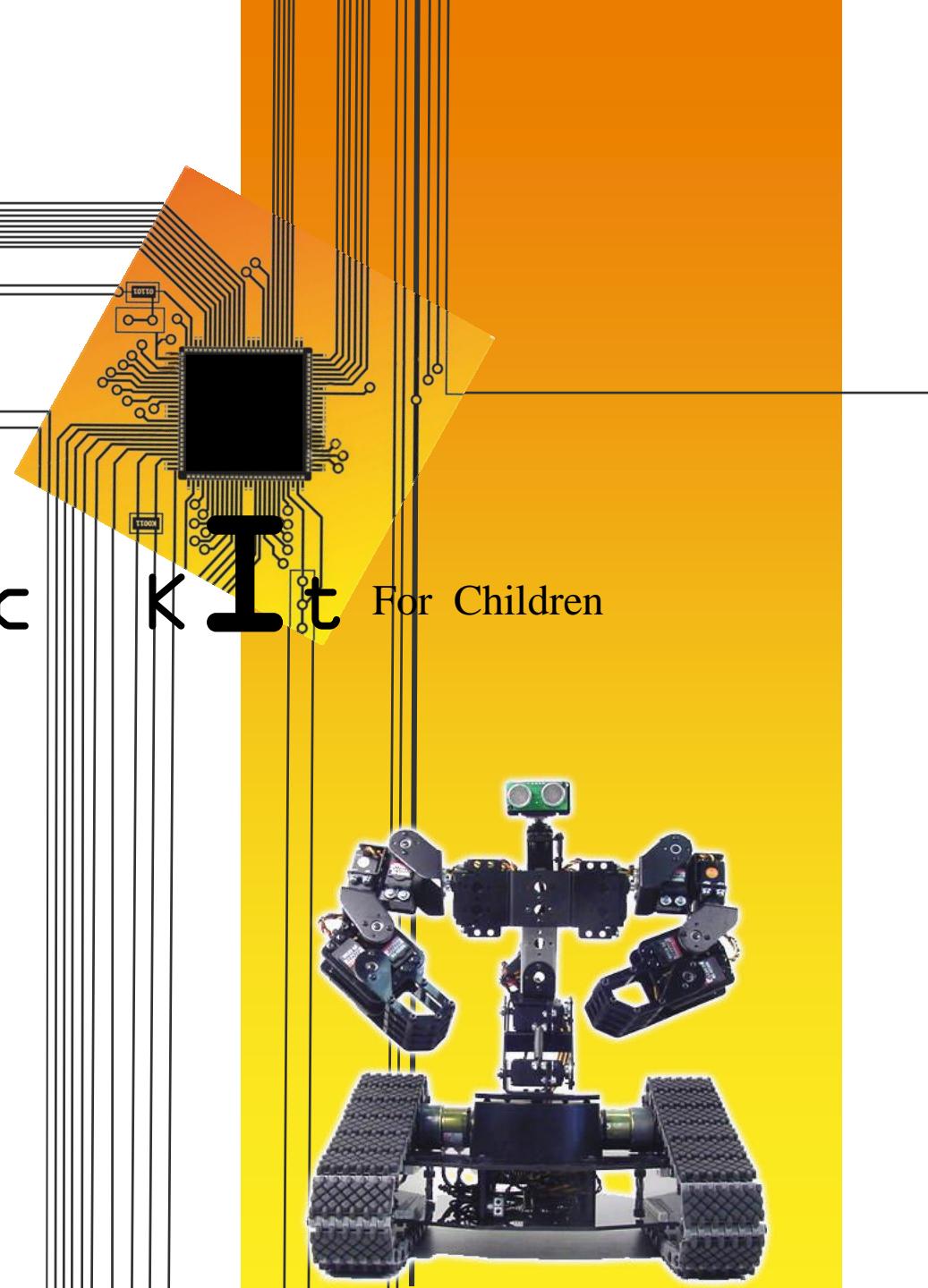
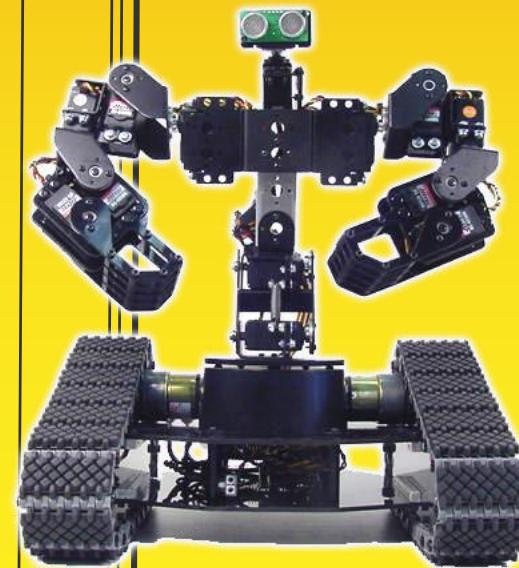


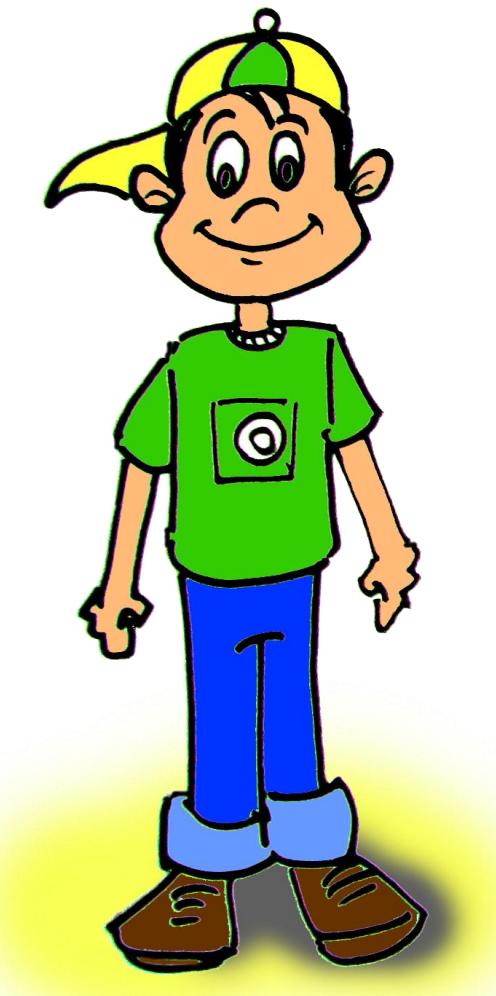
Robotics Kit For Children



Guide : Prof. Ravi Poovaiah

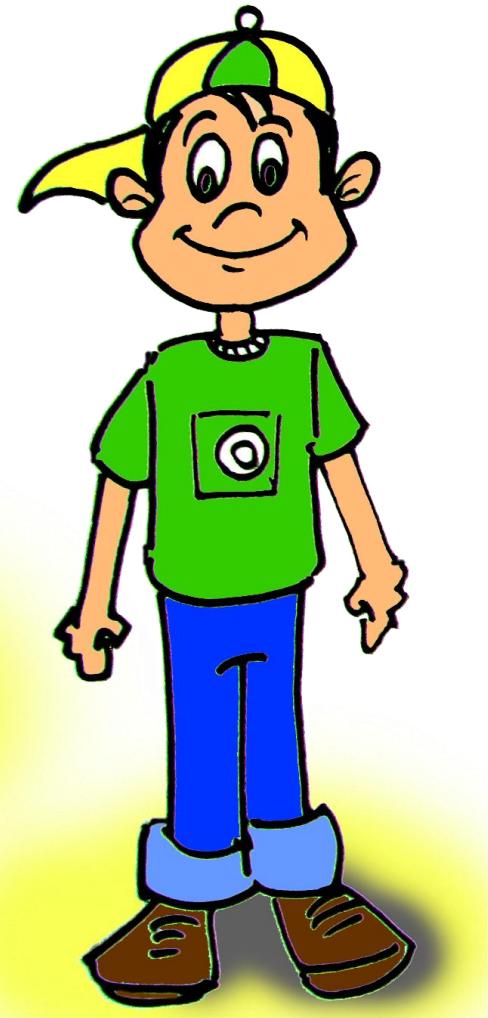
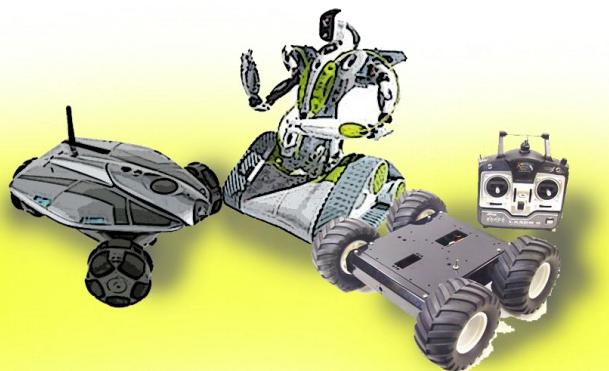
Ujjwal Likhar | Interaction Design | 07633005
IDC (Industrial Design Center)

Scenario



Rahul Rai
8years
Likes to play with Robotic toys

He has many Robotic Toys.
Every month he buys a new robotic toy.



MALL OF ASIA







Next day in school he tells his friend about the new robotic kit he bought from market yesterday and invites him to play with him



.....that afternoon after school





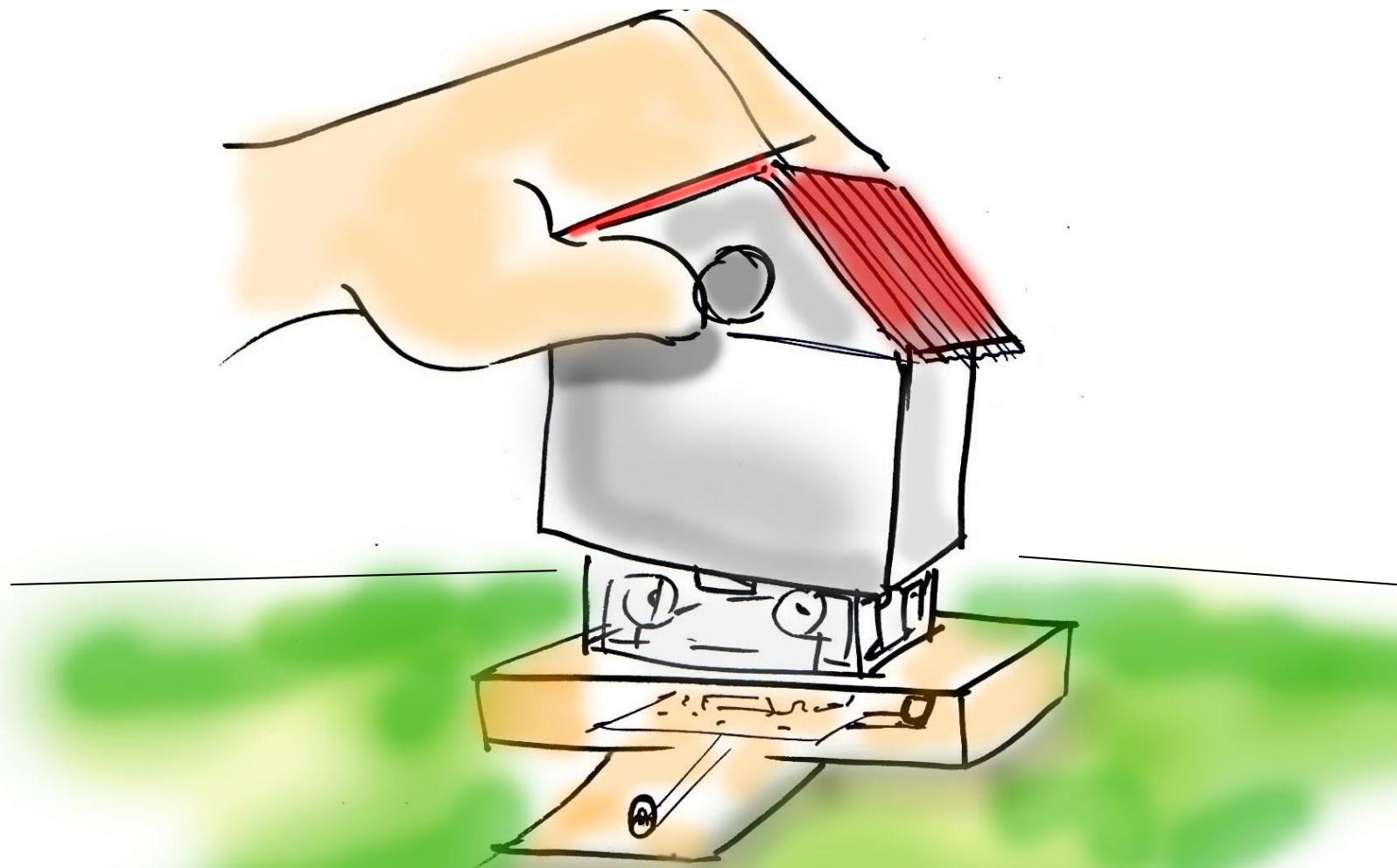
After reading instruction they assembled the robot, set the enviornment.



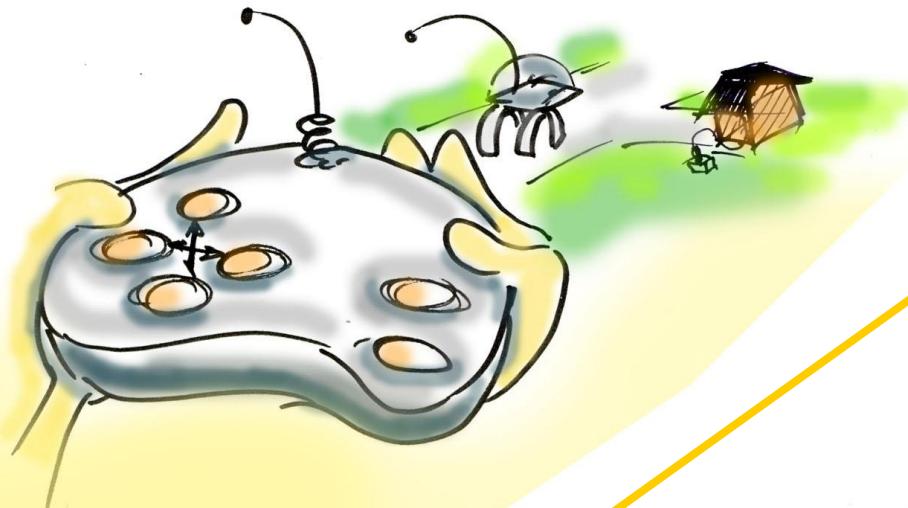








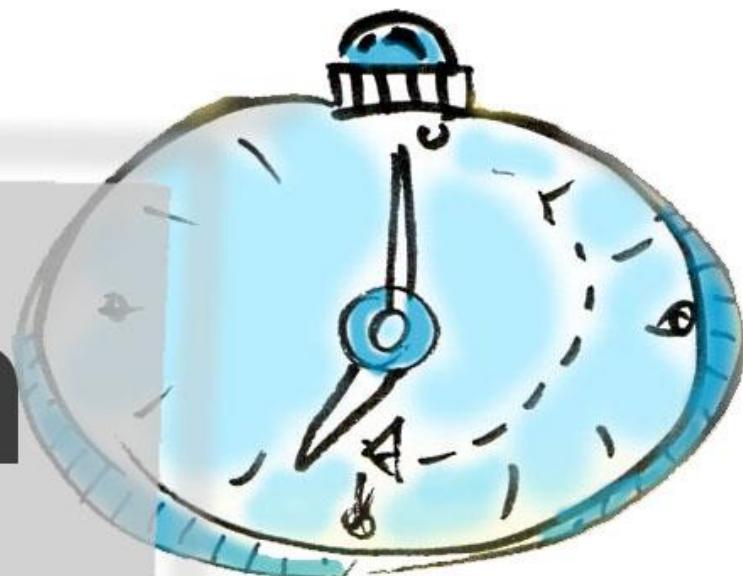
Player 1



Player 2

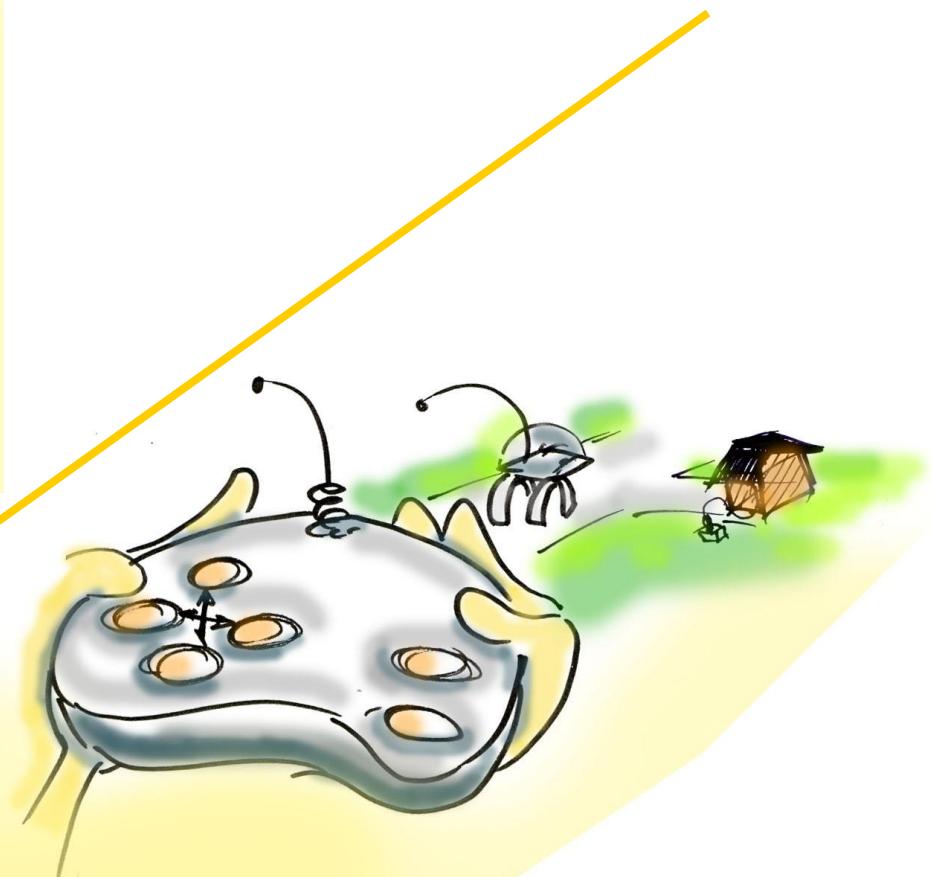


10 min



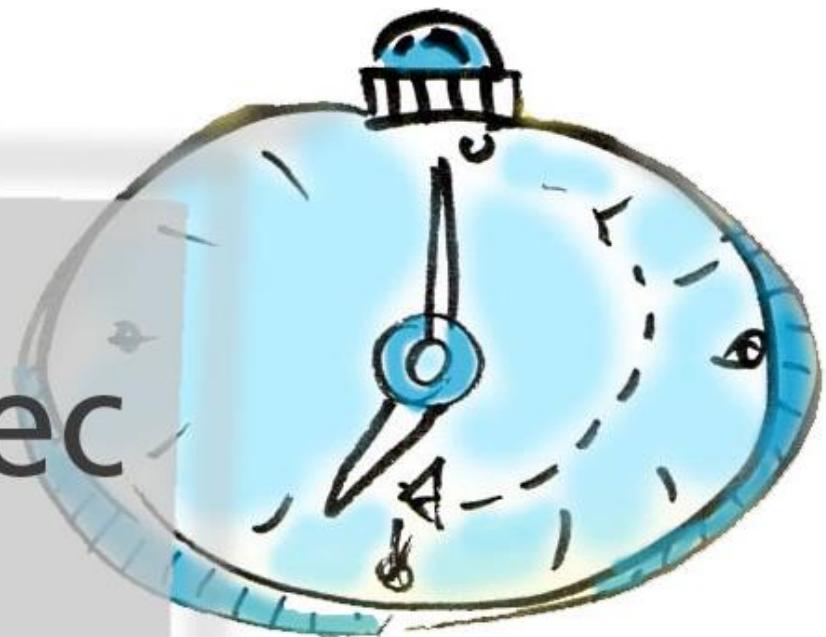


Player 1



Player 2

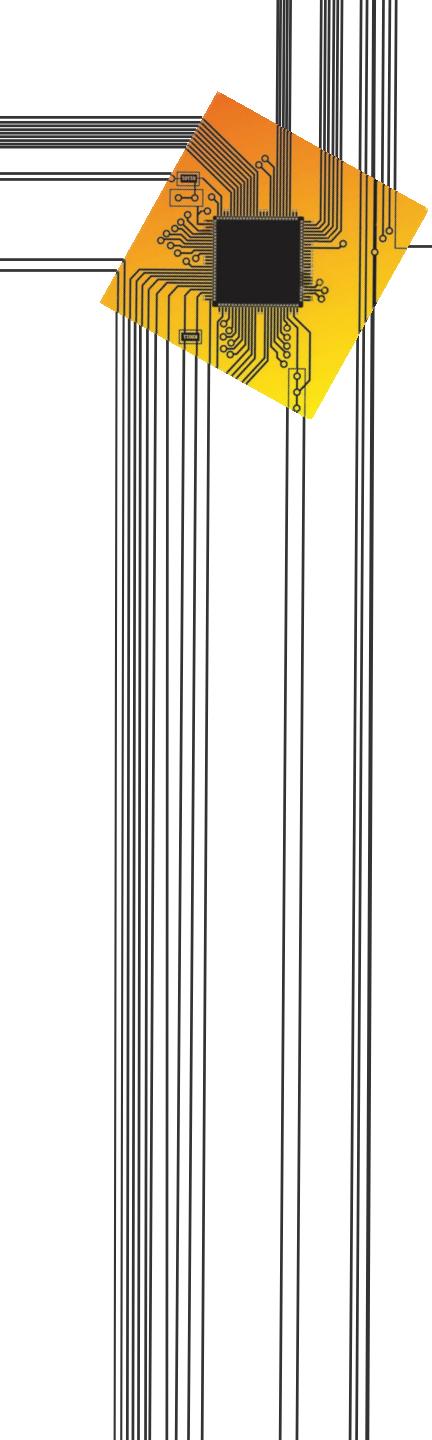
12min 15sec







End



Objective

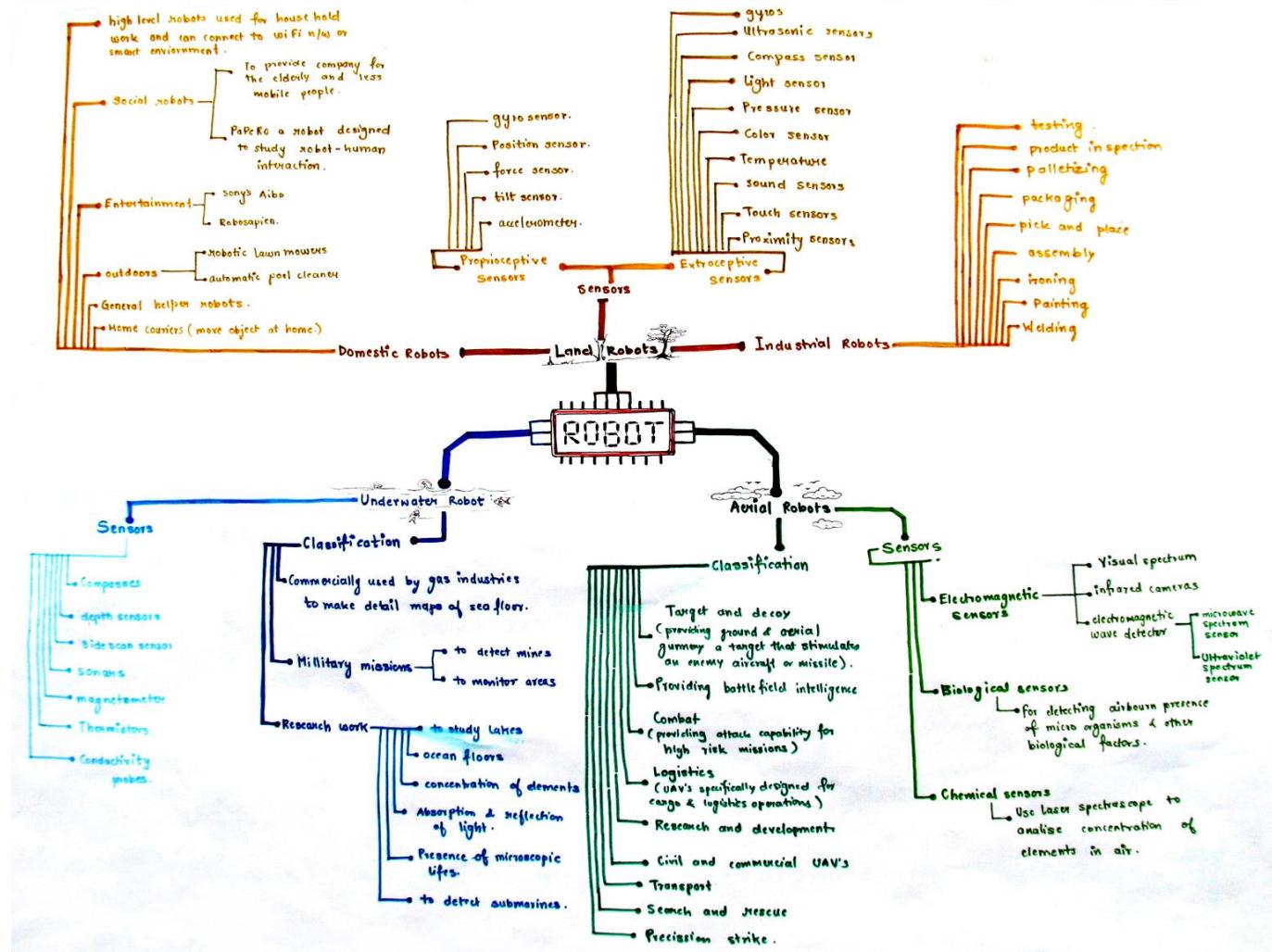


The main objective of this project is to design a robotic kit for children where in they can assemble the robot, set the environment and play.

Research and data collection



Classification of Robot



Classification of Robot



Aerial Robots



Land Robots



Under water robots



Robotic toy kits



Lego MindStorm NXT

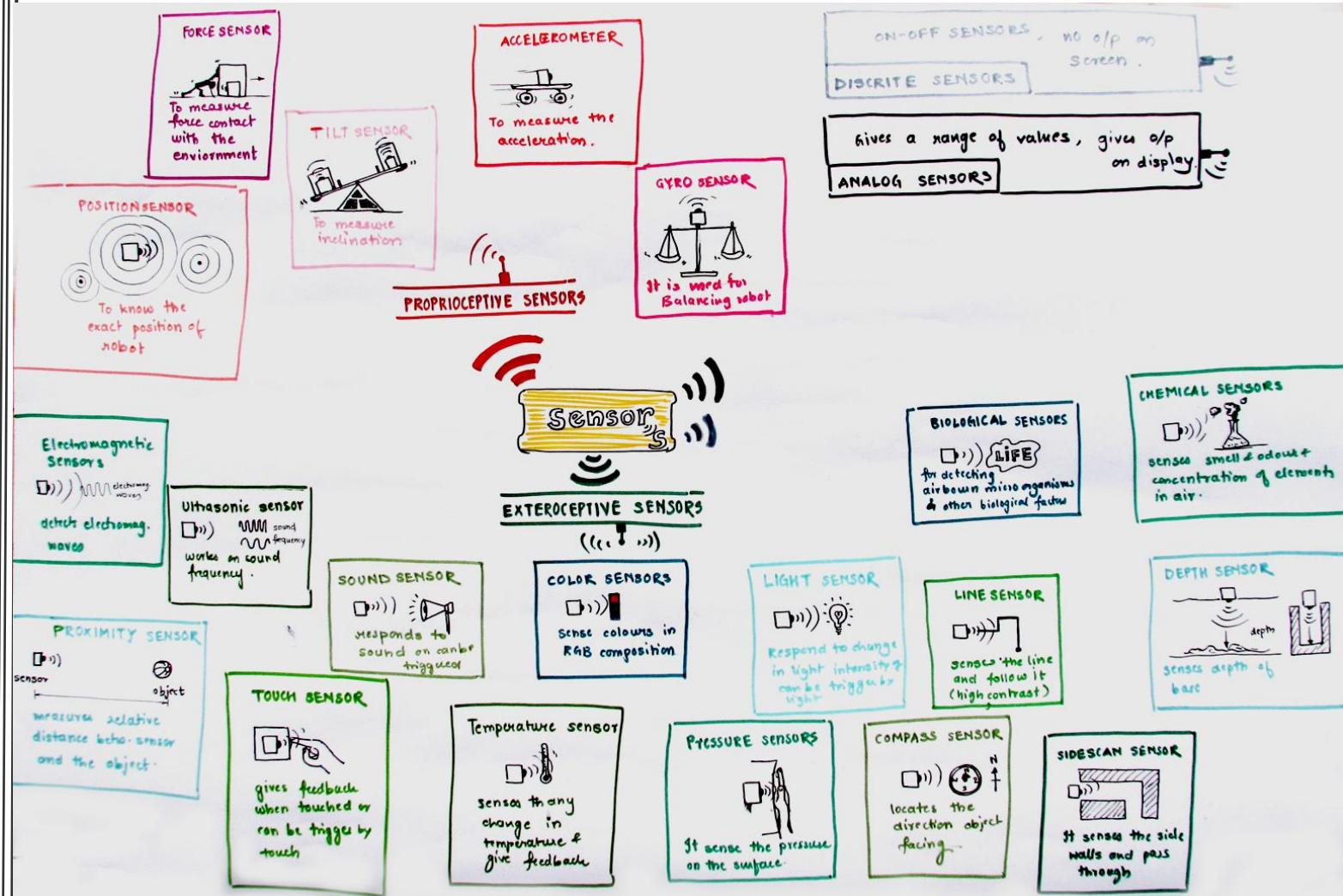
MA-VIN

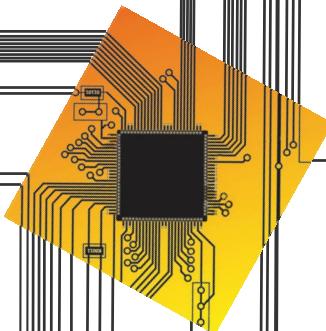


Sensors



Sensors map





Robotic Competitions



Basically robotics competition encourages enthusiast to built robots for competition and in the process they learn about robotics.



Micromouse

Techfest, IIT Bombay.

Trinity fire fighting robot

Trinity College in Hartford, Connecticut, USA.

First Lego league

FIRST : For inspiration & recognition of science and technology.

Botball

program of the KISS Institute for Practical Robotic

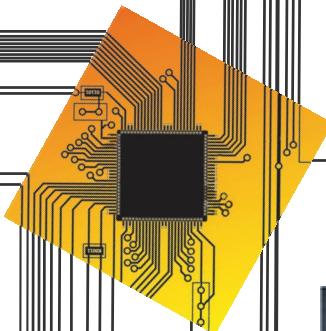
VEX robotics

VEX Robotics Design System.

TRICKS

ThinkLab,TRI.





Movies on Robot



These robot movies help to analyze the robot behavior, their emotions and personality. The movie characters are basically futuristic and are imaginative but still they give a sense of realistic robots and gives a good inspiration to work in this field.

Meeting Domain Experts



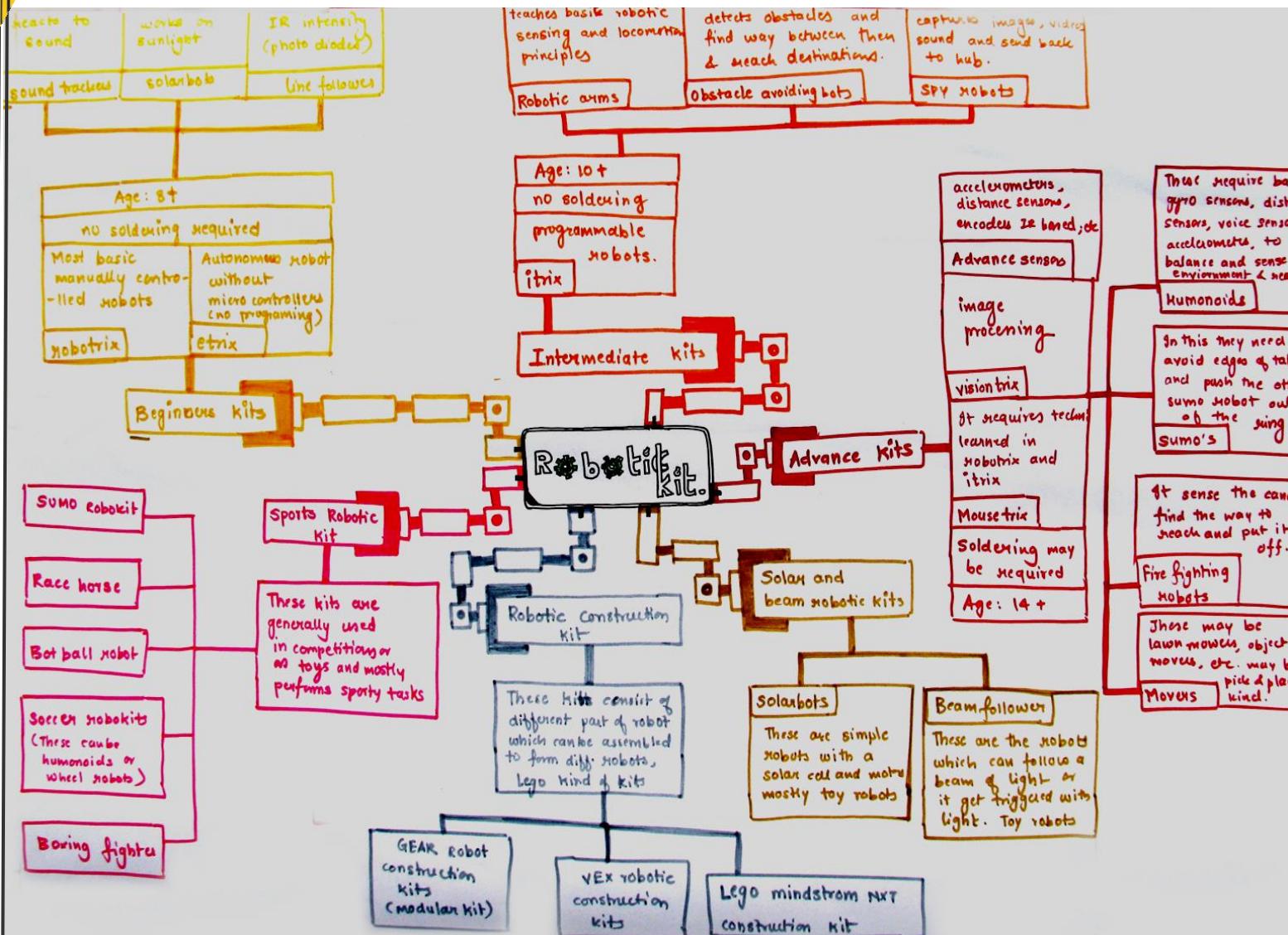
Talked experts from the robotics field were contacted to know more about robotics, the current trends, cutting edge technology, their work on robotics, etc.

Analysis

Problems faced by students using kits :

- Fixing screws
- Over a period of time Robot shakes.
- Problem with gear matching.
- Problem matching holes of two parts due to manufacturing defects
- Shorting of PCB because of metal chassis
- Damaging Sensors due to sorting.
- Breaking of Acrylic chassis

Classification of Robotic Kits



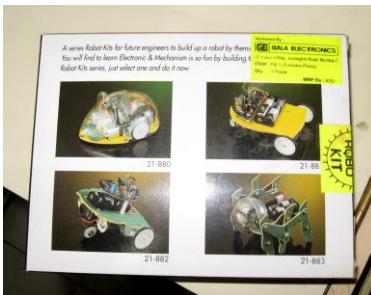
Market survey



Beginner level kits

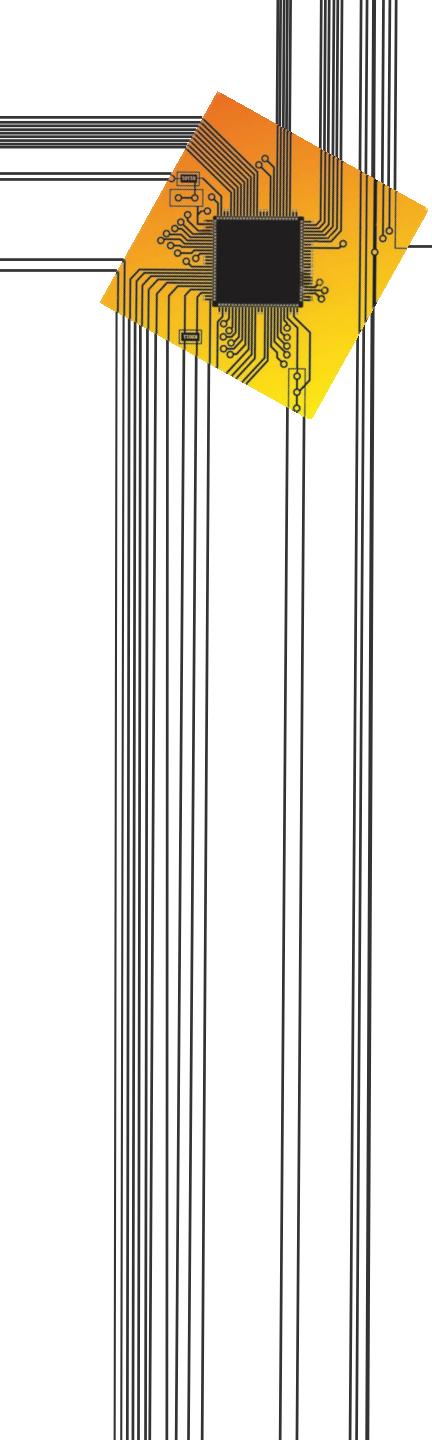


Intermediate kits

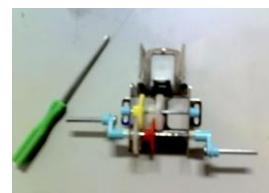


Advanced kits



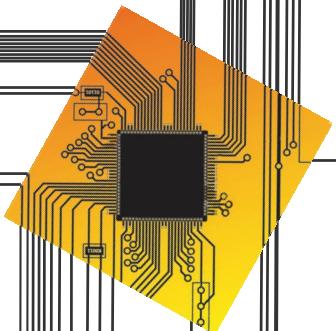


Study of Robotic Kits

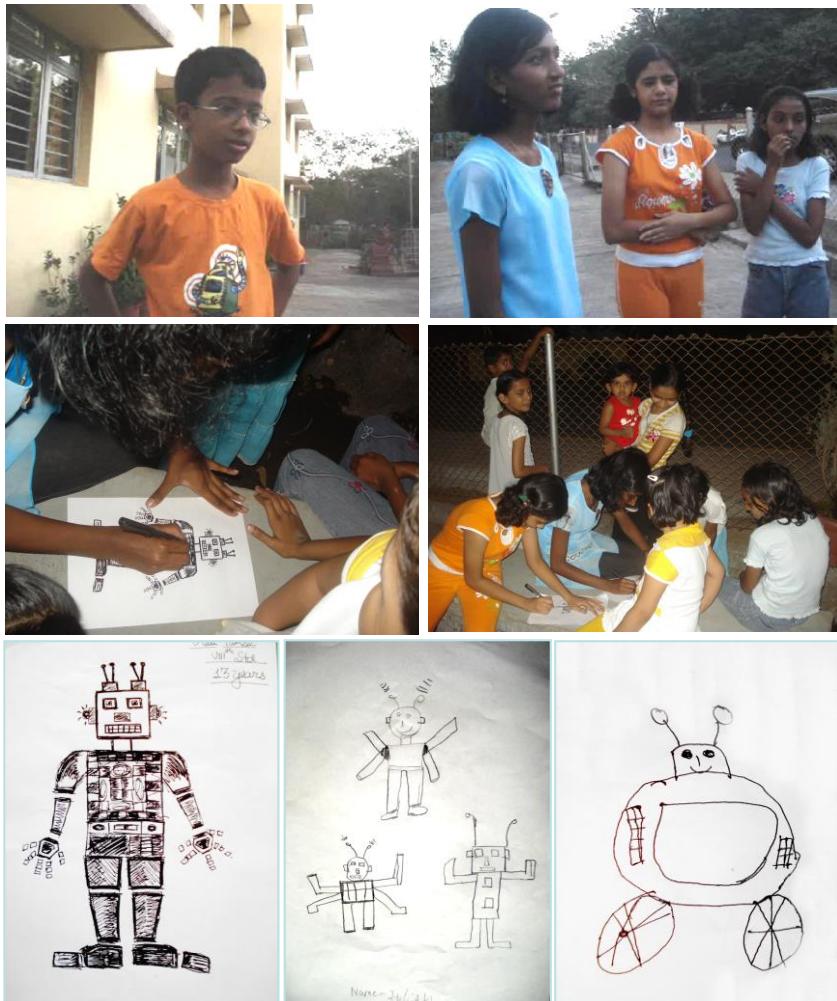


Insights

- Too many components in the kit
- Confusion in components (looks similar but slight changes in dimensions)
- Assembling gears is also a problem
- Assembly manual is very confusing and difficult to understand
- It takes a lot of time to assemble (3 to 4 hours for an adult) so it might happen that a child can get bored and quit.

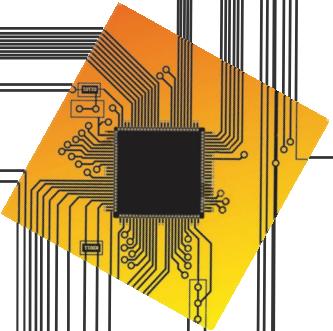


User Study



User statements

- क्या स्पीड है
- सबको बचाता है
- कछ भी कर सकता है
- रोबोट से हम कुछ भी करवा सकते हैं
- रोबोट स्टील का होता है
- रिमोट कंट्रोल से चलता है
- लाइट भी निकालता है
- उसकी आँख में लाइट होता है
- रोबोट उड़ भी सकता है
- आग भी बुजाता है



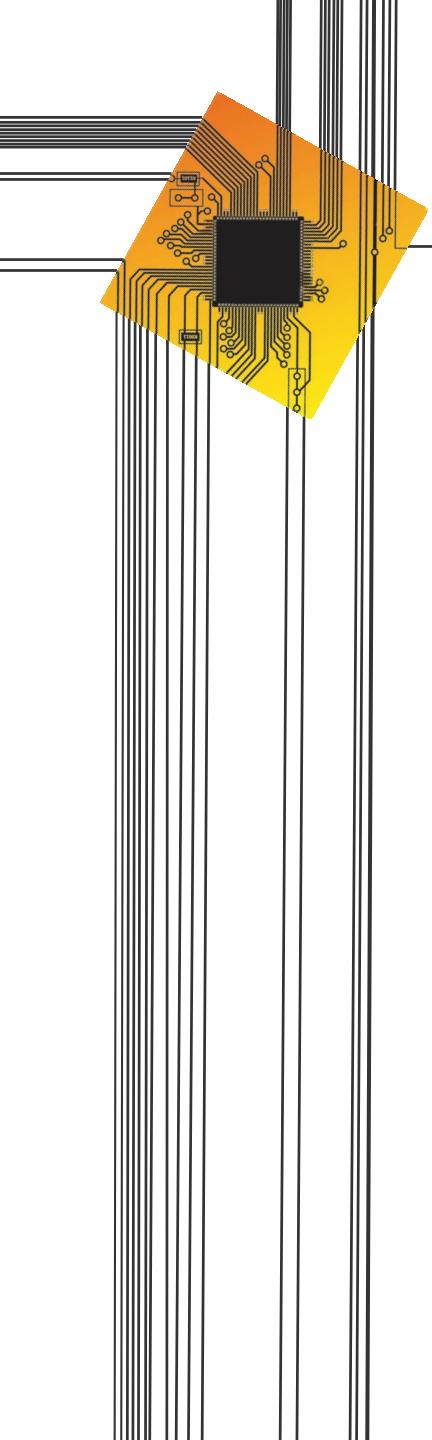
User Study



Observations and insights

- They like robot obeying there order
- Speed matters them a lot
- They think robot are made to help and save others.
- They have this feeling that robots can do anything
- Robot is a tough guy
- They are very excited with the way robots move n do things
- They like playing with remote They like new things to explore like when I showed them six legged machine, they are more curious about how it works.
- They like the sound n light feed backs from robot
- They like multi-tasking robots.





User group

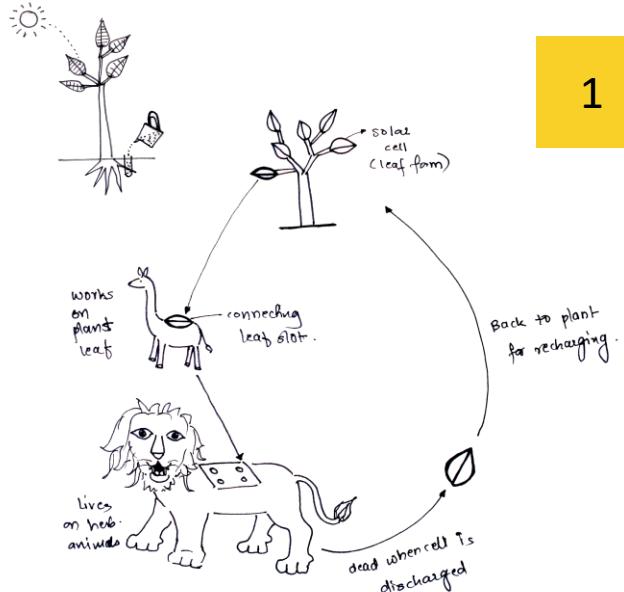


So I have decided to design a kit for the age group of 8+ kids
PLAY and **LEARN** as keywords.

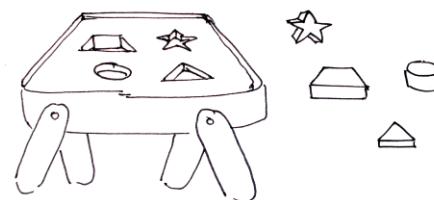
Initial explorations



1



3



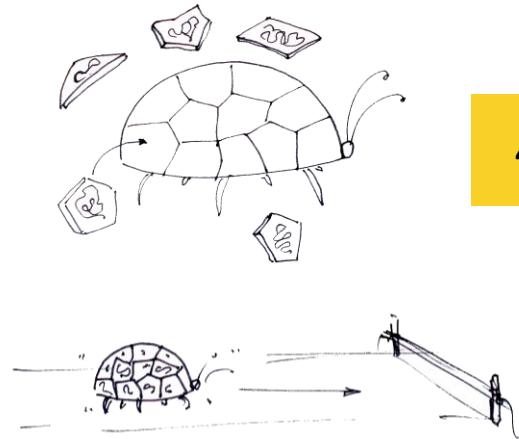
match the shapes or load shapes on back and it will walk.

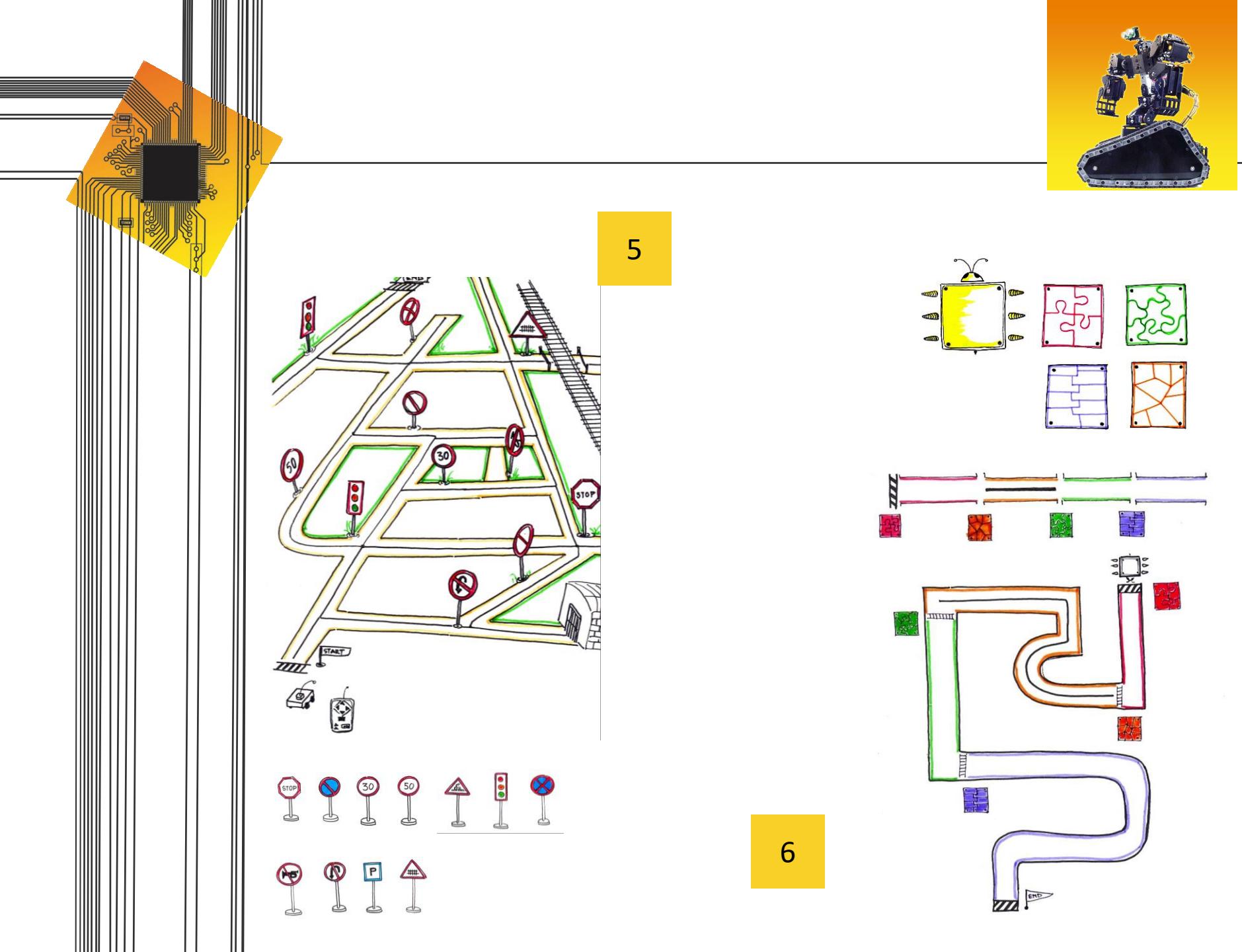
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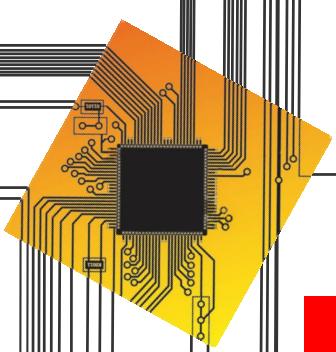


match the colors and butterfly will flip wings.

4







Project Domains



Robot Assembly

Easy to assemble

Learn with assembly

Puzzle with assembly

Activating robot

Remote

Physical game

Switch

Environments for play

- Single player
- Multiple players

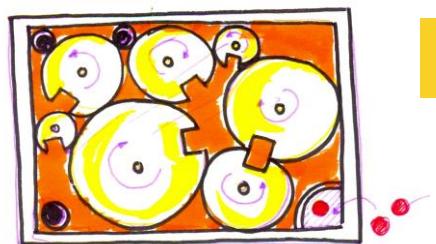
Different environments

- Boy
- Girl
- family

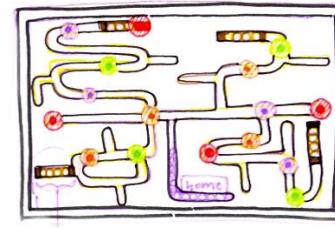
Secondary ideations



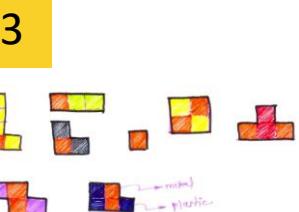
Ideation on activating robot



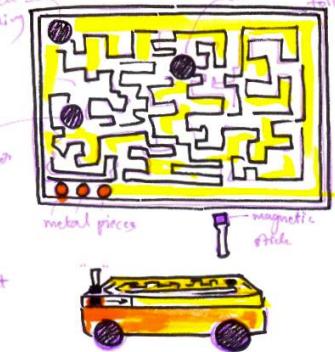
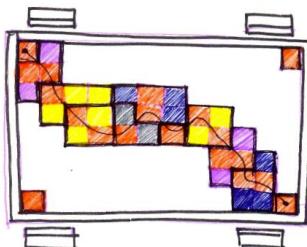
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2



3



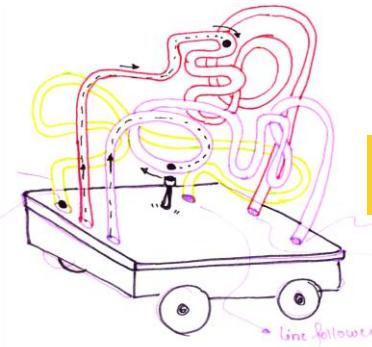
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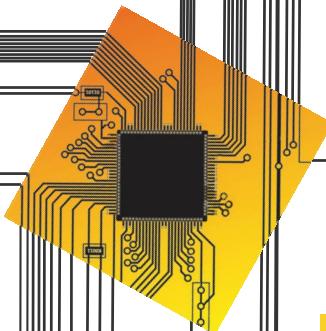
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6



5

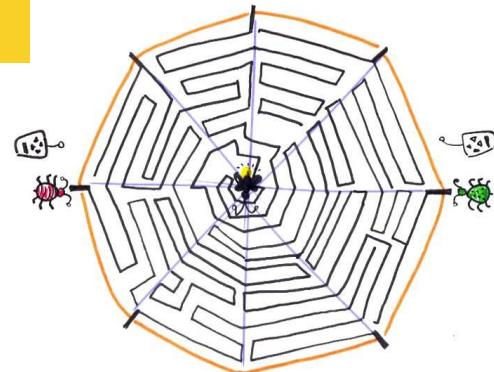


Secondary ideations

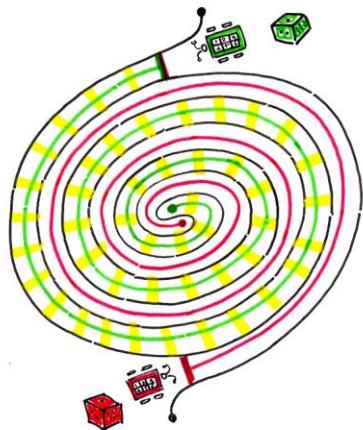


Game ideas

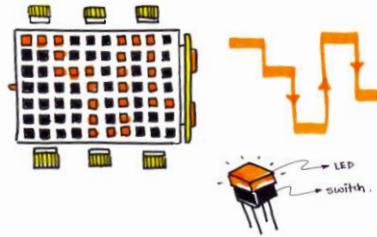
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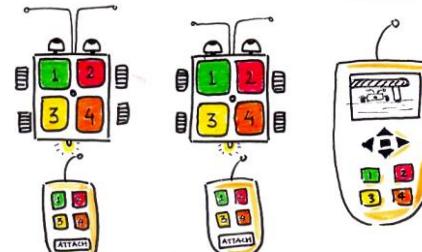
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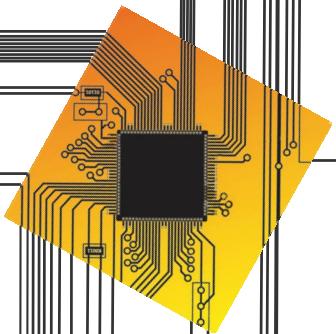
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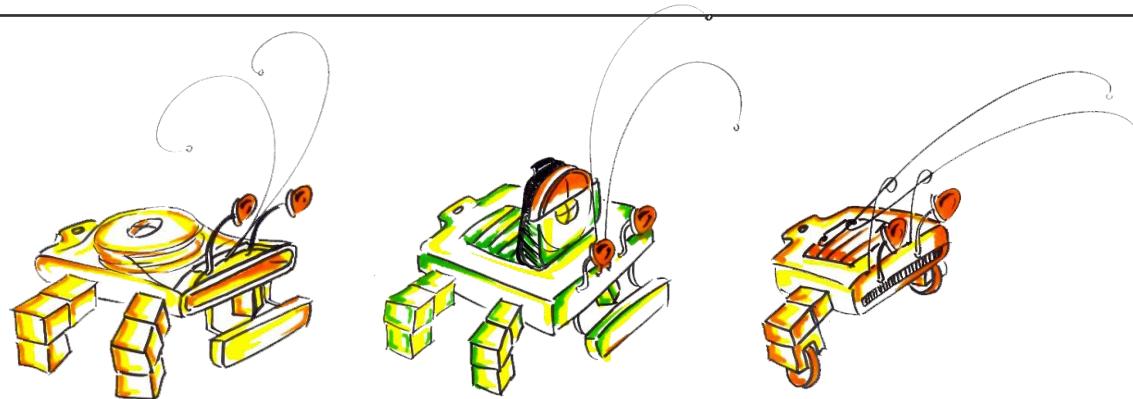
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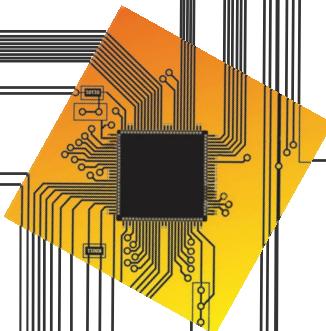


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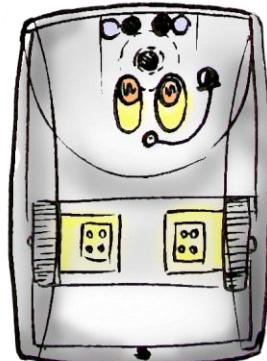


Final idea

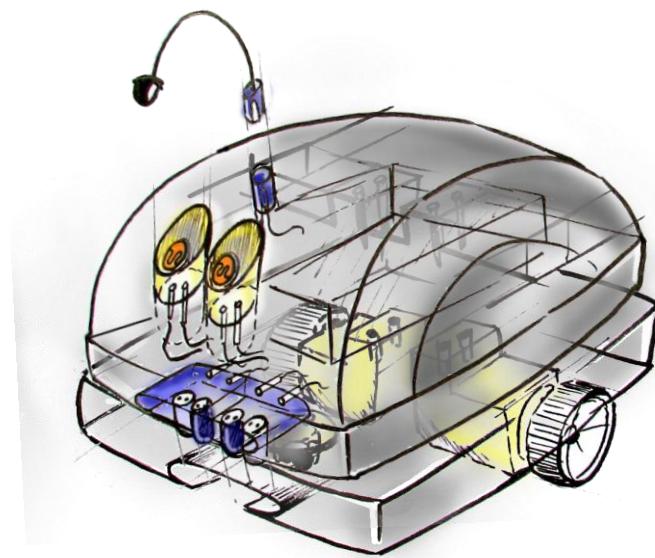
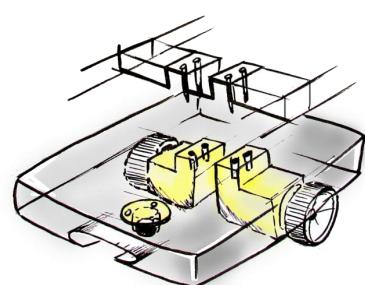
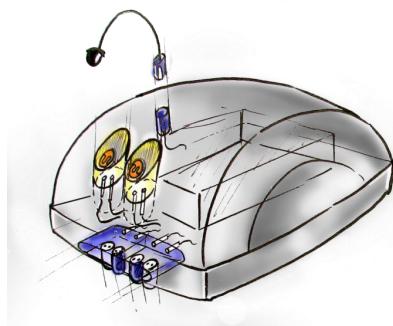




Final Concept



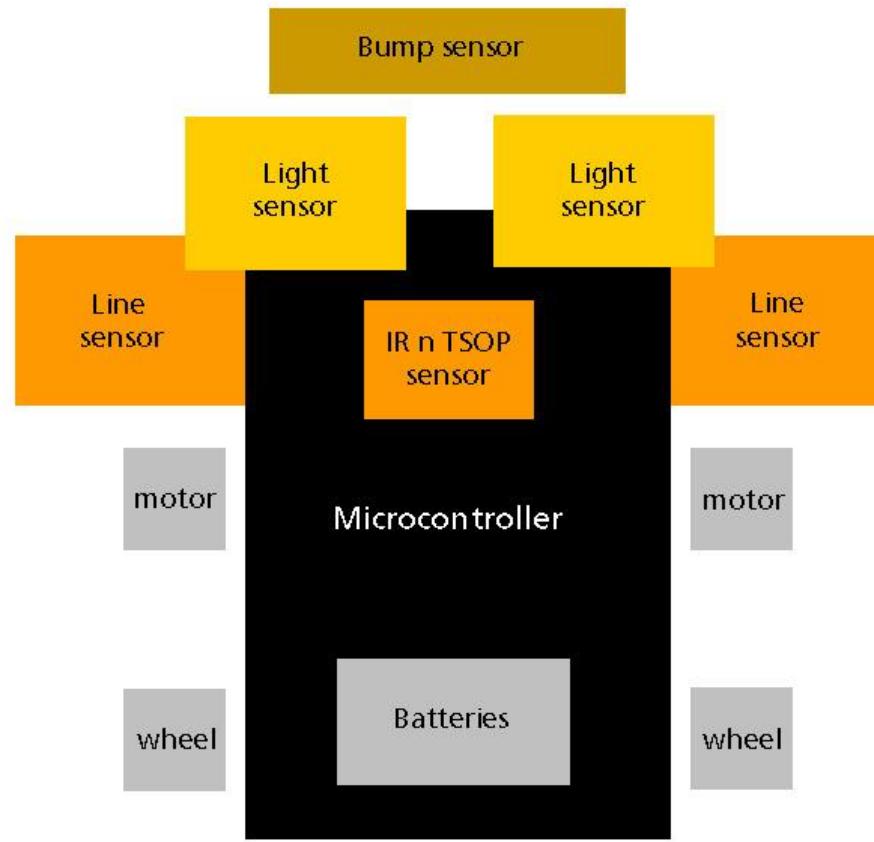
Robot assembly

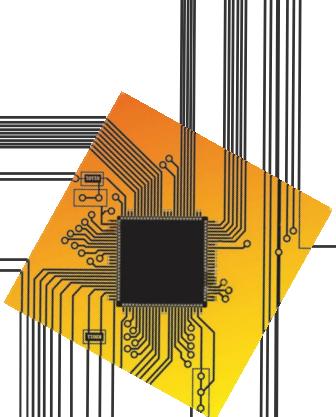


Components of Robot



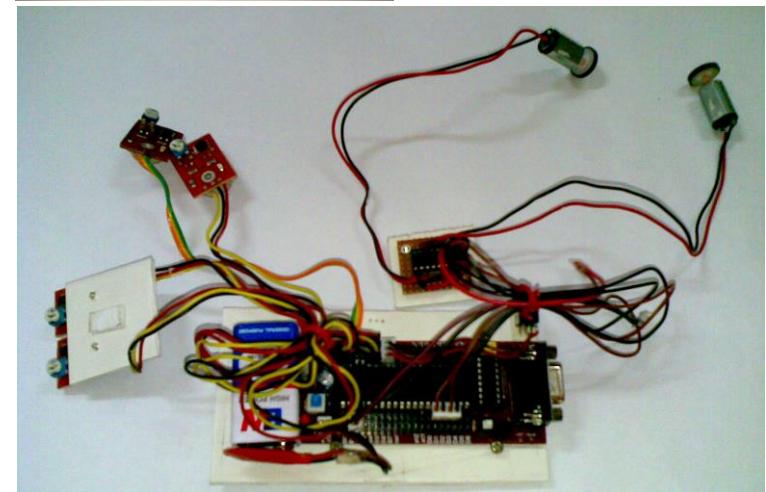
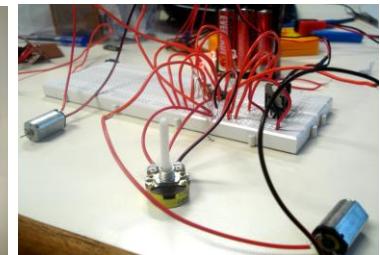
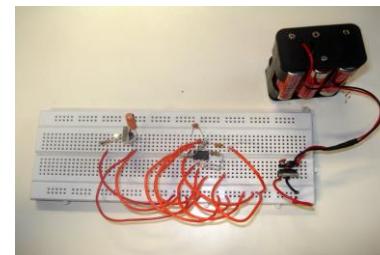
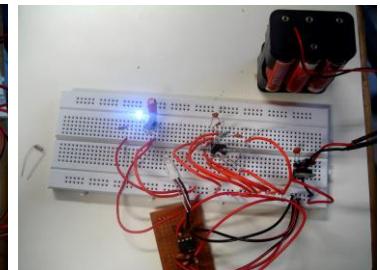
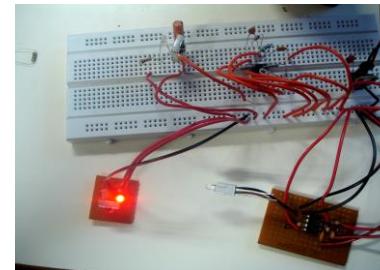
Components block diagram of robot

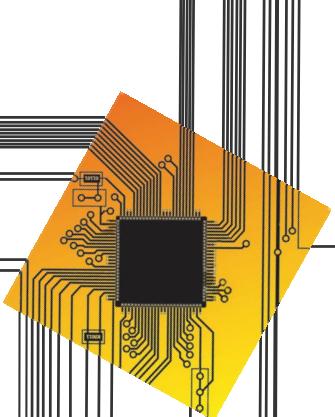




Circuit

Mock ups

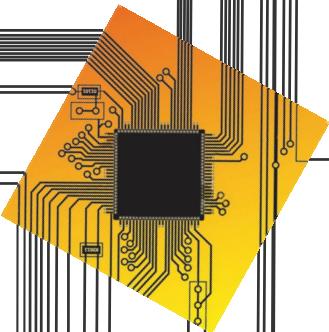




Environment

Mock ups





Characters



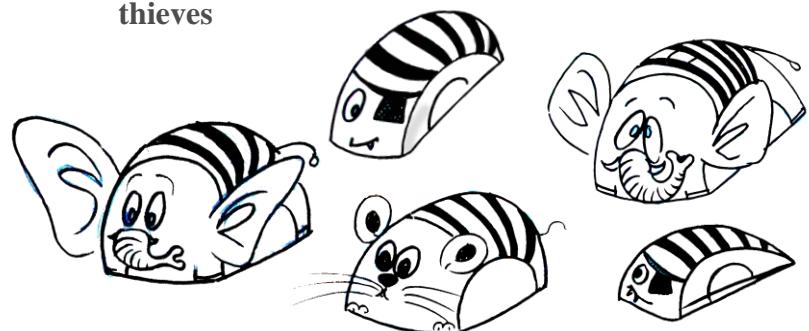
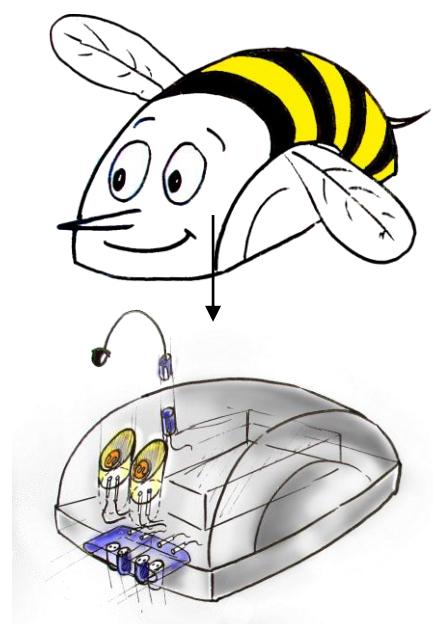
Mock ups

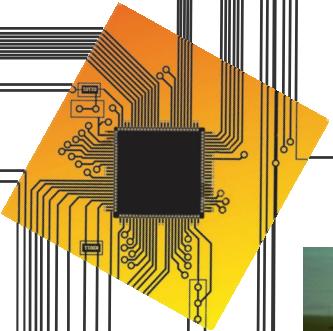


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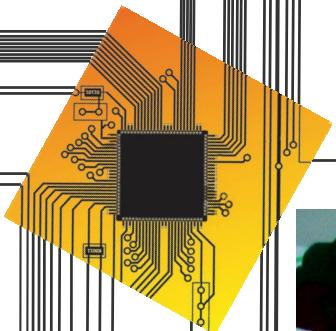
thieves





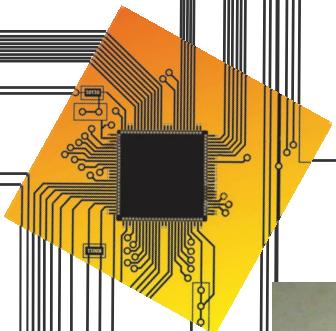
Mock ups





Mock ups



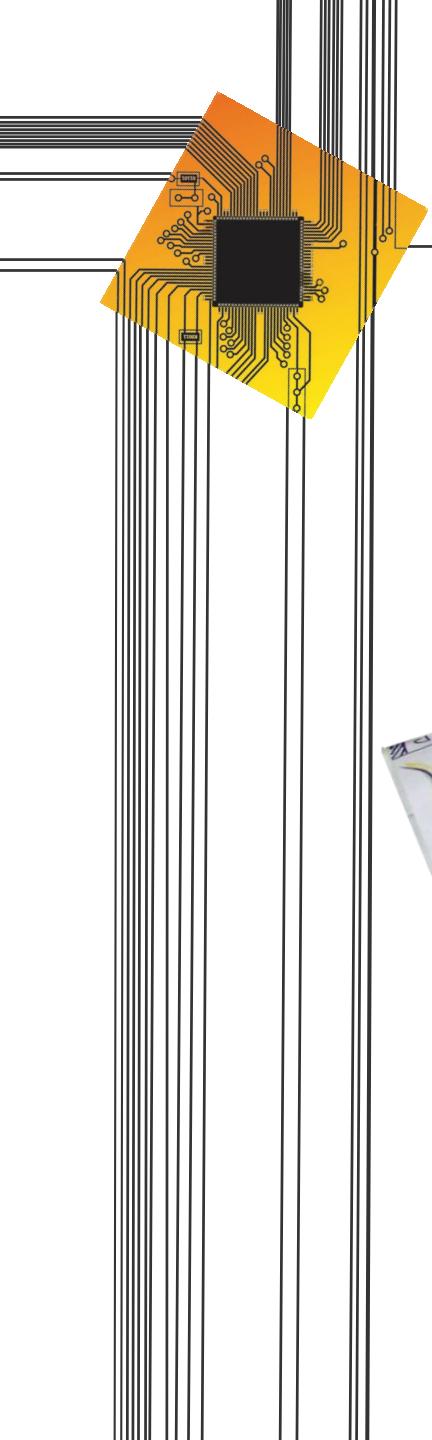


Mock ups



Conceptual game layout





Mock ups



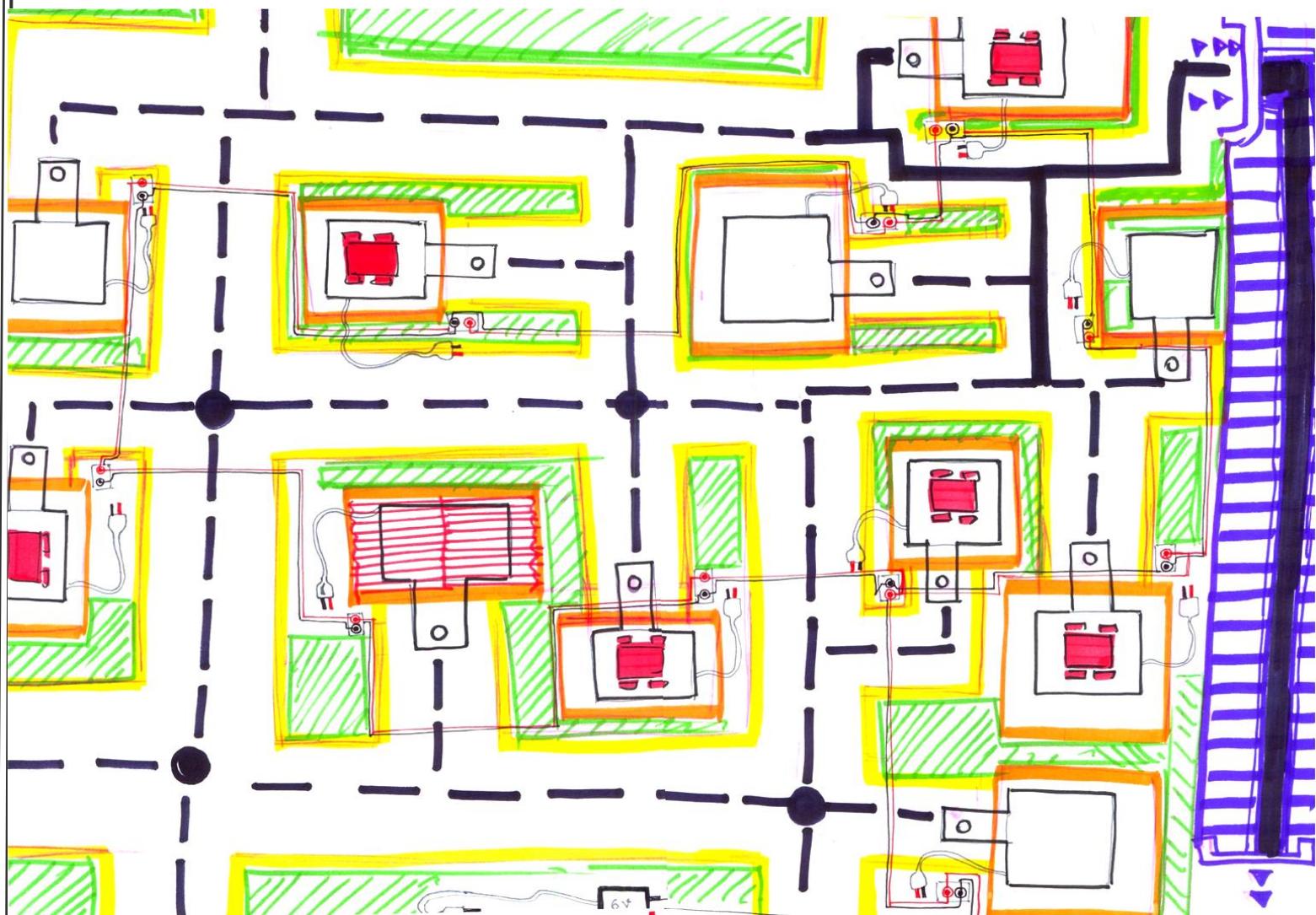
Conceptual game layout

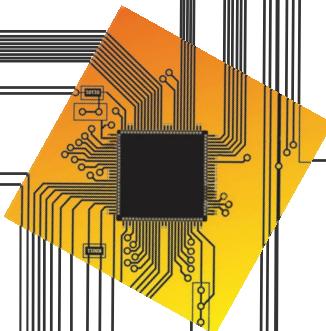


Refinements



Conceptual game layout

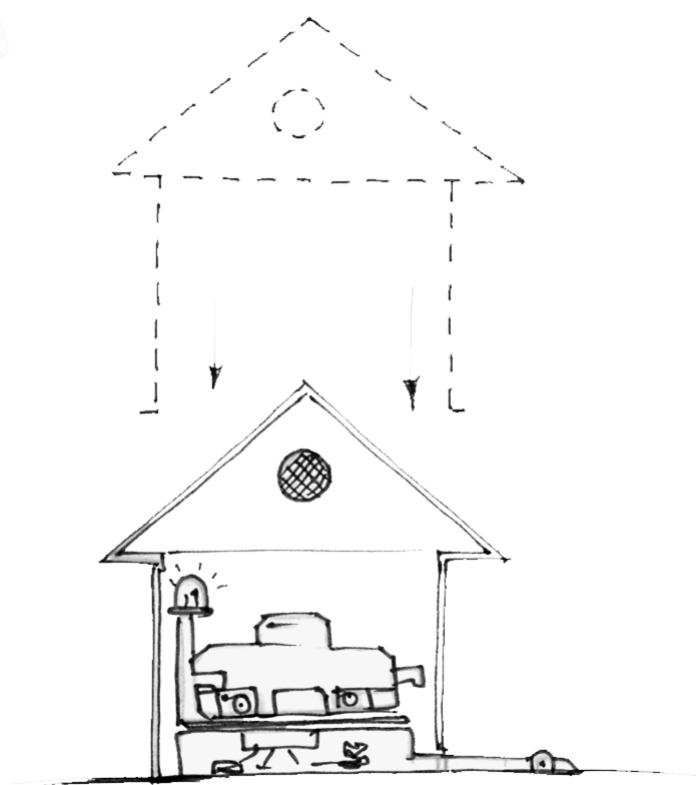
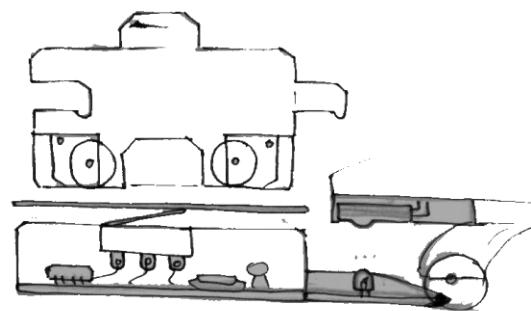
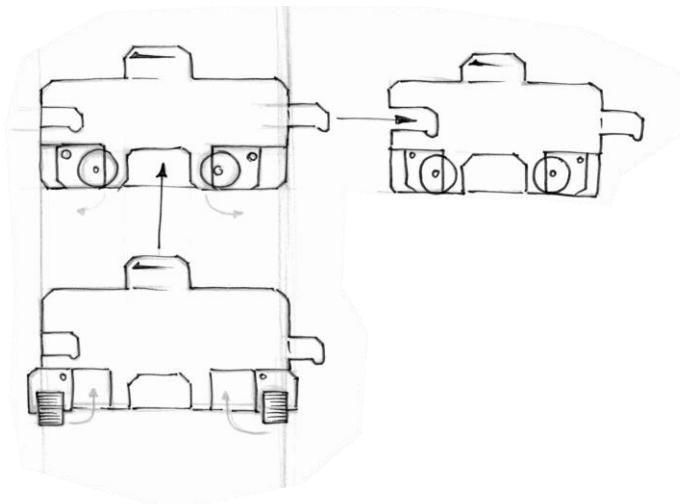




Refinements



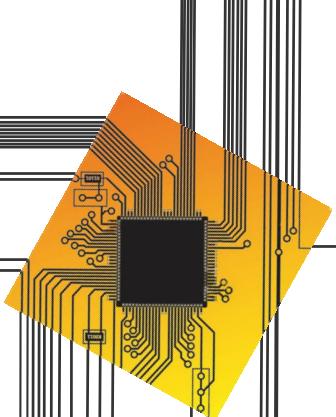
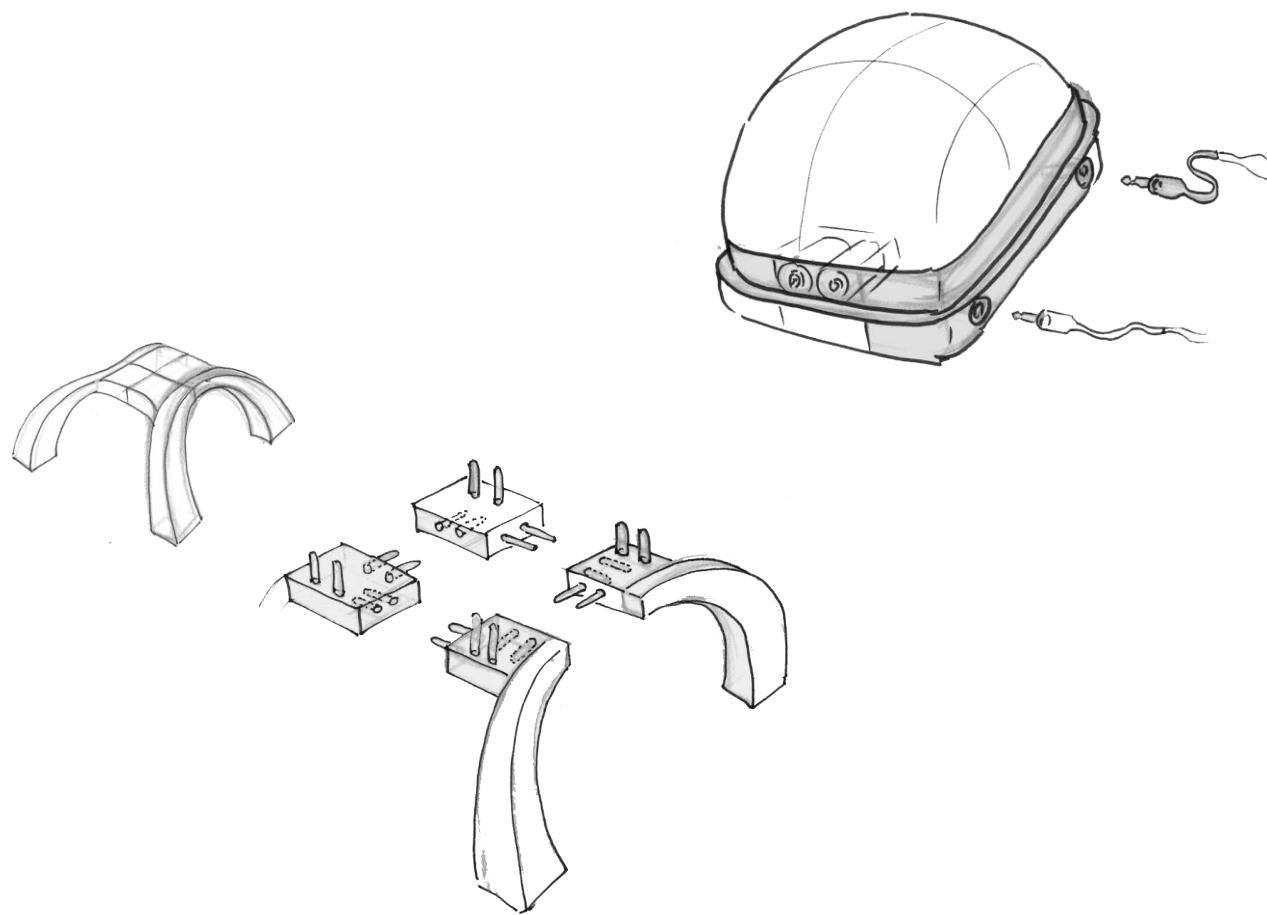
Elements in the game



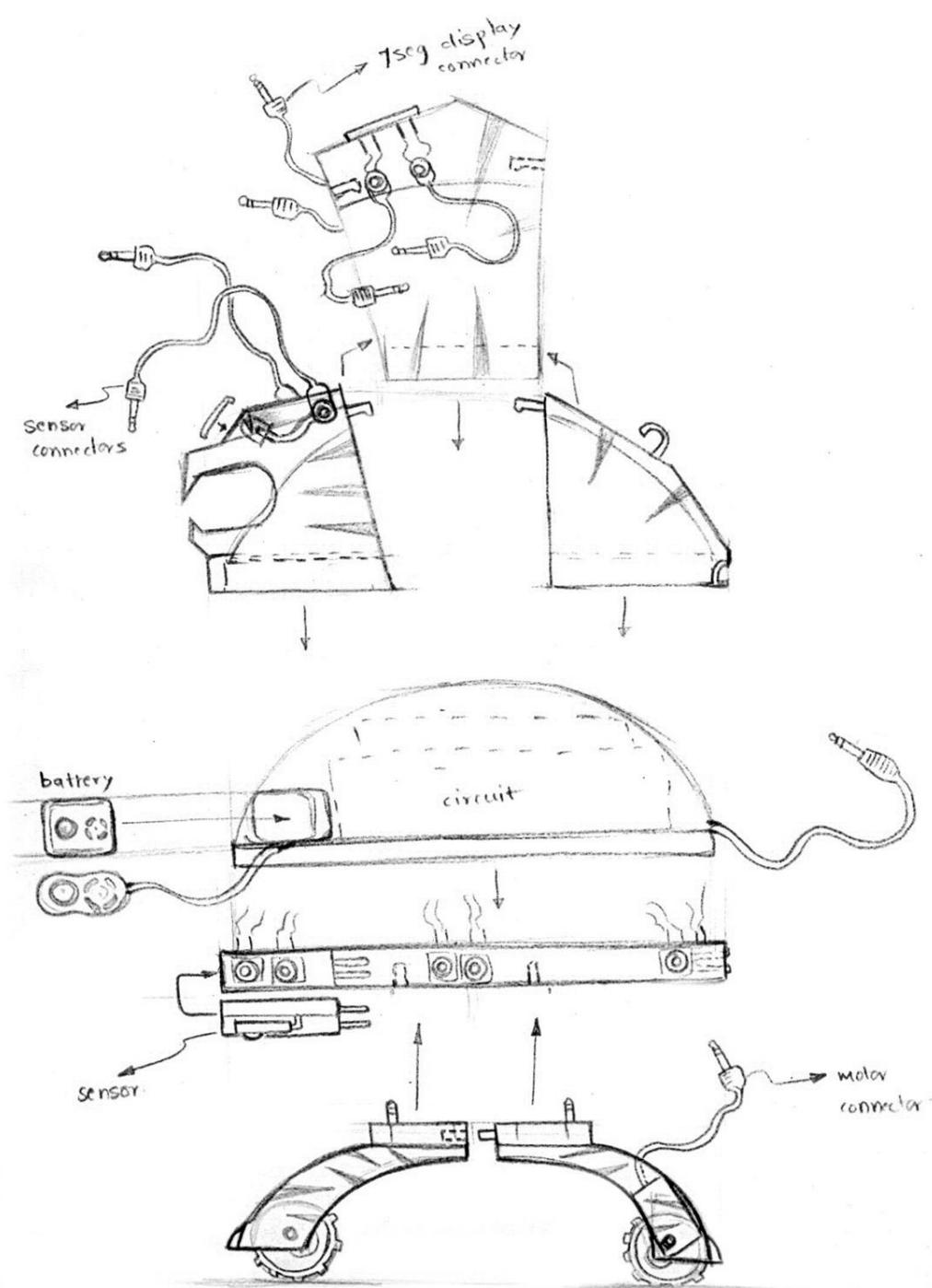
Refinements in concept

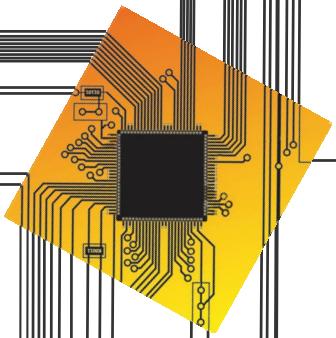


Robot Assembly



Robot Assembly

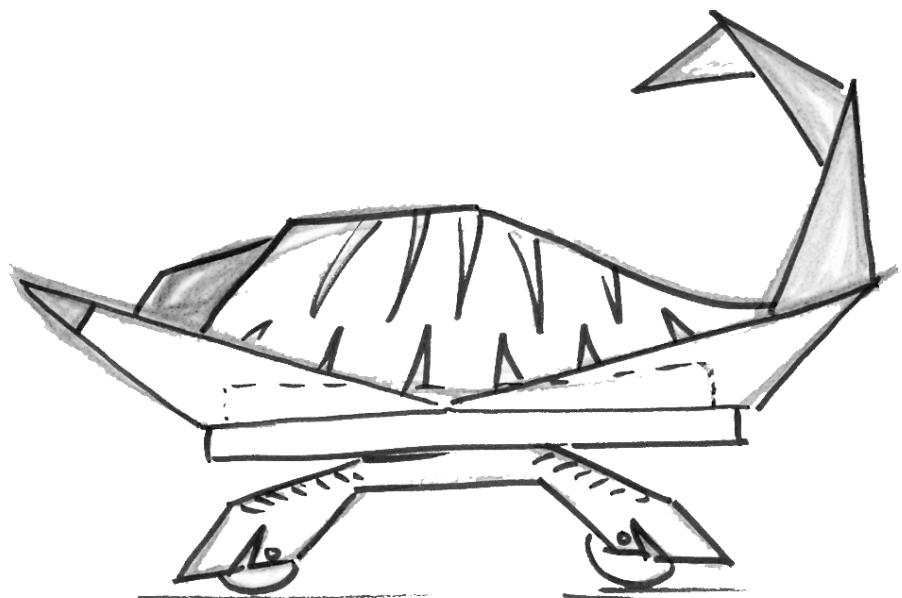


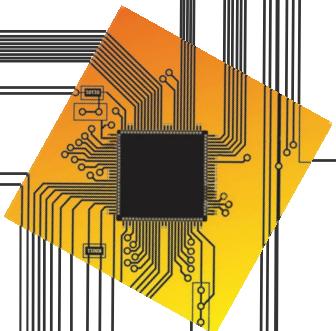


Refinements in concept



Robot Character (Scorpio)

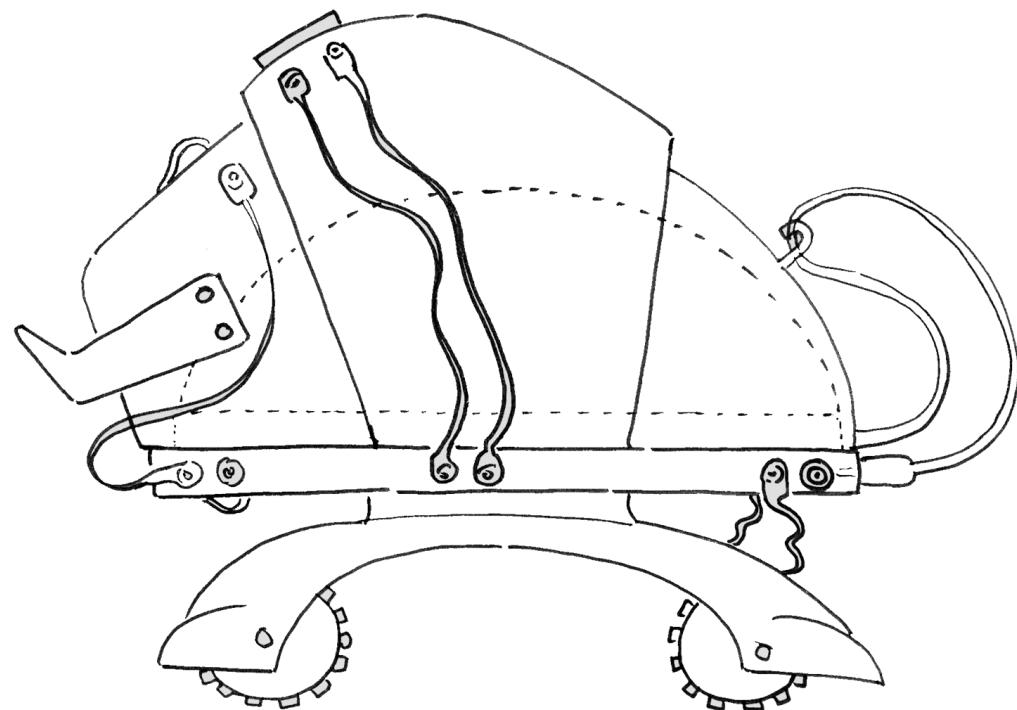
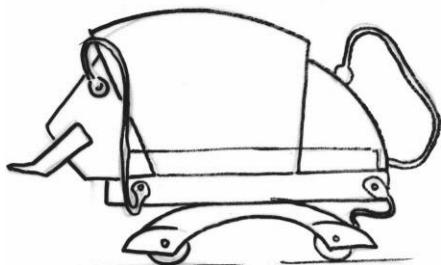
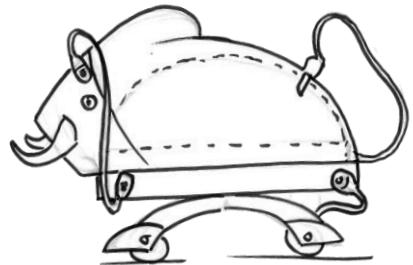


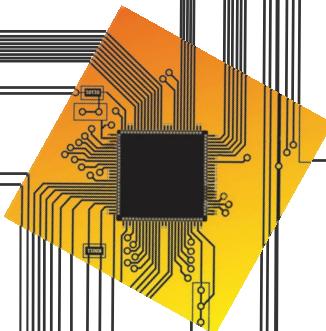


Refinements in concept



Robot Character (Bull)

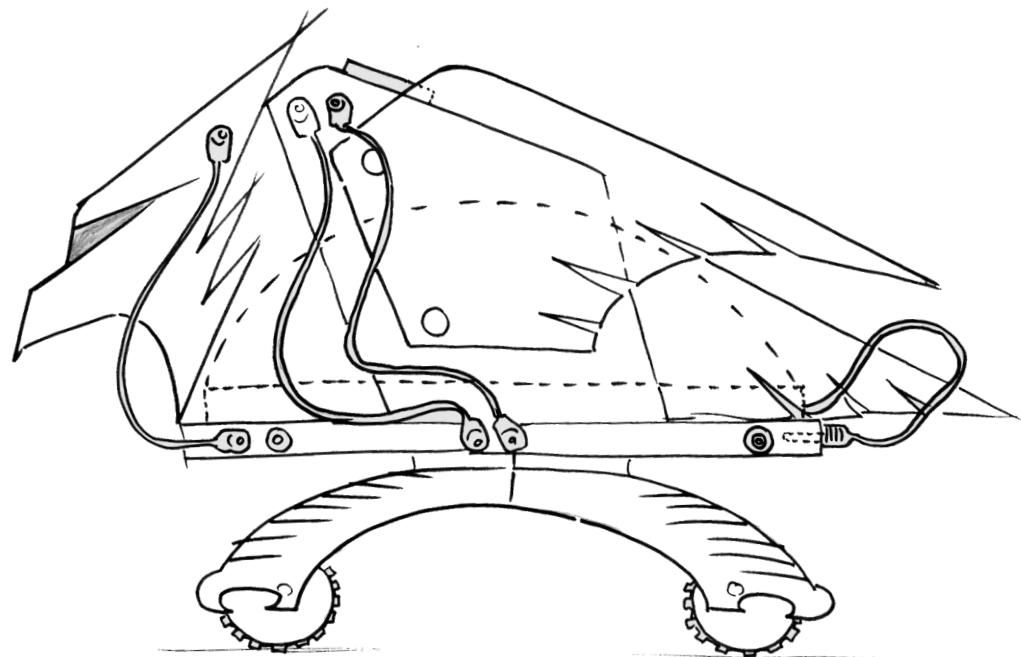
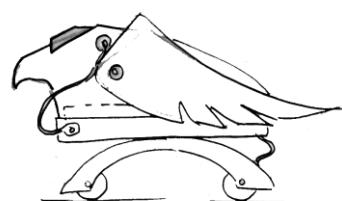
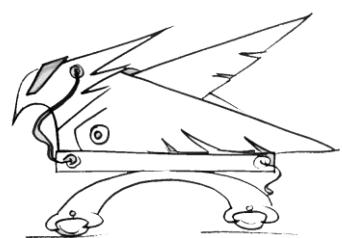
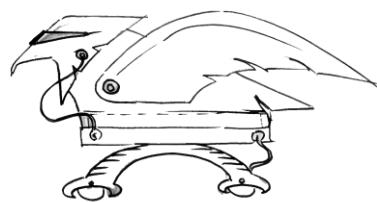
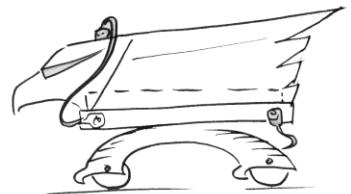


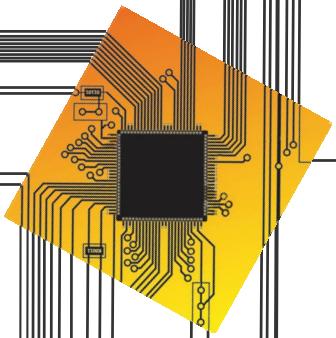


Refinements in concept



Robot Character (Eagle)

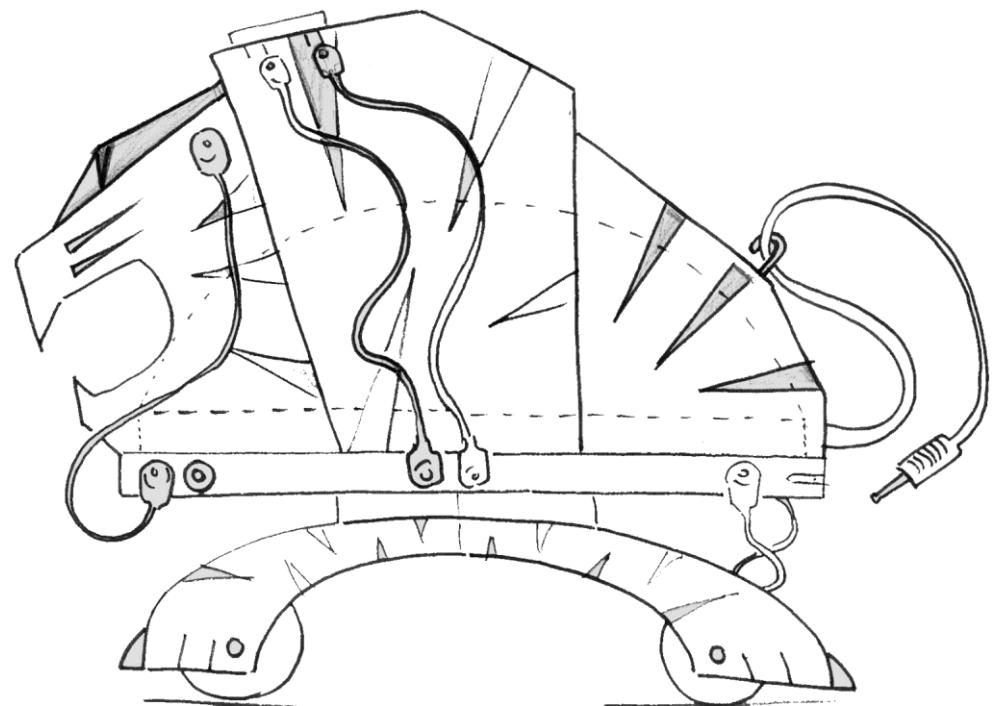
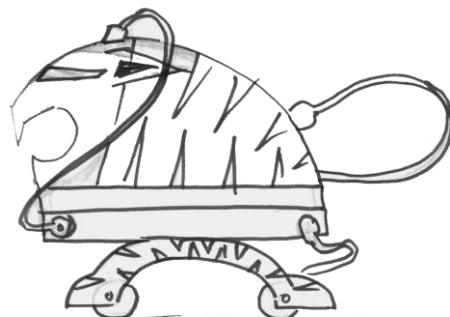
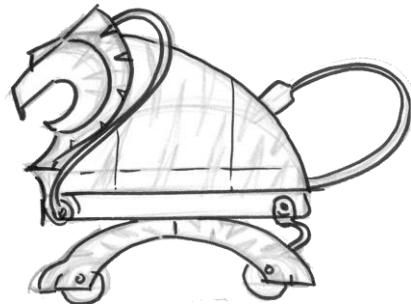




Refinements in concept



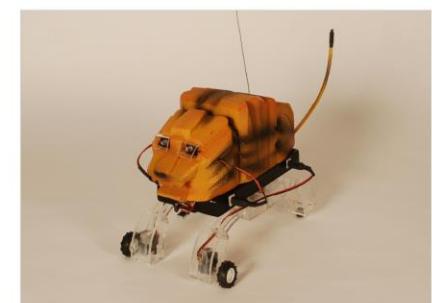
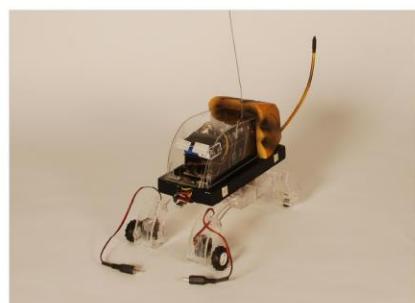
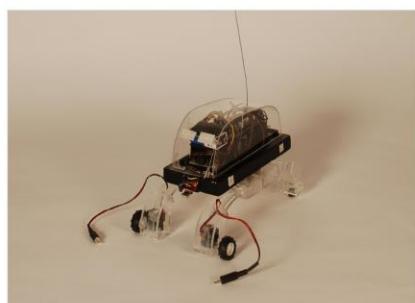
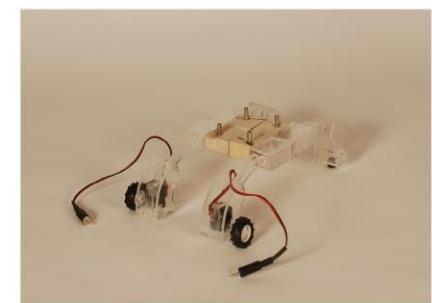
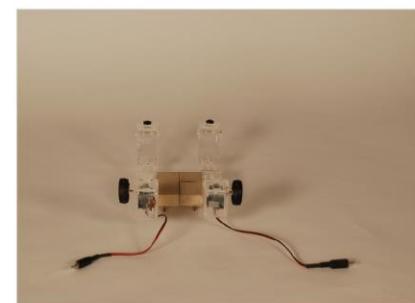
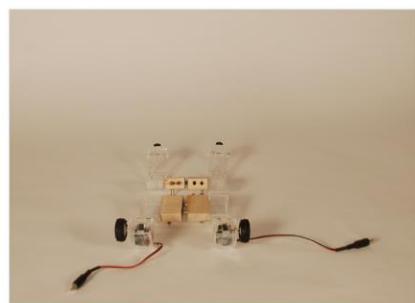
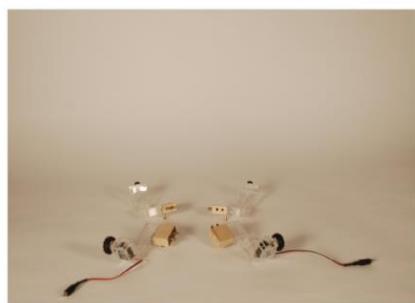
Robot Character (Tiger)



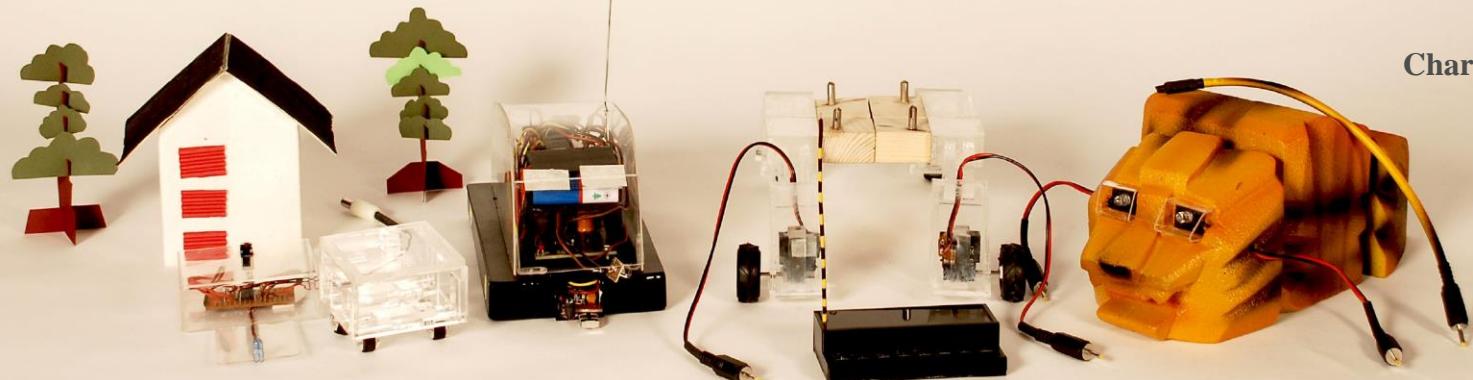


Final Prototyping

Prototype



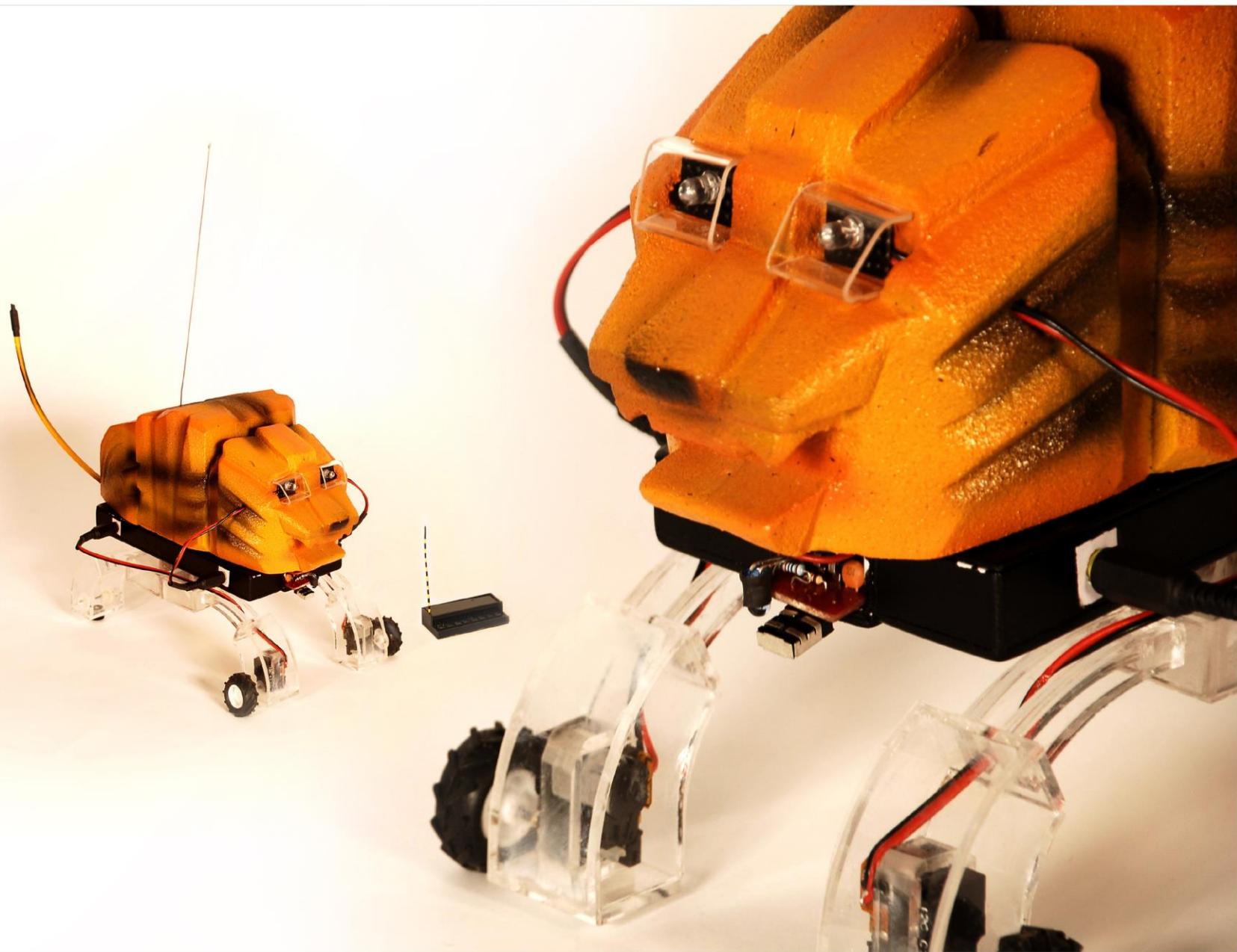
Elements of Kit



Environment







Acknowledgement



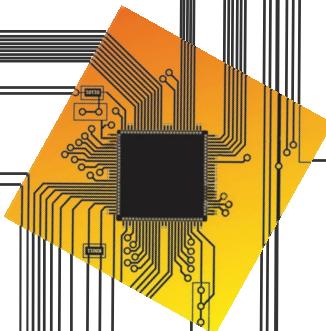
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Thank you

