



# PROGRAMIRANJE MINDSTORMS ROBOTA

Škola robotike, Ogulin, ožujak 2010.

# DIJELOVI ROBOTA

---



**Light Sensor**



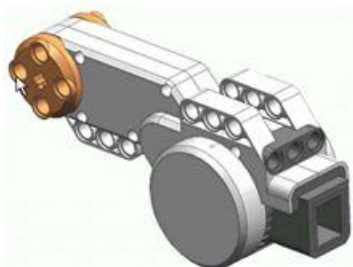
**Ultrasonic Sensor**



**Sound Sensor**



**Touch Sensor**



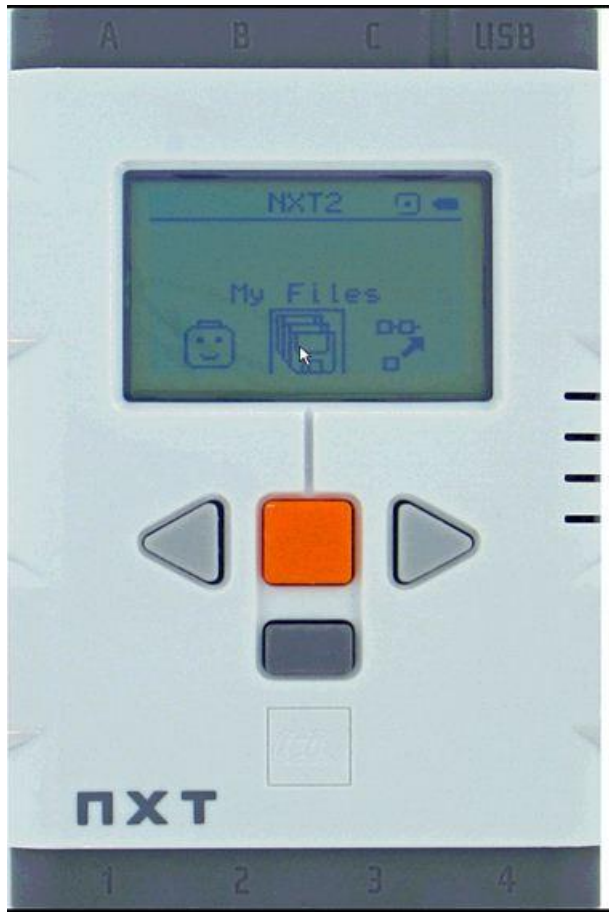
**3 SERVO MOTORA**

---



# TEHNIČKE KARAKTERISTIKE

---



- ✓ 32-bit ARM7 mikrokontroler
  - ✓ 256 KB FLASH, 64 KB RAM
  - ✓ 8-bit AVR mikrokontroler
  - ✓ 4 Kbytes FLASH, 512 Byte RAM
  - ✓ Bluetooth veza (Bluetooth Class II V2.0 compliant)
  - USB port (12 Mbit/s)
  - ✓ 4 ulazna porta, 6-kablova (uključuje IEC 61158 Type 4/EN 50 170 compliant expansion port)
  - ✓ 3 izlazna porta, 6-kablova
  - ✓ 100 x 64 pixel LCD graphical display
  - ✓ Loudspeaker - 8 kHz kvaliteta zvuka. Zvučni kanal sa 8-bit rezolucijom i raspon od 2 do 16 KHz .
  - ✓ Napajanje: 6 AA baterija
- 



# KONSTRUKCIJA

---



ALPHAREX

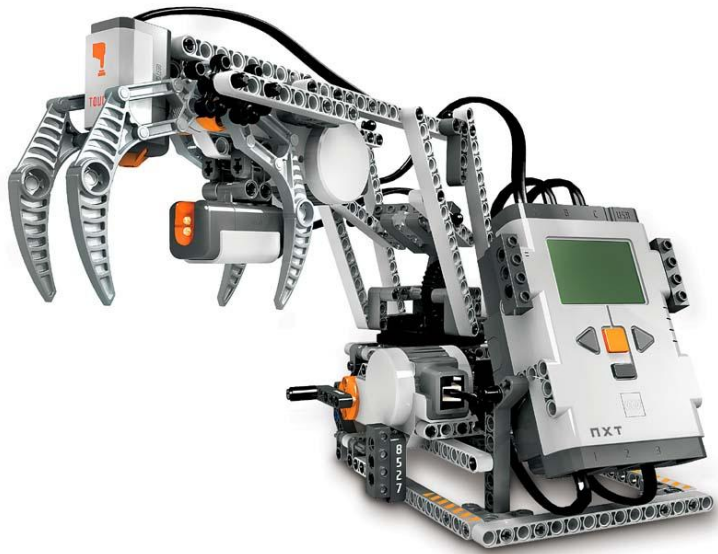
## Izgled čovjeka Što može raditi?

- Hodati na dvije noge (uz pomoć 2 servo motora)
- Čuti i govoriti (zvučni senzor)
- Vidjeti (Ultrasonic senzor)
- Osjetiti (senzor za dodir i svjetlosni senzor)



# KONSTRUKCIJA

---



ROBOARM

- 3 servo motora koji upravljaju RoboArm-om . Jedan motor služi za pokretanje kliješta a druga dva za podizanje, spuštanje i okretanje
  - Može detektirati boje predmeta sa svjetlosnim senzorom i osjetiti predmete sa senzorom za dodir.
- 



# KONSTRUKCIJA

---



PAUK (SPIKE)

## Izgled pauka

Što može raditi?

- Pauk reagira kao škorpion.
- Ima šest nogu, kliješta i žalac
- Pauk može vidjeti, čuti i “paralizirati ubodom” žalca koji je pokretan



# KONSTRUKCIJA

---



TRIBOT

## Vozilo Što može raditi?

- Ovo je najmobilnija varijanta robota
- Koristi svih pet senzora
- Ima najviše programerskog potencijala



# KOMUNIKCIJA robot-računalo

---

## 1. BLUETOOTH om



## 2. USB KABELOM

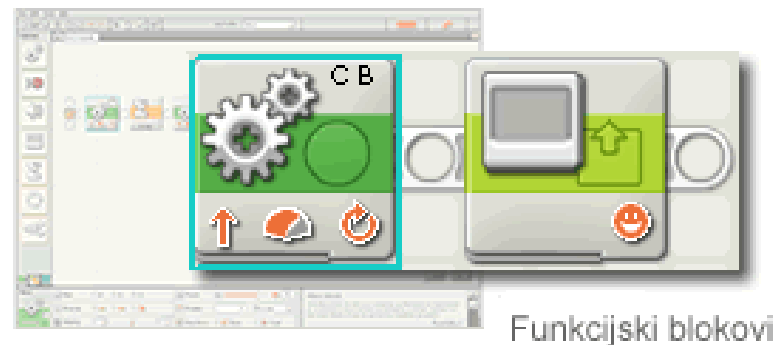
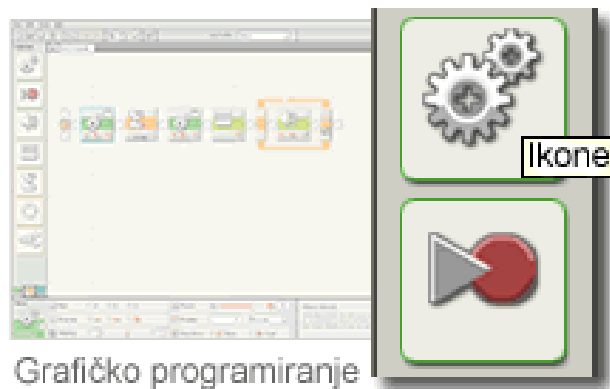




# VIZUALNO PROGRAMIRANJE

---

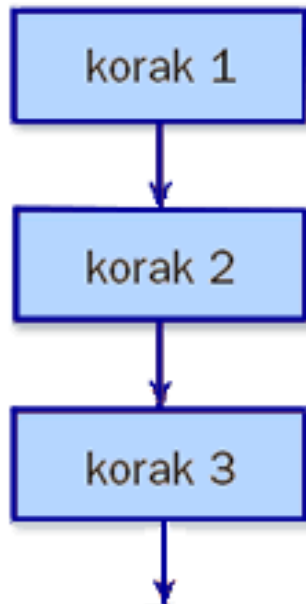
- program NXT, ima grafičko sučelje.
- sadrži i grafičke naredbe za programiranje.
- način na koji se programira, sličan je **crtanju blok dijagrama** - ne utipkava se tekst programa već se postupkom miša pritisni-povuci, grafički blokovi s lijeve strane zaslona slažu u dijagram (program) s desne strane zaslona.



# VIZUALNO PROGRAMIRANJE – SLIJEDNE NAREDBE

---

## OPĆENITO



## U PROGRAMU LEGO NXT

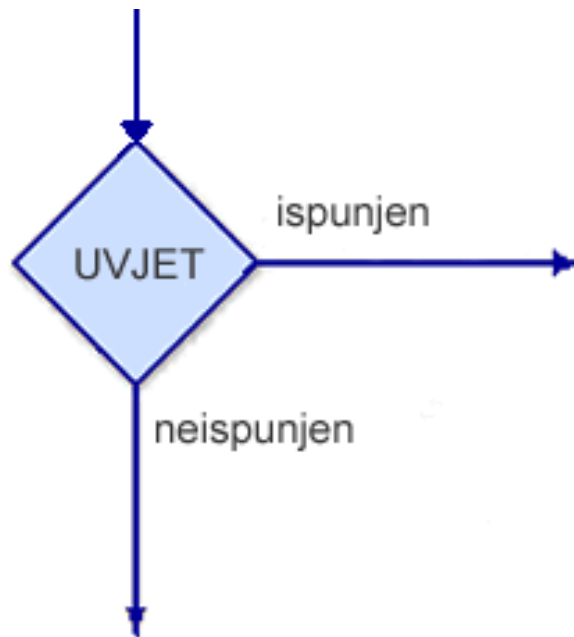
Robot se kreće prema naprijed 2 sekunde, zati stane i kaže "Have A Nice Day", zatim na zaslonu pokaže Smile-a nakon toga, nastavi se kretati prema naprijed još 2 sekunde.

The screenshot shows a sequence of five programming blocks in the LEGO NXT software. The first block is a start block (orange square with a white 'P'). The second and fifth blocks are motor blocks (grey with green gears and 'AB' label). The third block is a sound block (grey with a speaker icon). The fourth block is a display block (grey with a screen icon). The text below the blocks describes the sequence: the robot moves forward for 2 seconds, stops and says "Have A Nice Day", shows a smile on the screen, and then continues moving forward for another 2 seconds.

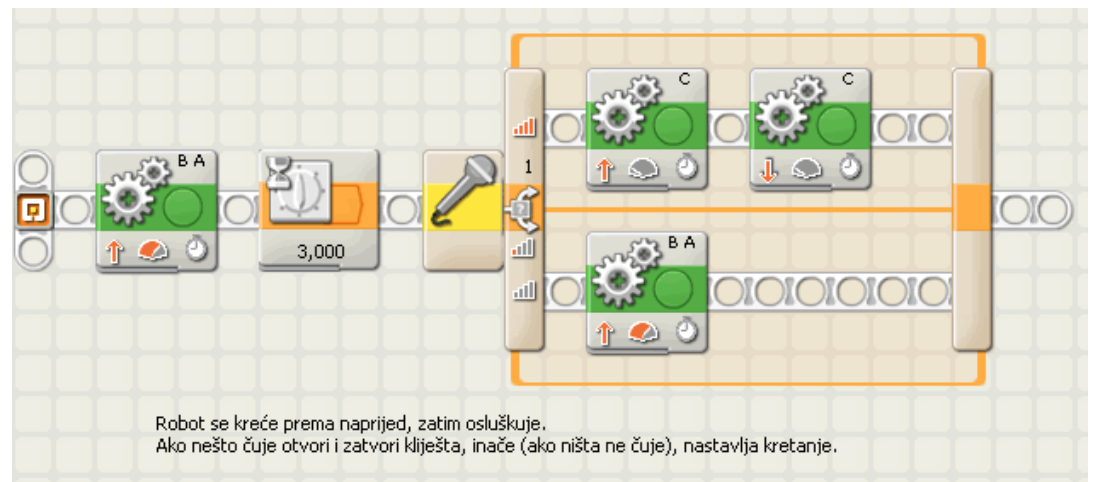


# VIZUALNO PROGRAMIRANJE –GRANANJE

OPĆENITO

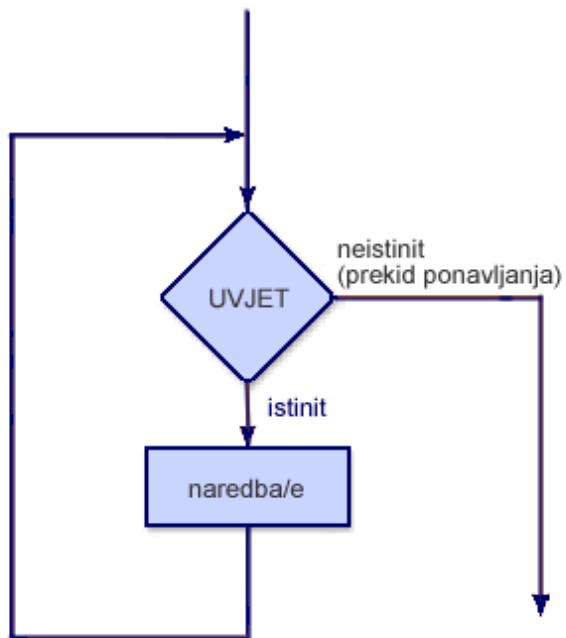


U PROGRAMU LEGO NXT

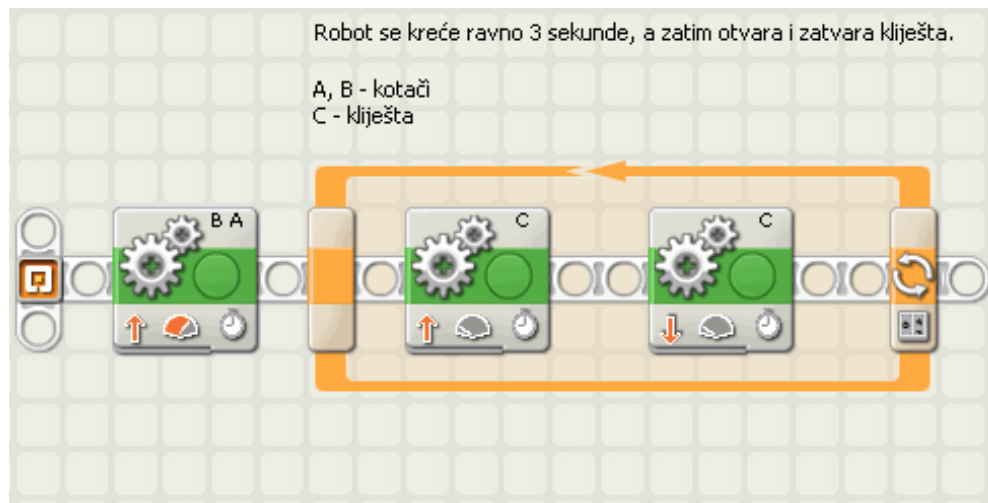


# VIZUALNO PROGRAMIRANJE – PONAVLJANJE

OPĆENITO



U PROGRAMU LEGO NXT



# SLIJEDE PRIMJERI U PROGRAMU

---



- 1) Robot izvodi slijed naredbi
- 2) Robot osluškuje
- 3) Robot ponavlja radnje
- 4) Robot se okreće
- 5) Robot prati crnu liniju
- 6) Robot izbjegava prepreku



# Izvorišta

---

- <http://mindstorms.lego.com/>
- <http://www.ss-zeljeznickatehnicka-zg.skole.hr/Projekti/>

Saida Deljac  
sdeljac@email.t-com.hr

---

