreta, prepoznavanje uzoraka ili glasovne naredbe
- Ciljevi:
 - inspirirati učitelje da koriste najbolje od klasičnih i suvremenih metoda u učenju programiranja
 - spojiti klasične temelje programiranja s inovativnim mogućnostima koje pruža umjetna inteligencija u alatu poput Scratcha

Ulovi loptu – klik mišem



The image displays a Scratch script for a ball game. It is organized into three columns of code blocks. The first column contains three sub-programs: 'kretanje' (movement), 'kretanje2', and 'kretanje3'. Each sub-program starts with a 'definiraj' block, followed by 'promijeni efekt' (change effect), 'idi do' (go to), and 'čekaj' (wait) blocks. The second column is the main game loop, starting with 'Kada je kliknuta' (when clicked), followed by 'prikaži' (show), 'prikaži varijablu' (show variable), 'postavi' (set), and 'promijeni pozadinu' (change background) blocks. It then enters a 'ponavljaj' (repeat) loop with three iterations. Each iteration contains a 'ponavljaj dok nije' (repeat while) loop for a specific score (5, 10, and 15). Inside these loops are 'kretanje' blocks and 'govori' (say) blocks. The final iteration includes 'sakrij' (hide), 'promijeni pozadinu' (change background), 'sviraj zvuk' (play sound), and 'zaustavi druge programe lika' (stop other scripts) blocks. The third column contains a 'Kada je lik kliknut' (when clicked by character) block with 'promijeni' (change) and 'sviraj zvuk' (play sound) blocks.

```
definicija kretanje
  promijeni efekt boja za 50
  idi do nasumična pozicija
  čekaj 1 sekundi

definicija kretanje2
  promijeni efekt boja za 50
  idi do nasumična pozicija
  čekaj 0.8 sekundi

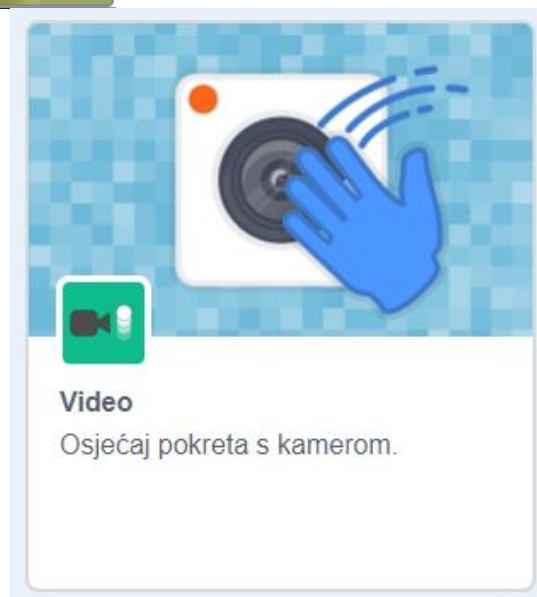
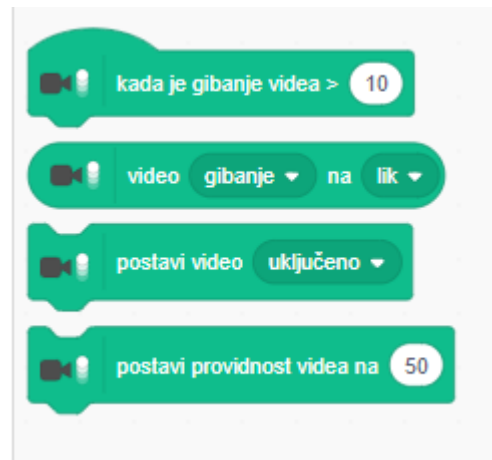
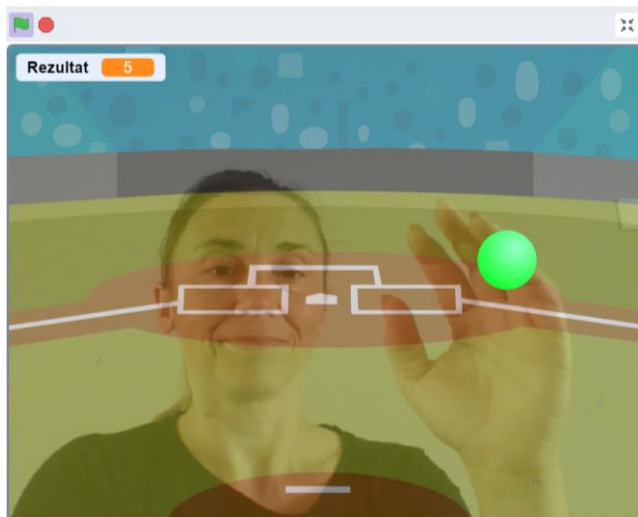
definicija kretanje3
  promijeni efekt boja za 50
  idi do nasumična pozicija
  čekaj 0.6 sekundi

Kada je kliknuta
  prikaži
  prikaži varijablu Rezultat
  postavi Rezultat na 0
  promijeni pozadinu na Castle 3
  ponavljaj
    ponavljaj dok nije Rezultat = 5
      kretanje
    govori Bravol Prvi nivo je uspješno završen! 2 sekundi
    promijeni pozadinu na Baseball 1
    ponavljaj dok nije Rezultat = 10
      kretanje2
    govori Bravol Drugi nivo je uspješno završen! 2 sekundi
    promijeni pozadinu na Beach Rio
    ponavljaj dok nije Rezultat = 15
      kretanje3
    sakrij
    promijeni pozadinu na Party
    sviraj zvuk Wand do kraja
    zaustavi druge programe lika

Kada je lik kliknut
  promijeni Rezultat za 1
  sviraj zvuk Pop do kraja
```

Programsko rješenje za igru s loptom.

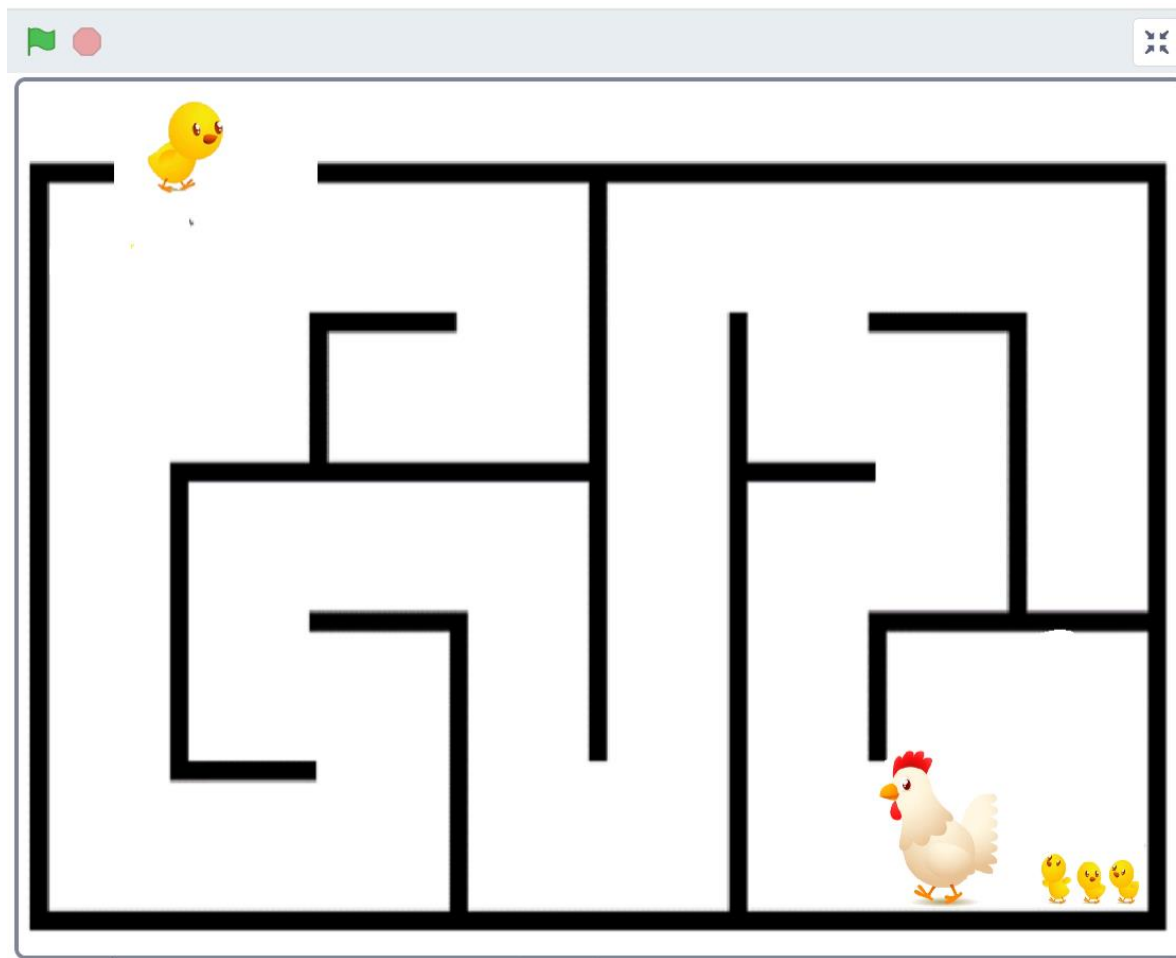
Ulovi loptu - UI dodatak



Programsko rješenje za igru s loptom uz pokret i kameru.

The image displays a Scratch script for a ball game, organized into three columns. The first column contains three sub-procedures: 'kretanje' (movement), 'kretanje2', and 'kretanje3'. Each procedure starts with 'definiraj' (define) and 'promijeni efekt boja za 50' (change color effect by 50), followed by 'idi do nasumična pozicija' (go to random position) and a 'čekaj' (wait) block. The second column is the main script, triggered by 'Kada je kliknuta' (when clicked). It begins with 'postavi video uključeno' (set video on) and 'postavi providnost videa na 50' (set video opacity to 50). It then shows 'prikaži' (show) and 'prikaži varijablu Rezultat' (show variable Rezultat). The variable 'Rezultat' is set to 0, and the background is changed to 'Castle 3'. A 'ponavljaj' (repeat) loop is used: 'ponavljaj dok nije' (repeat while not) with a condition 'Rezultat = 5'. Inside the loop, 'mahanje' (shake) and 'kretanje' (movement) blocks are executed. After the loop, a 'govori' (say) block displays 'Bravo! Prvi nivo je uspješno završen!' (Well done! First level completed successfully!) for 2 seconds, and the background is changed to 'Baseball 1'. Another 'ponavljaj dok nije' loop with condition 'Rezultat = 10' follows, containing 'mahanje' and 'kretanje2' blocks. This is followed by a third 'ponavljaj dok nije' loop with condition 'Rezultat = 15', containing 'mahanje' and 'kretanje3' blocks. The script concludes with 'postavi video isključeno' (set video off), 'sakrij' (hide), 'promijeni pozadinu na Party' (change background to Party), 'sviraj zvuk Wand do kraja' (play sound Wand until end), and 'zaustavi druge programe lika' (stop other scripts of this sprite).

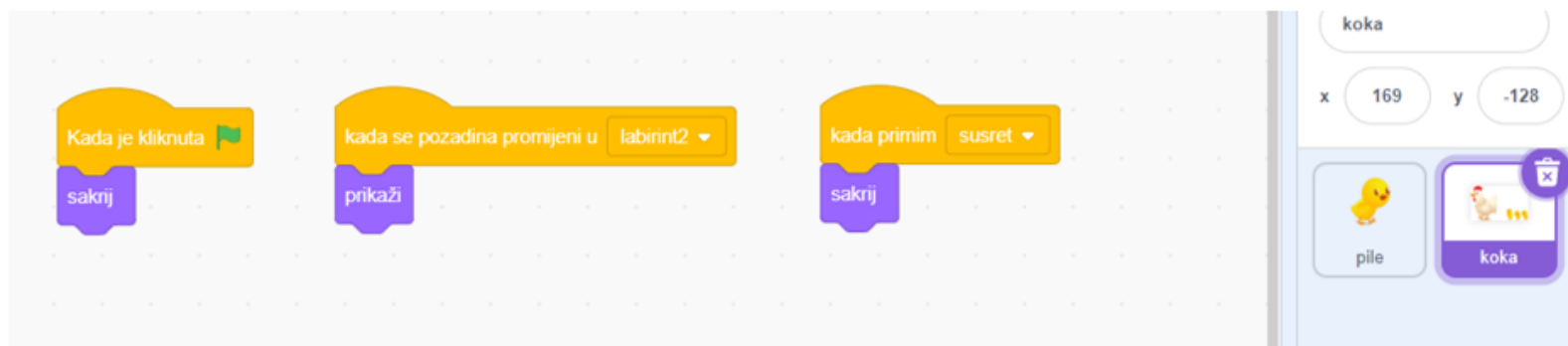
Labirint – kretanje strelicama



The image displays a Scratch script for a maze game, organized into three main sections:

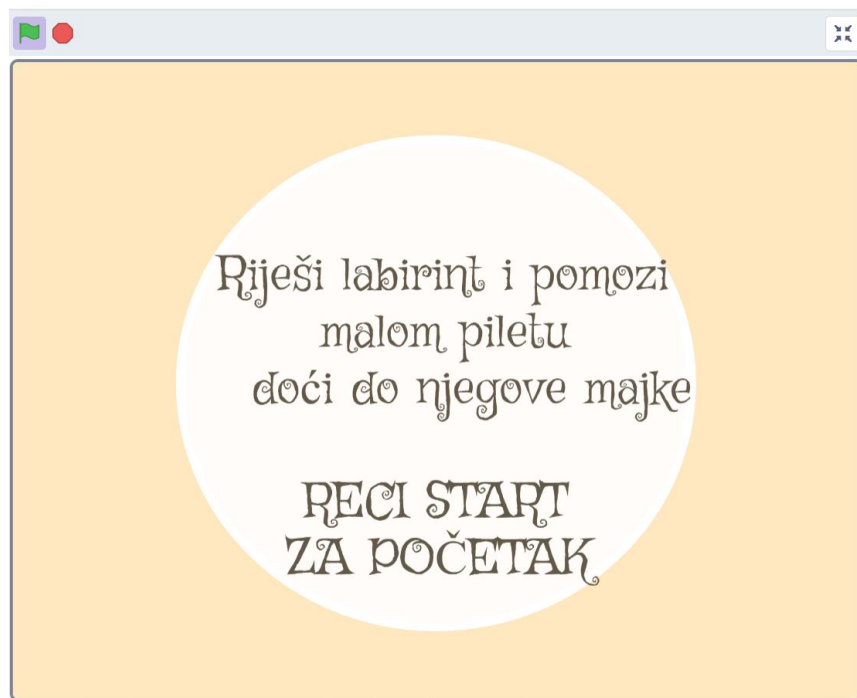
- Left Section (Movement):** Starts with a pink 'definiraj kretanje' block. It contains four 'ako' (if) blocks, each triggered by a specific arrow key ('tipka strelica dolje', 'tipka strelica gore', 'tipka strelica lijevo', 'tipka strelica desno'). Each 'ako' block is followed by an 'onda' (then) block that changes a coordinate: 'promijeni y za -5' (down), 'promijeni y za 5' (up), 'promijeni x za -5' (left), and 'promijeni x za 5' (right).
- Middle Section (Collision and Win):** Starts with a yellow 'Kada je kliknuta' (when clicked) block followed by a purple 'sakrij' (hide) block. Below it is a yellow 'kada primim susret' (when I receive susret) block. This is followed by a purple 'promijeni pozadinu na pozadina3' (change background to pozadina3), a purple 'sakrij' (hide) block, a purple 'sviraj zvuk Win do kraja' (play sound Win to the end), and a yellow 'zaustavi sve' (stop all) block.
- Right Section (Maze Logic):** Starts with a yellow 'kada se pozadina promijeni u labirint2' (when background changes to labirint2) block. It includes a purple 'prikaži' (show) block, a blue 'idi na x: -172 y: 152' (go to x: -172 y: 152) block, and an orange 'ponavljaj' (repeat) loop. Inside the loop, there are two 'ako' (if) blocks: one for 'dodiruje boju' (touches color) with a black circle, and another for 'dodiruje koka' (touches koka). The first 'ako' block has an 'onda' (then) block with 'idi na x: -172 y: 152' and 'govori Uh, pokušaj ponovo! 1 sekundi' (say Uh, pokušaj ponovo! 1 sekundi). The second 'ako' block has an 'onda' (then) block with 'govori Mamice, pronašao sam tel 2 sekundi' (say Mamice, pronašao sam tel 2 sekundi), 'sviraj zvuk Chee Chee do kraja' (play sound Chee Chee to the end), and a yellow 'pošalji susret i čekaj' (send susret and wait) block.

Programsko rješenje za pile u labirintu.



Programsko rješenje za
start i kokoš.

Labirint pomoću glasovnog upravljanja



Programsko rješenje za pile i kokoš pomoću glasovnog upravljanja.

```
Kada je kliknuta
sakrij
promijeni pozadinu na pozadina2
slušaj i čekaj
```

```
kada primim susret
promijeni pozadinu na pozadina3
sakrij
sviraj zvuk Win do kraja
zaustavi sve
```

```
kada čujem START
sakrij
promijeni pozadinu na labirint2
idi na x: -172 y: 152
```

```
kada čujem DESNO
promijeni x za 30
```

```
kada čujem LIJEVO
promijeni x za -30
```

```
kada čujem GORE
promijeni y za 30
```

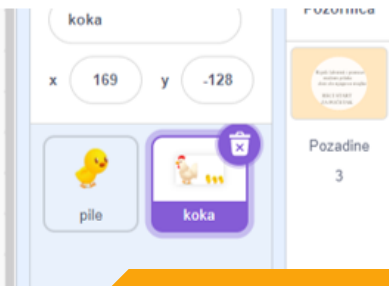
```
kada čujem DOLJE
promijeni y za -30
```

```
kada se pozadina promijeni u labirint2
prikaži
idi na x: -172 y: 152
ponavljaj
  slušaj i čekaj
  ako dodiruje boju ? onda
    idi na x: -172 y: 152
    govori Uh, pokušaj ponovo! 1 sekundi
  ako dodiruje koka ? onda
    govori Mamice, pronašao sam te! 2 sekundi
    sviraj zvuk Chee Chee do kraja
    pošalji susret i čekaj
```

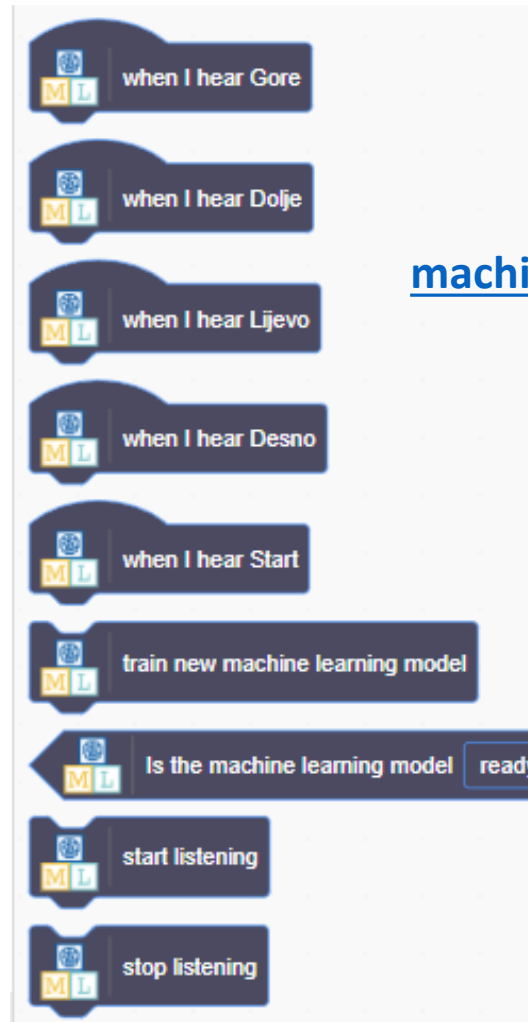
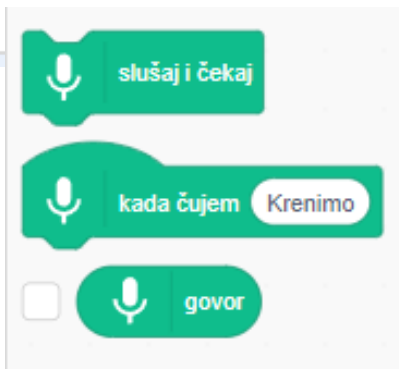
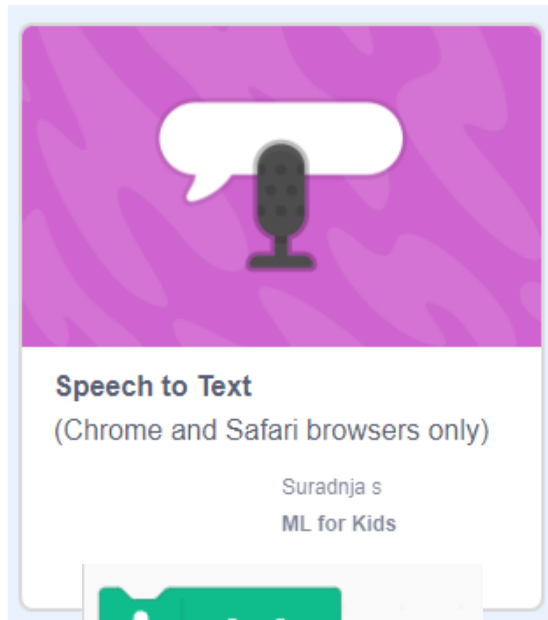
```
Kada je kliknuta
sakrij
```

```
kada se pozadina promijeni u labirint2
prikaži
```

```
kada primim susret
sakrij
```

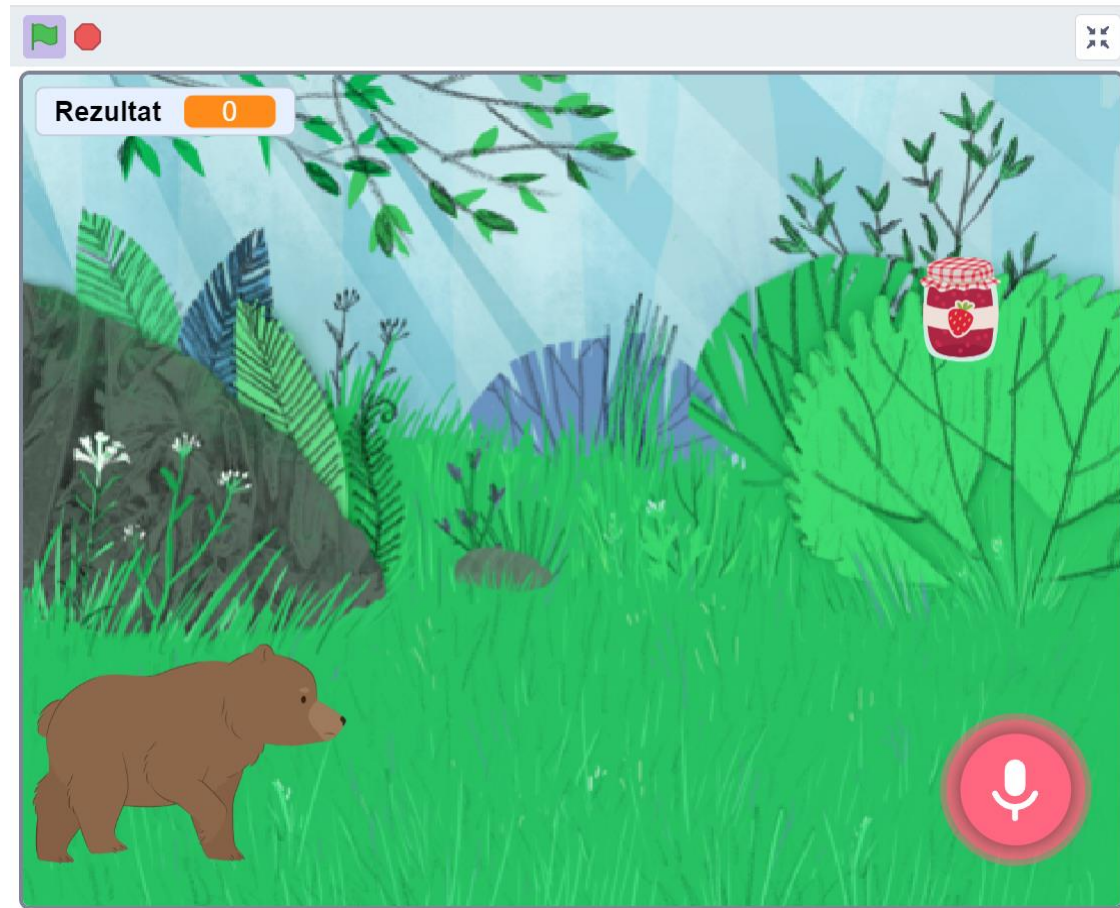


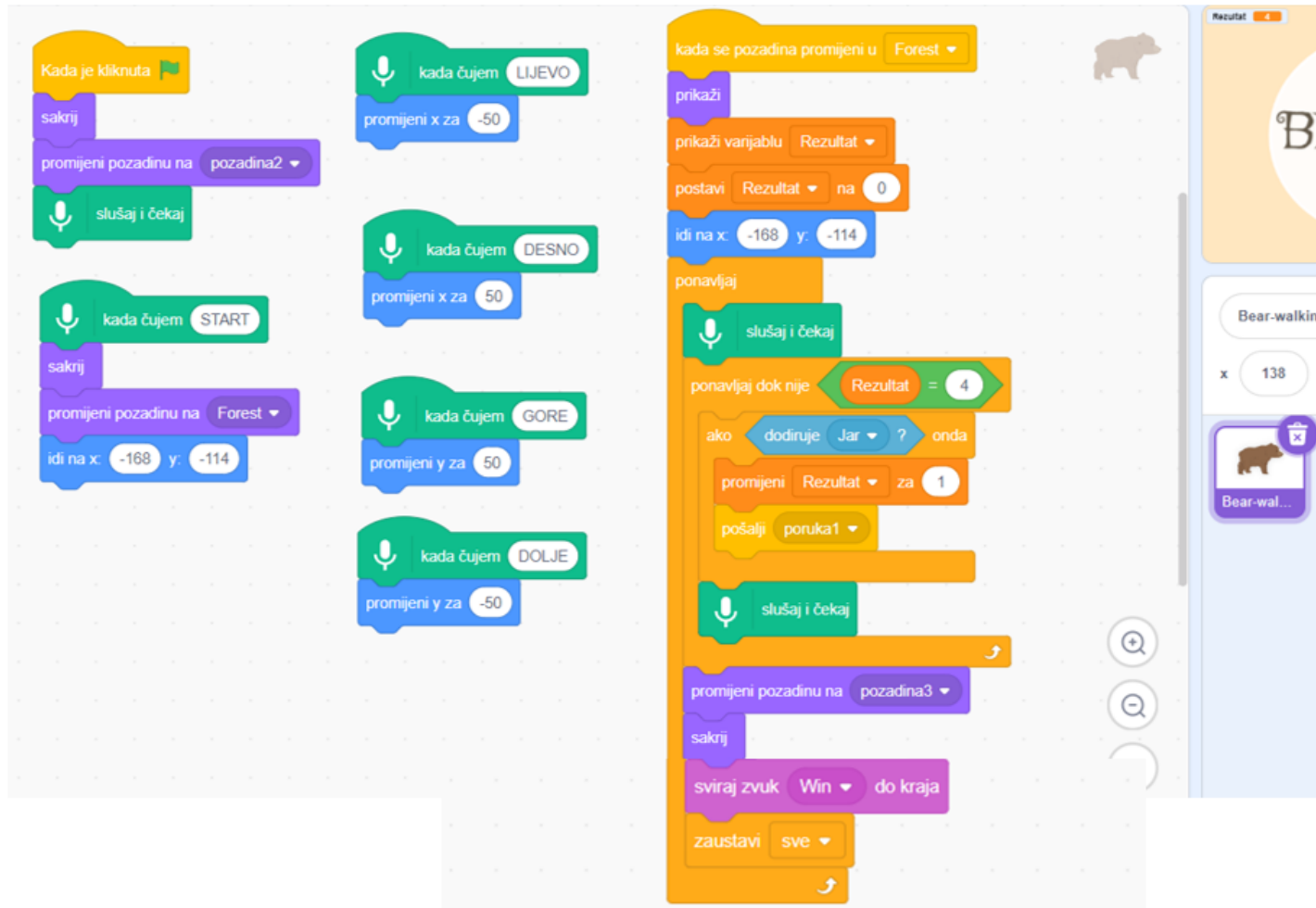
Glasovno upravljanje – UI dodaci



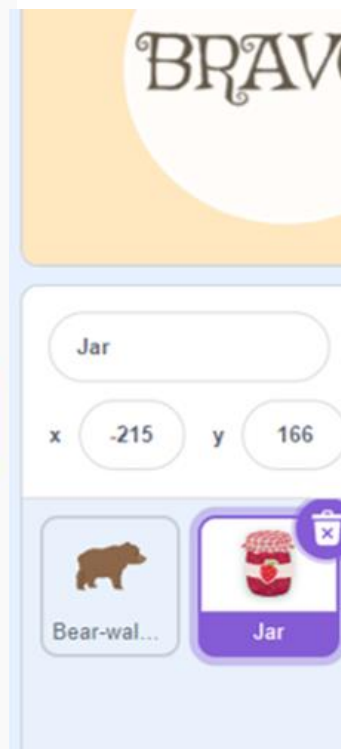
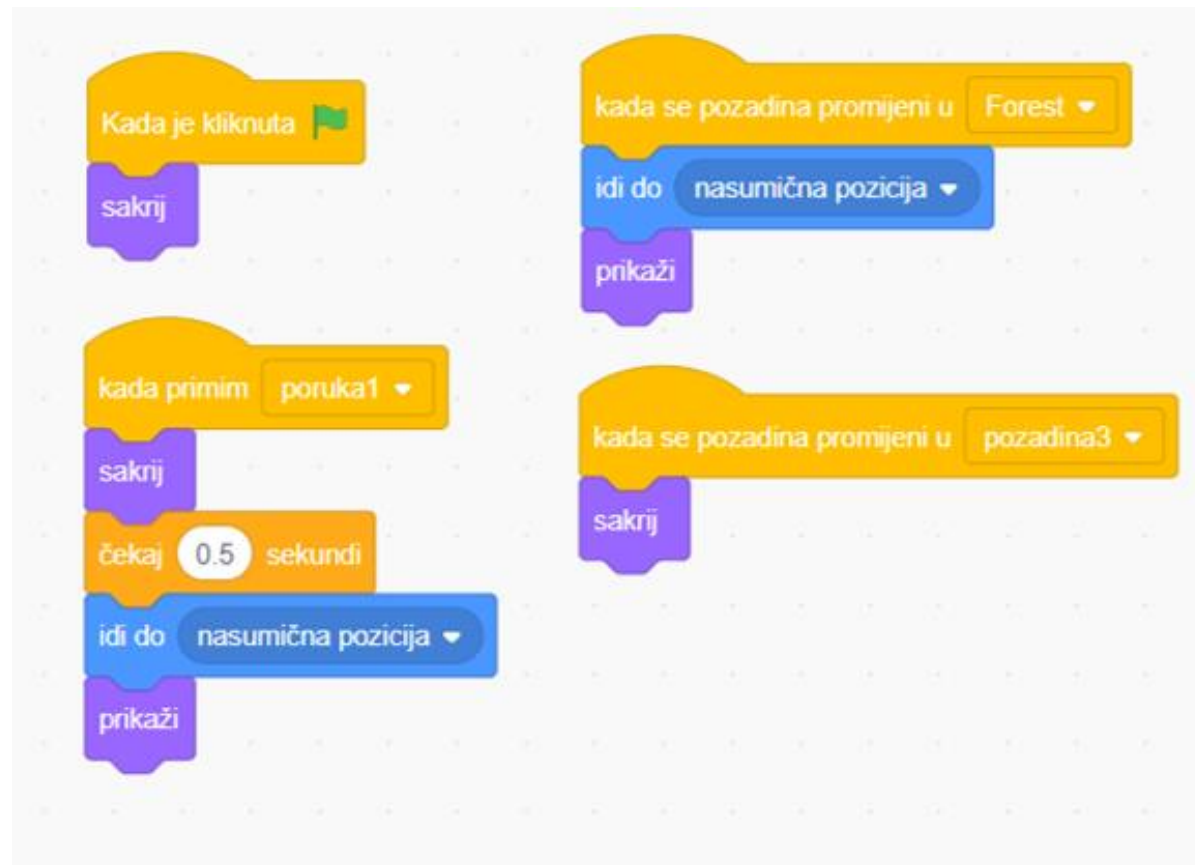
machinelearningforkids.co.uk

Medo i džem – glasovno upravljanje



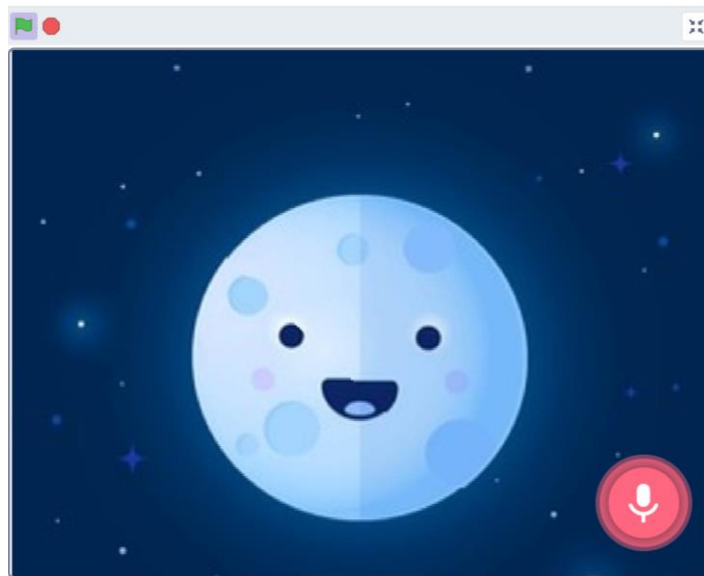


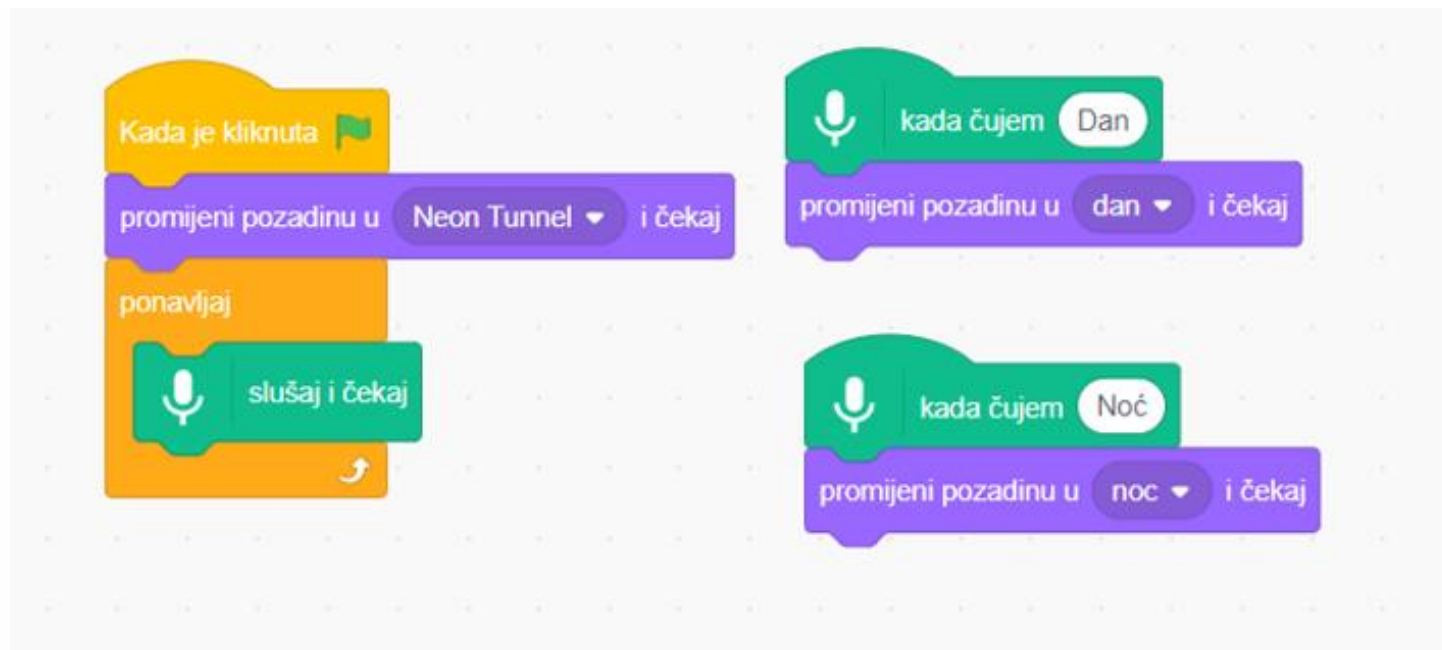
Programsko rješenje za medu.



Programsko rješenje za džem.

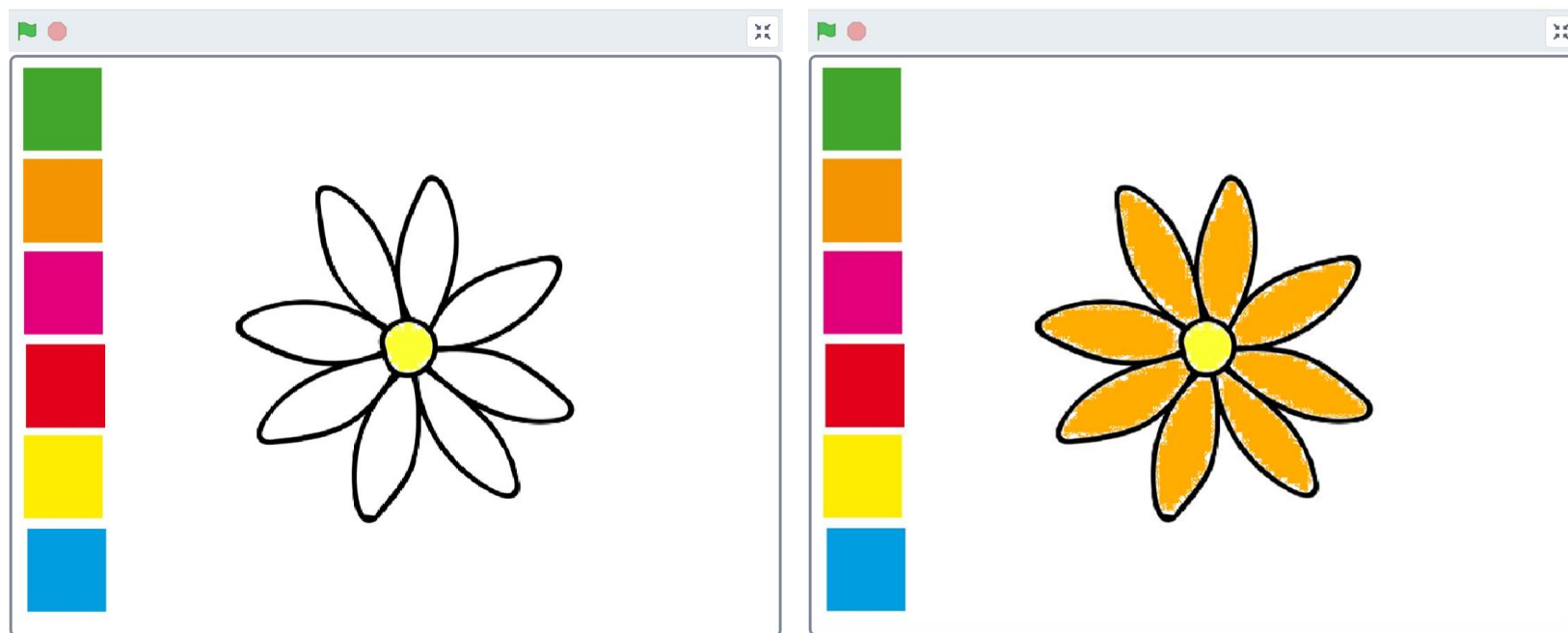
Dan-noć

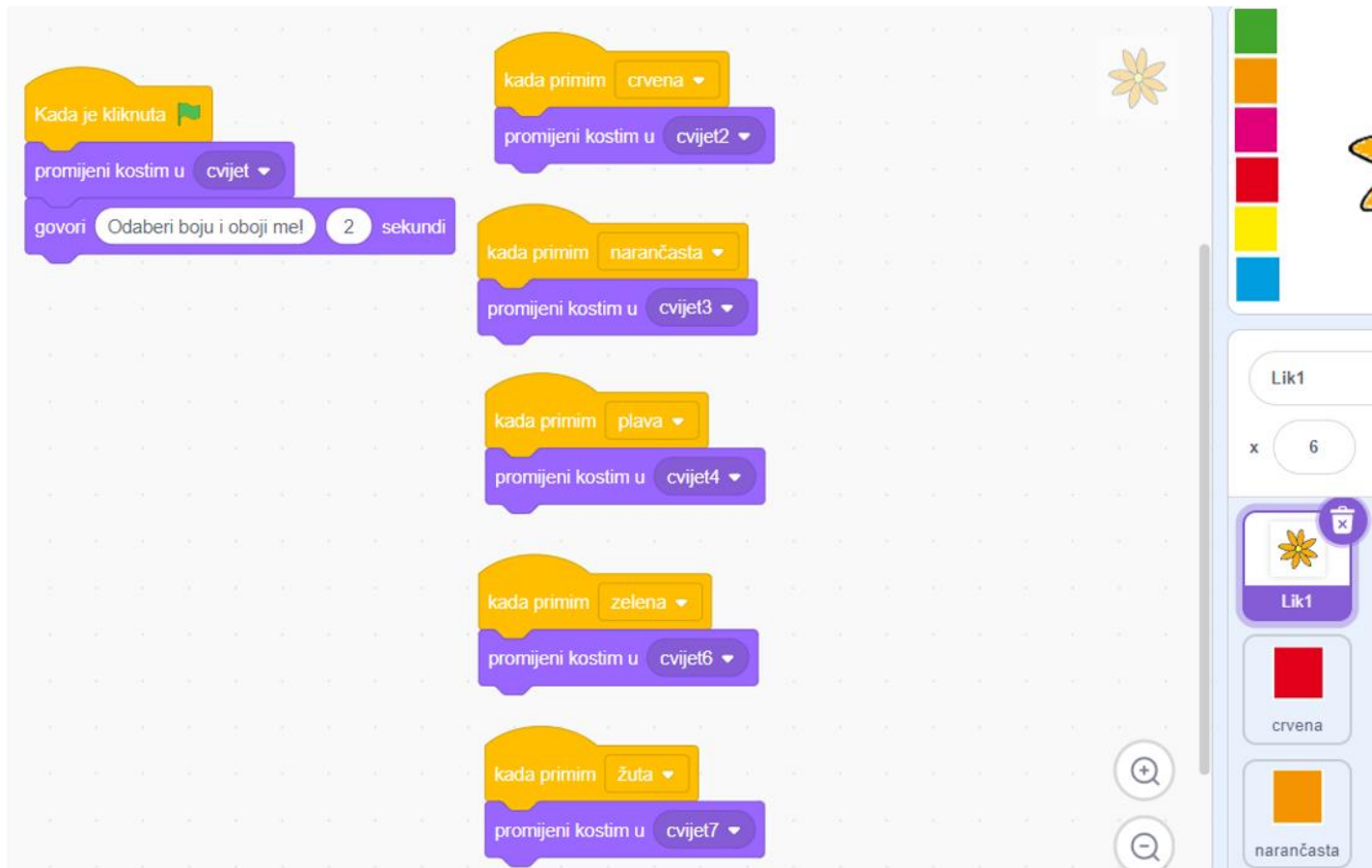




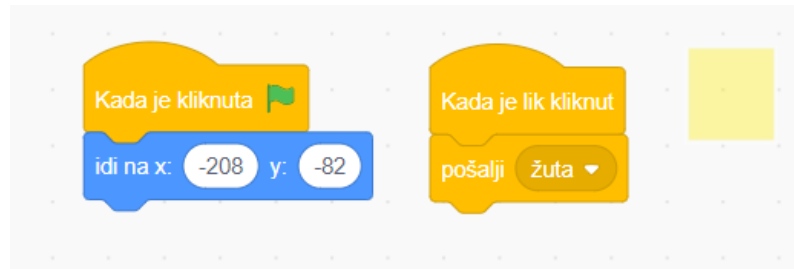
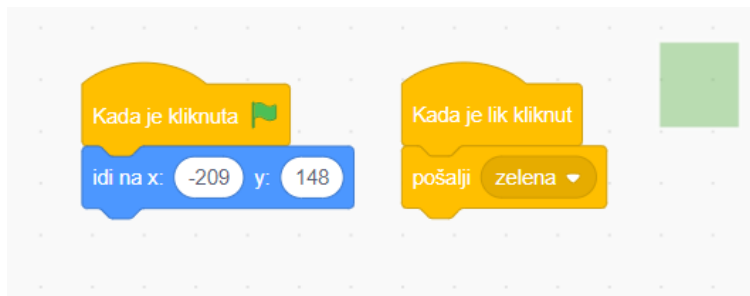
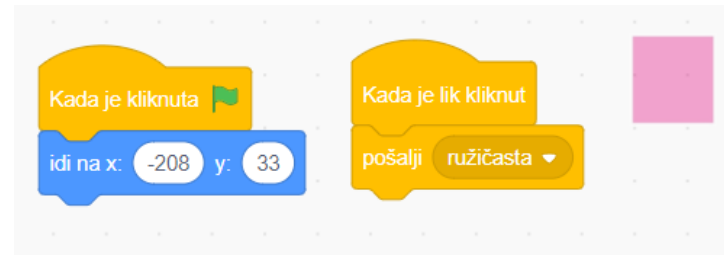
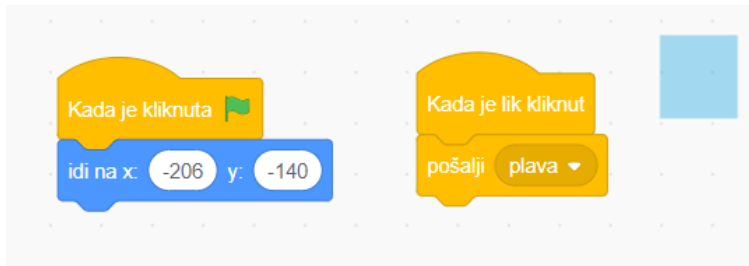
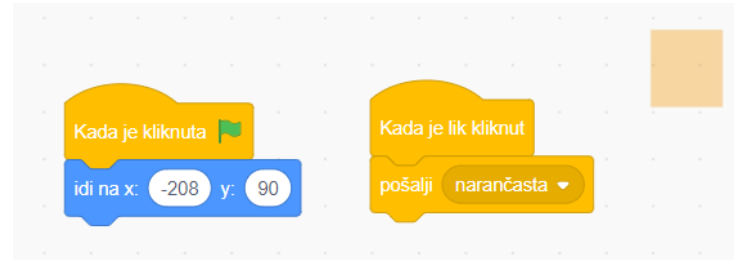
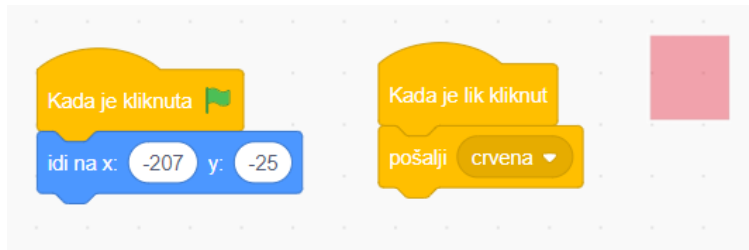
Programsko rješenje za glasovno upravljanje u igri „Dan-noć”.

Bojanje – odabir boje mišem





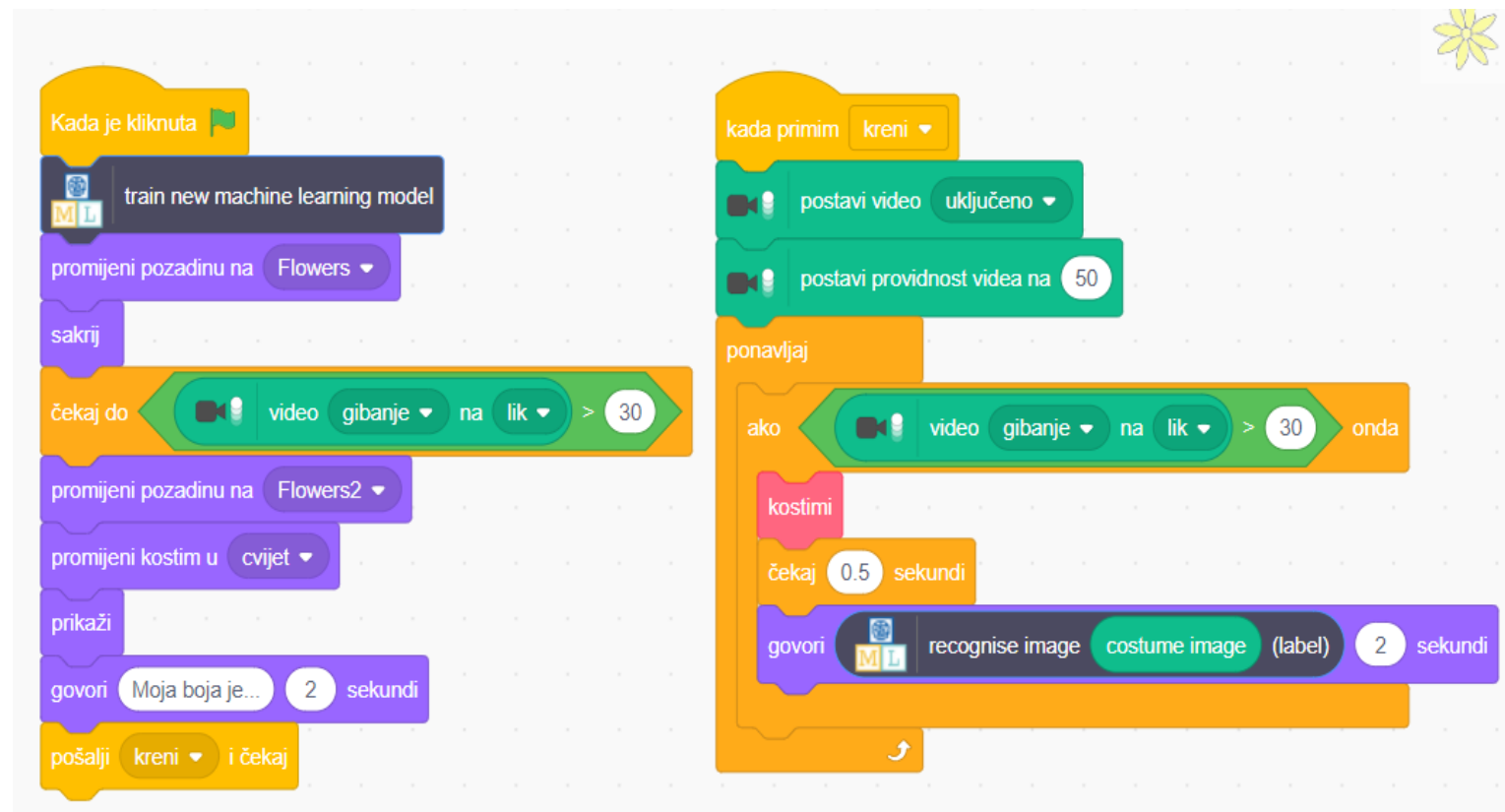
Programsko rješenje za cvijet.



Programska rješenja za boje.

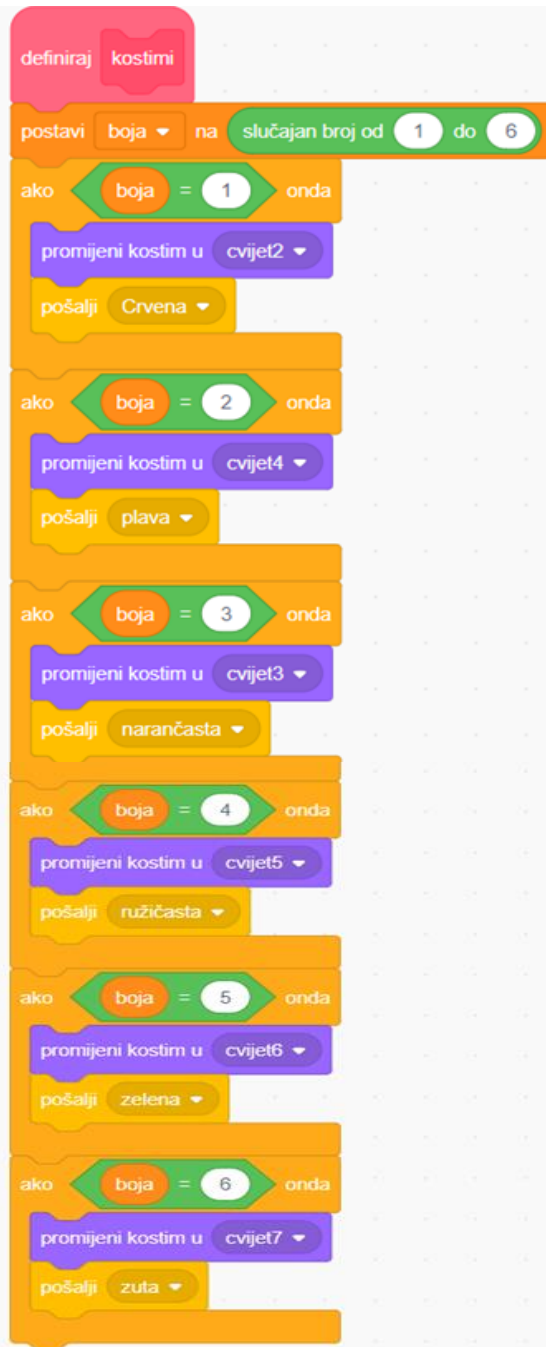
Bojanje uz korištenje modela prepoznavanja uzorka





Programsko rješenje za cvijet.

Programsko rješenje za slučajni odabir boje



```
definiiraj kostimi
postavi boja na slučajan broj od 1 do 6
ako boja = 1 onda
  promijeni kostim u cvijet2
  pošalji Crvena
ako boja = 2 onda
  promijeni kostim u cvijet4
  pošalji plava
ako boja = 3 onda
  promijeni kostim u cvijet3
  pošalji narančasta
ako boja = 4 onda
  promijeni kostim u cvijet5
  pošalji ružičasta
ako boja = 5 onda
  promijeni kostim u cvijet6
  pošalji zelena
ako boja = 6 onda
  promijeni kostim u cvijet7
  pošalji zuta
```

The image shows a Scratch script for random color selection. It starts with a 'definiiraj kostimi' block. Then, a 'postavi boja na slučajan broj od 1 do 6' block sets a random number between 1 and 6. This is followed by six conditional blocks, each starting with 'ako boja = [number] onda'. Each conditional block contains two sub-blocks: 'promijeni kostim u [cvijetX]' and 'pošalji [boja]'. The colors are: 1 (Crvena), 2 (plava), 3 (narančasta), 4 (ružičasta), 5 (zelena), and 6 (zuta).


```
Kada je kliknuta
  idi na x: -209 y: 31
  sakrij
```

```
kada primim Crvena
  ponovi 2
    promijeni veličinu za 10
    čekaj 0.5 sekundi
  promijeni veličinu za -10
  čekaj 0.5 sekundi
```

```
kada se pozadina promijeni u Flowers2
  postavi veličinu na 20 %
  prikaži

Kada je kliknuta
  idi na x: -209 y: -147
  sakrij
```

```
kada primim narančasta
  ponovi 2
    promijeni veličinu za 10
    čekaj 0.5 sekundi
  promijeni veličinu za -10
  čekaj 0.5 sekundi
```

```
kada se pozadina promijeni u Flowers2
  postavi veličinu na 20 %
  prikaži
```

```
Kada je kliknuta
  idi na x: -209 y: -28
  sakrij
```

```
kada se pozadina promijeni u Flowers2
  postavi veličinu na 20 %
  prikaži

Kada je kliknuta
  idi na x: -209 y: 148
  sakrij
```

```
kada primim ružičasta
  ponovi 2
    promijeni veličinu za 10
    čekaj 0.5 sekundi
  promijeni veličinu za -10
  čekaj 0.5 sekundi
```

Programsko rješenje za boje i isticanje kad ih lik prepozna

Scratch code blocks for a green background and green click event:

- When background color changes to Flowers2:**
 - Set size to 20 %
 - Show
- When green flag is clicked:**
 - Go to x: -209 y: 90
 - Hide
- When green key is pressed:**
 - Repeat 2 times:
 - Change size by 10
 - Wait 0.5 seconds
 - Change size by -10
 - Wait 0.5 seconds

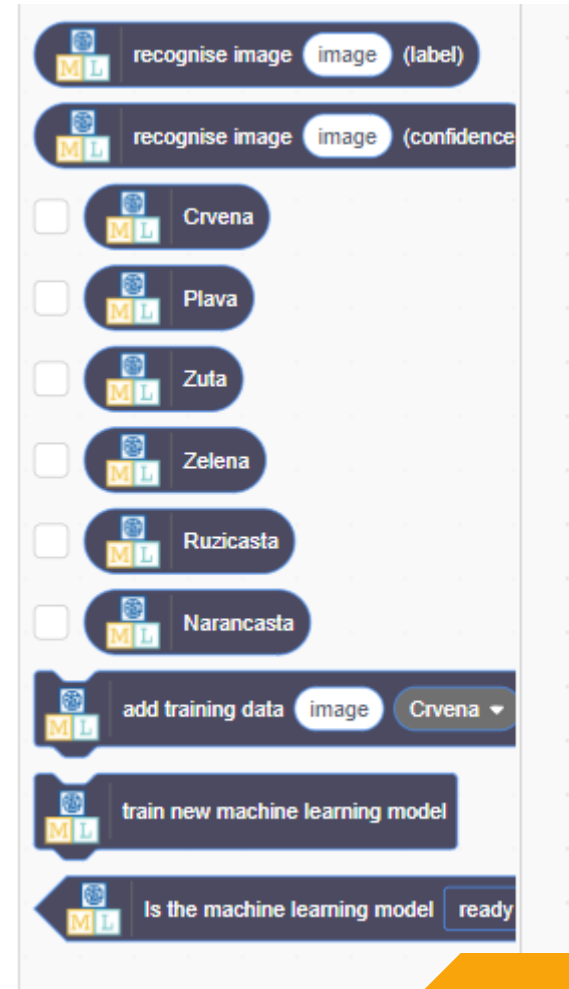
Scratch code blocks for a yellow background and yellow click event:

- When background color changes to Flowers2:**
 - Set size to 20 %
 - Show
- When yellow flag is clicked:**
 - Go to x: -209 y: -88
 - Hide
- When yellow key is pressed:**
 - Repeat 2 times:
 - Change size by 10
 - Wait 0.5 seconds
 - Change size by -10
 - Wait 0.5 seconds

Programsko rješenje za boje i isticanje kad ih lik prepozna

Model prepoznavanja uzorka

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Sadržaji za radionicu

<https://bit.ly/4cyURHY>

Evaluacija

bit.ly/kongres-mat



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