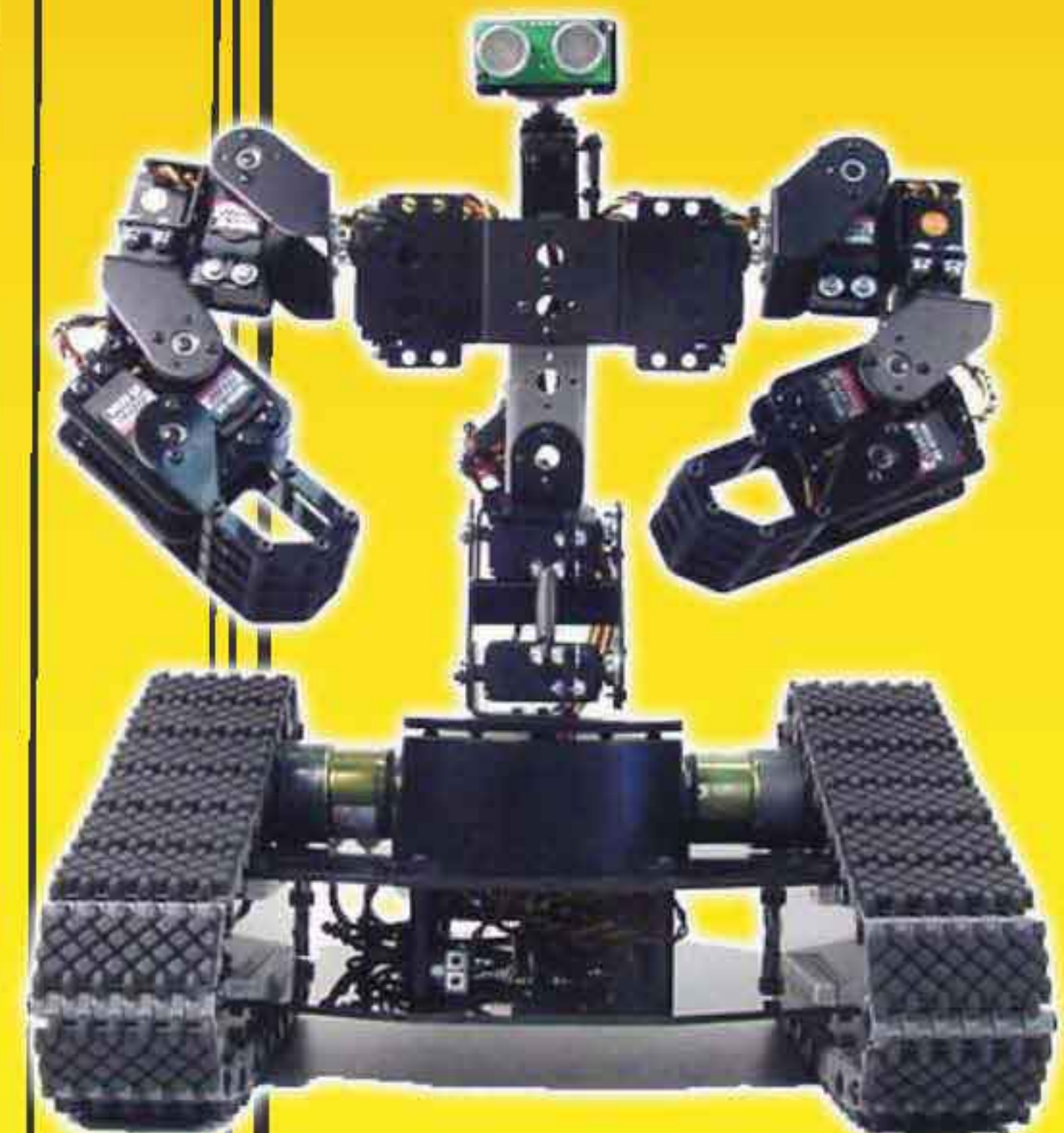


# ROBOTICS

For Children

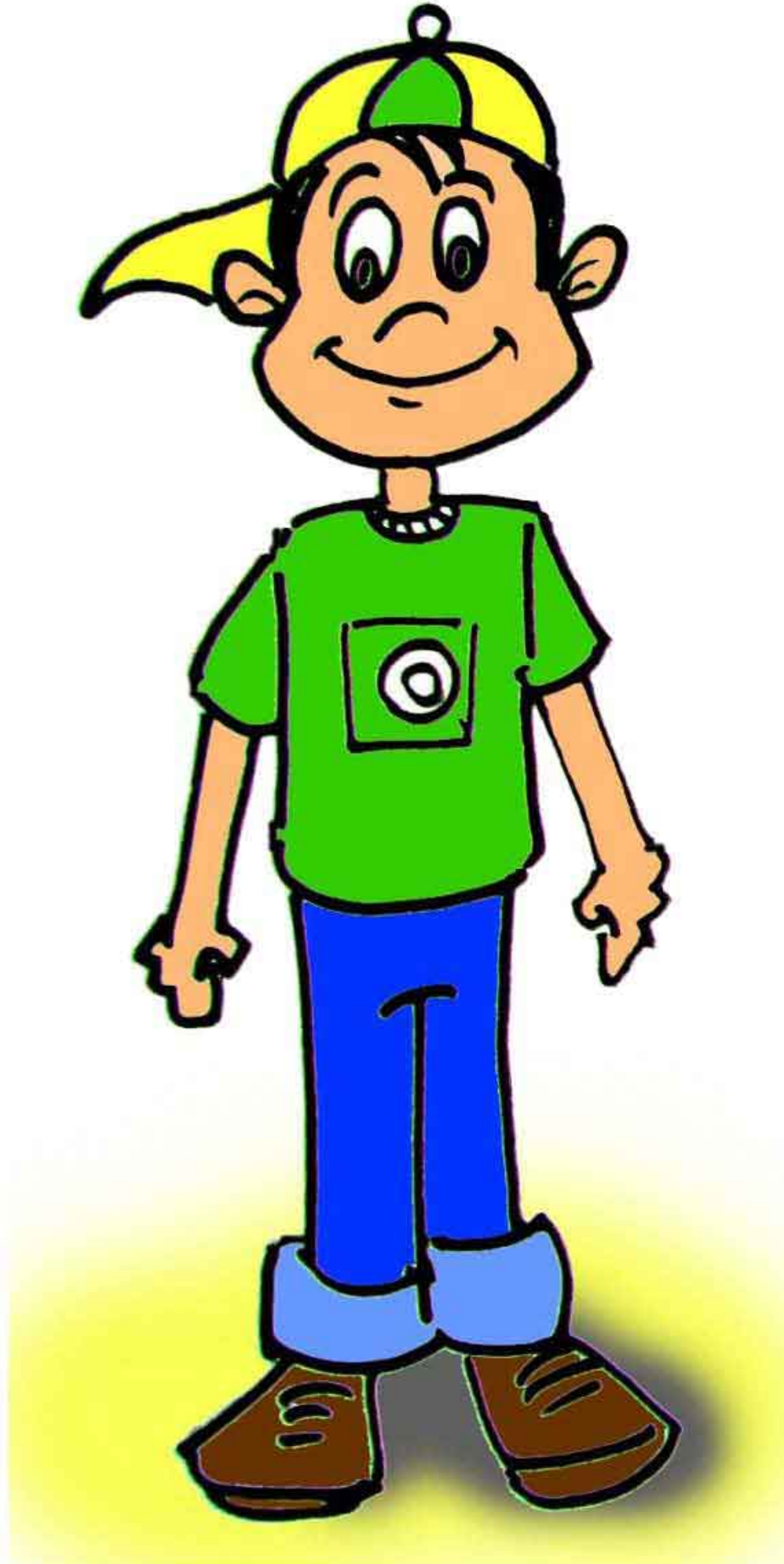
Guide : Prof. Ravi Poovaiah  
Ujjwal Likhar |

Interaction Design | 07633005  
IDC (Industrial Design Center)





# Scenario



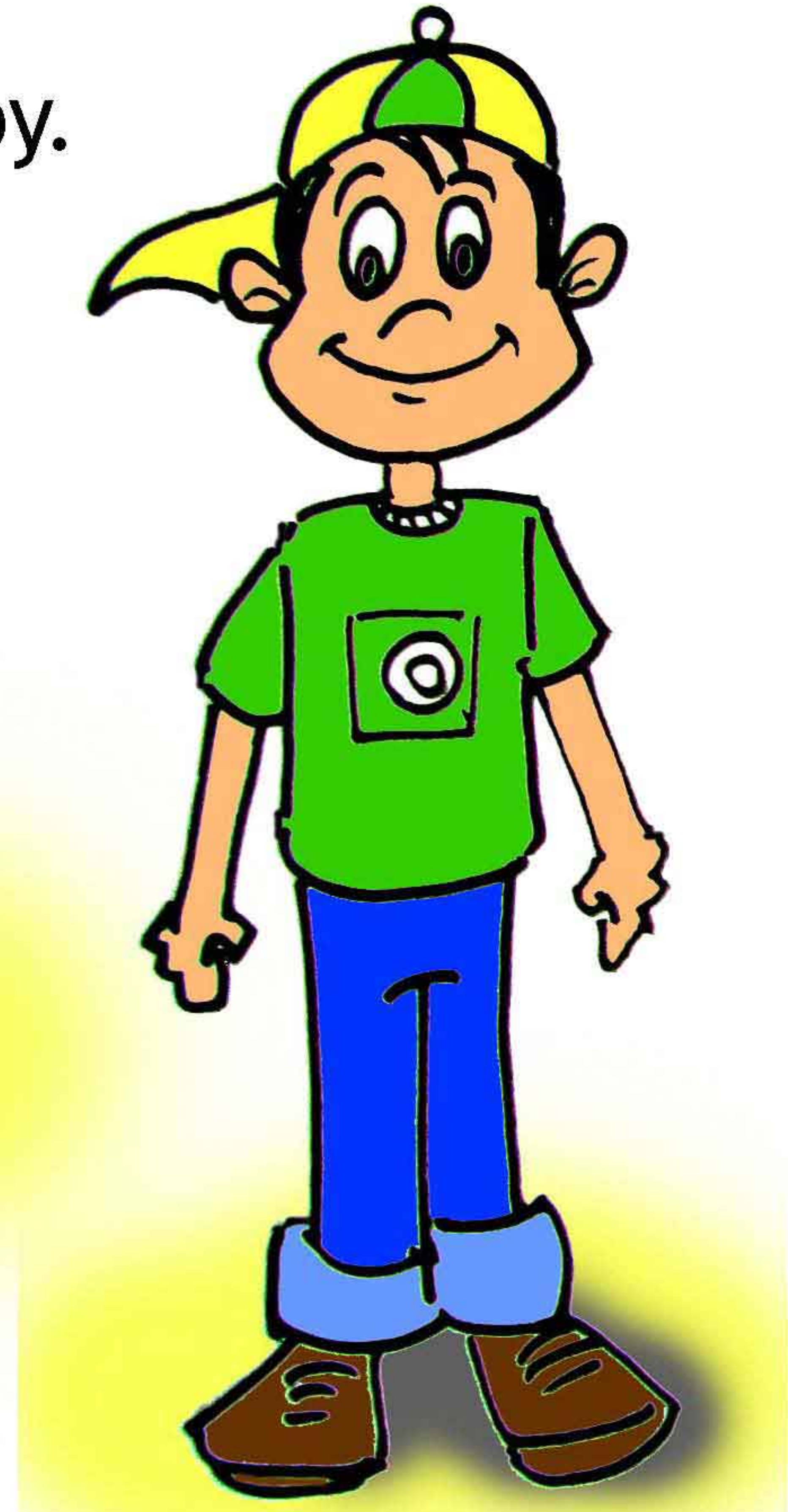
Rahul Rai

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.







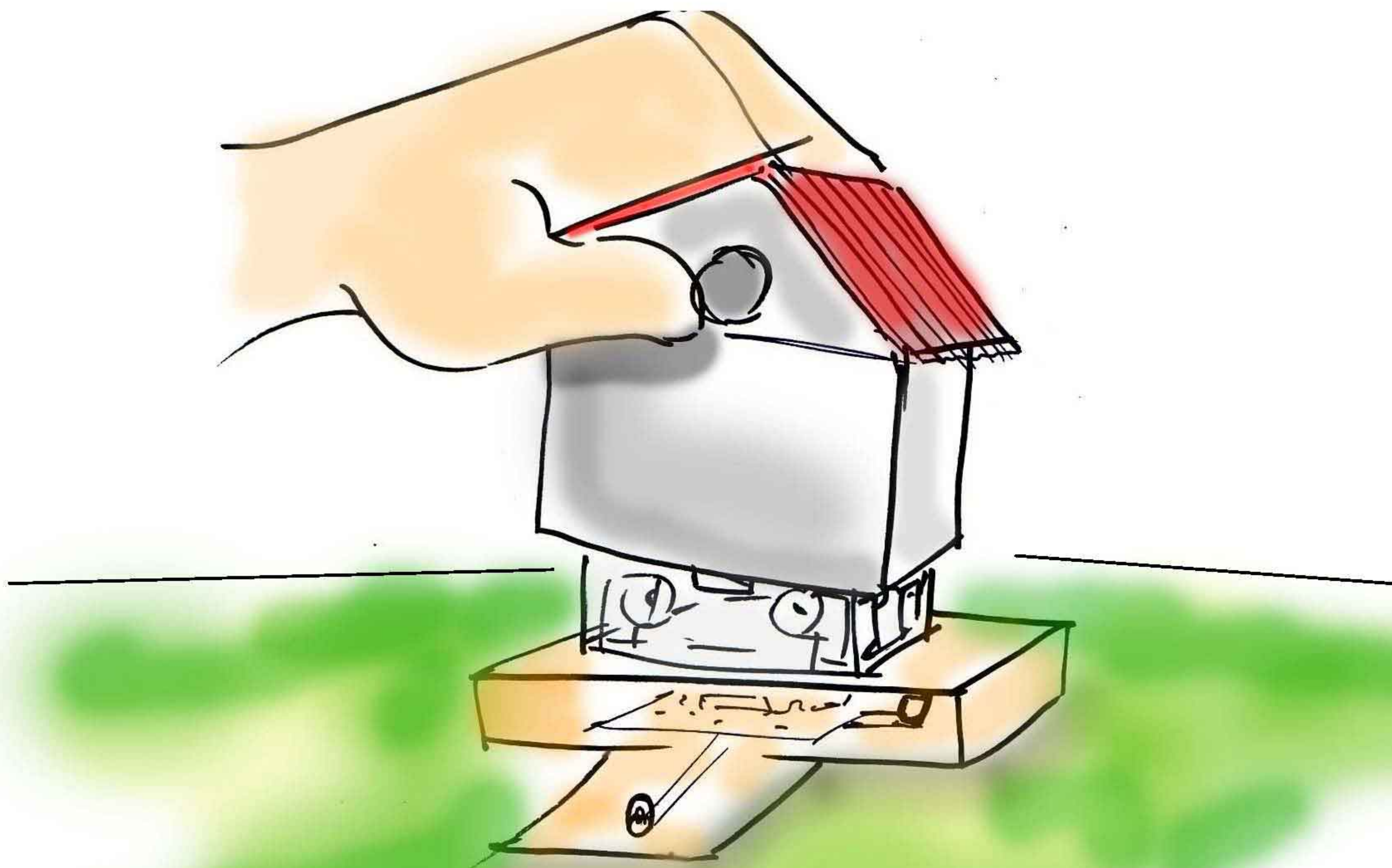














Player 1



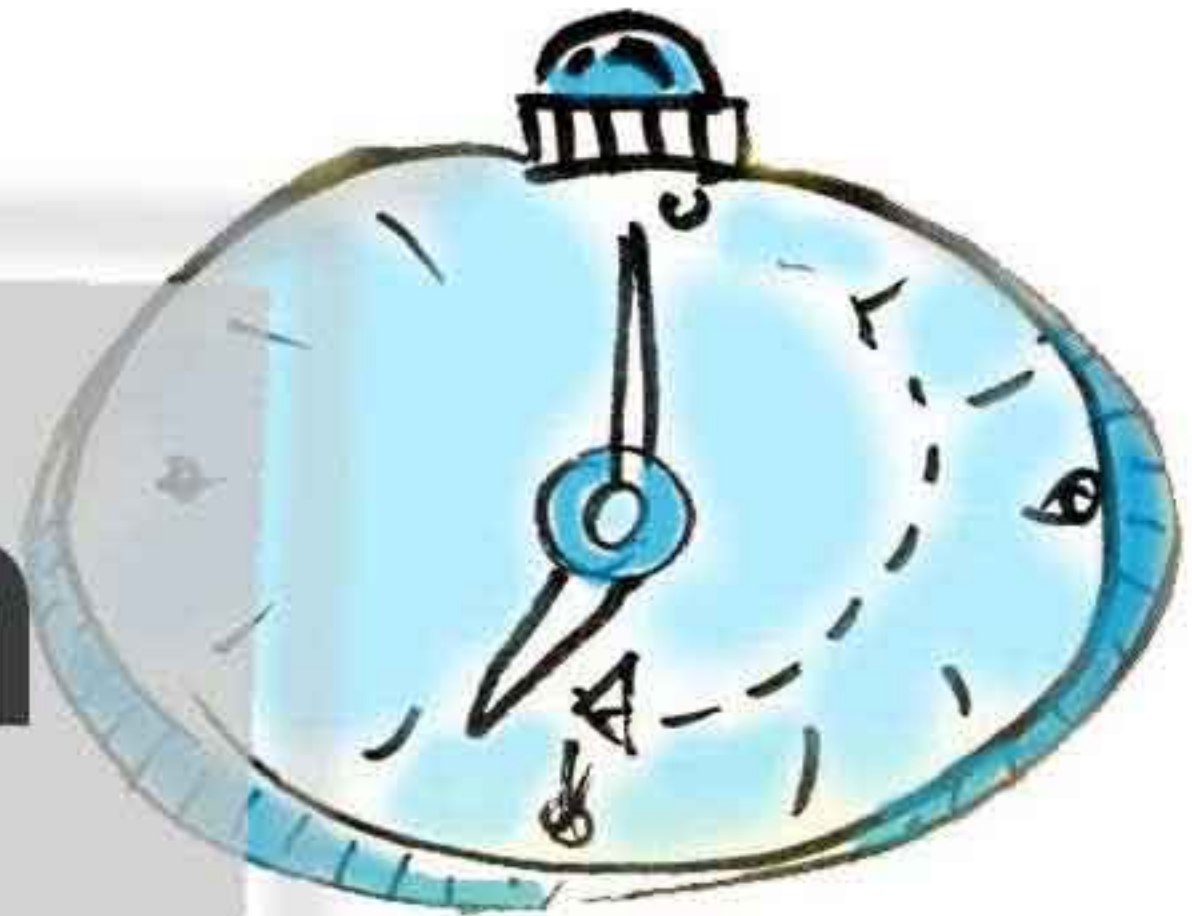
Player 2







10 min









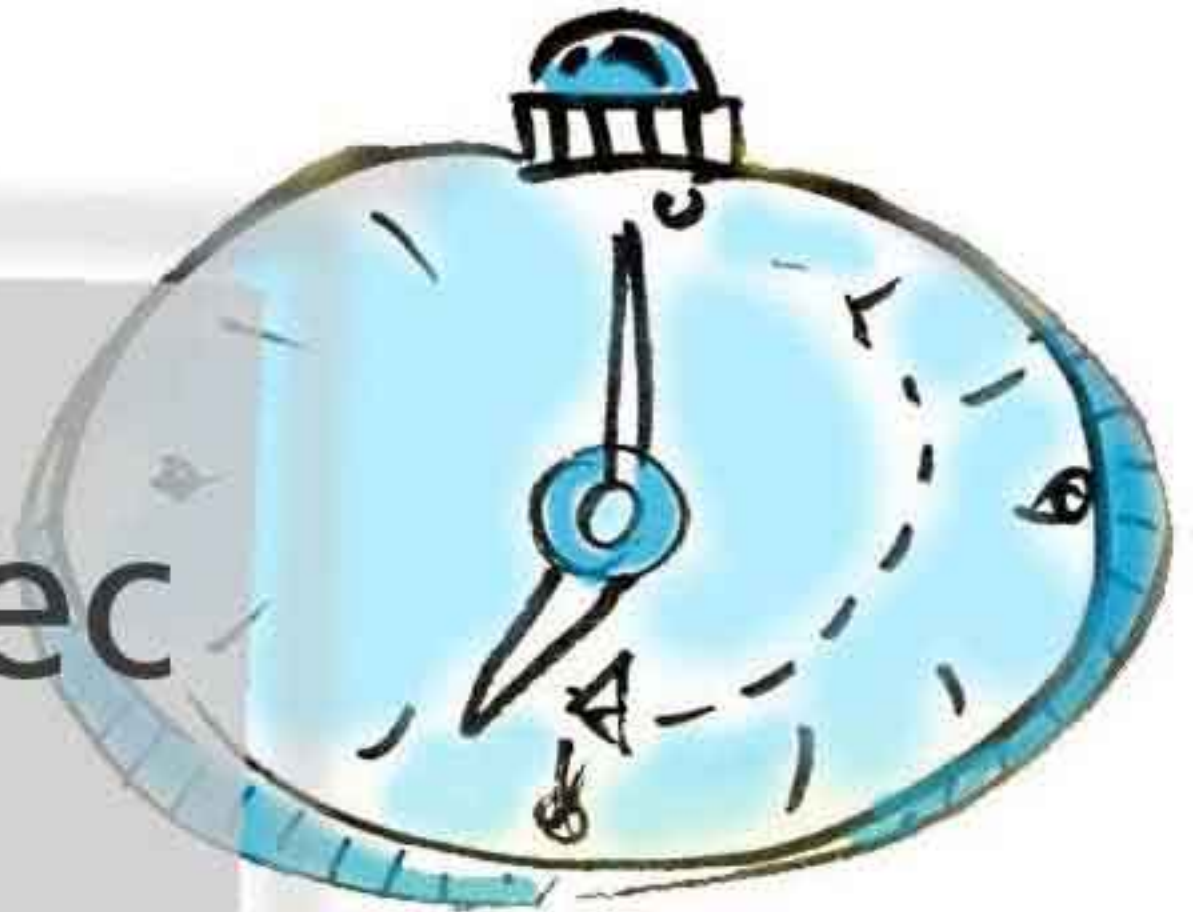
Player 1



Player 2



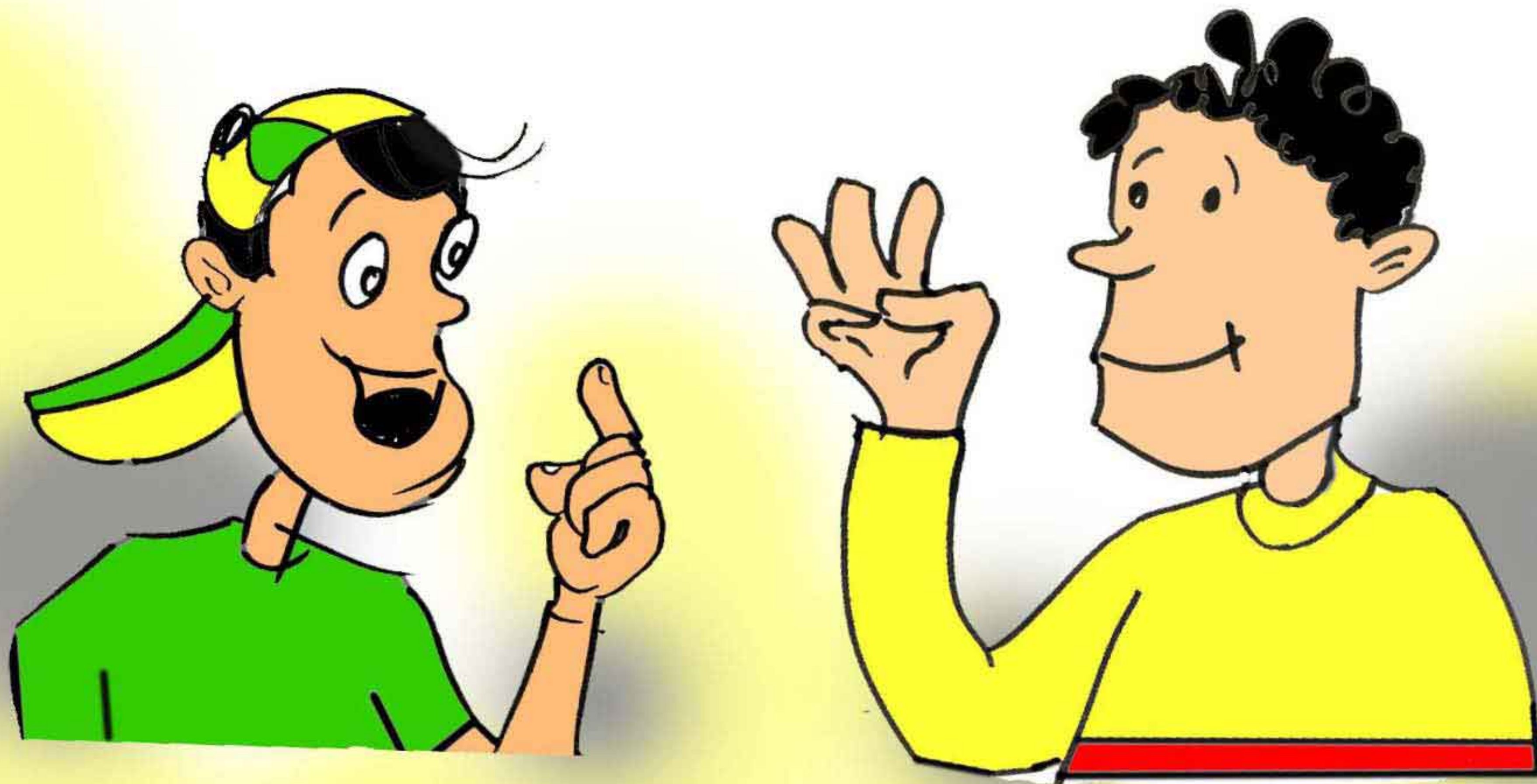
12min 15sec











End



# Objective

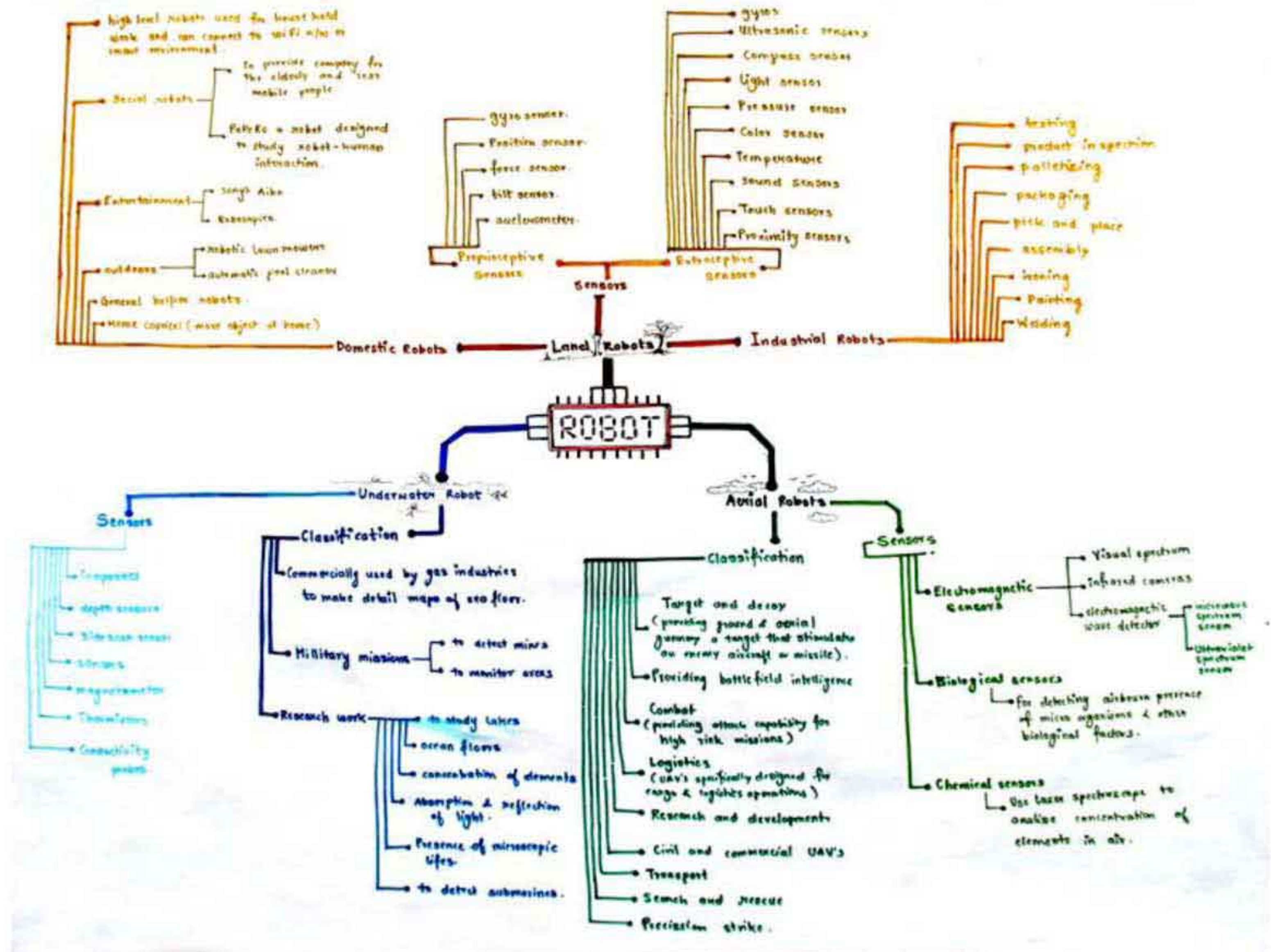


The main objective of this project is to design a robotic kit for children where in they can assemble the robot, set the environment and play.



# Research and data collection

## Classification of Robot





# Classification of Robot



## Aerial Robots

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## Land Robots

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## Under water robots

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# Robotic toy kits



Lego MindStorm NXT



MA-VIN

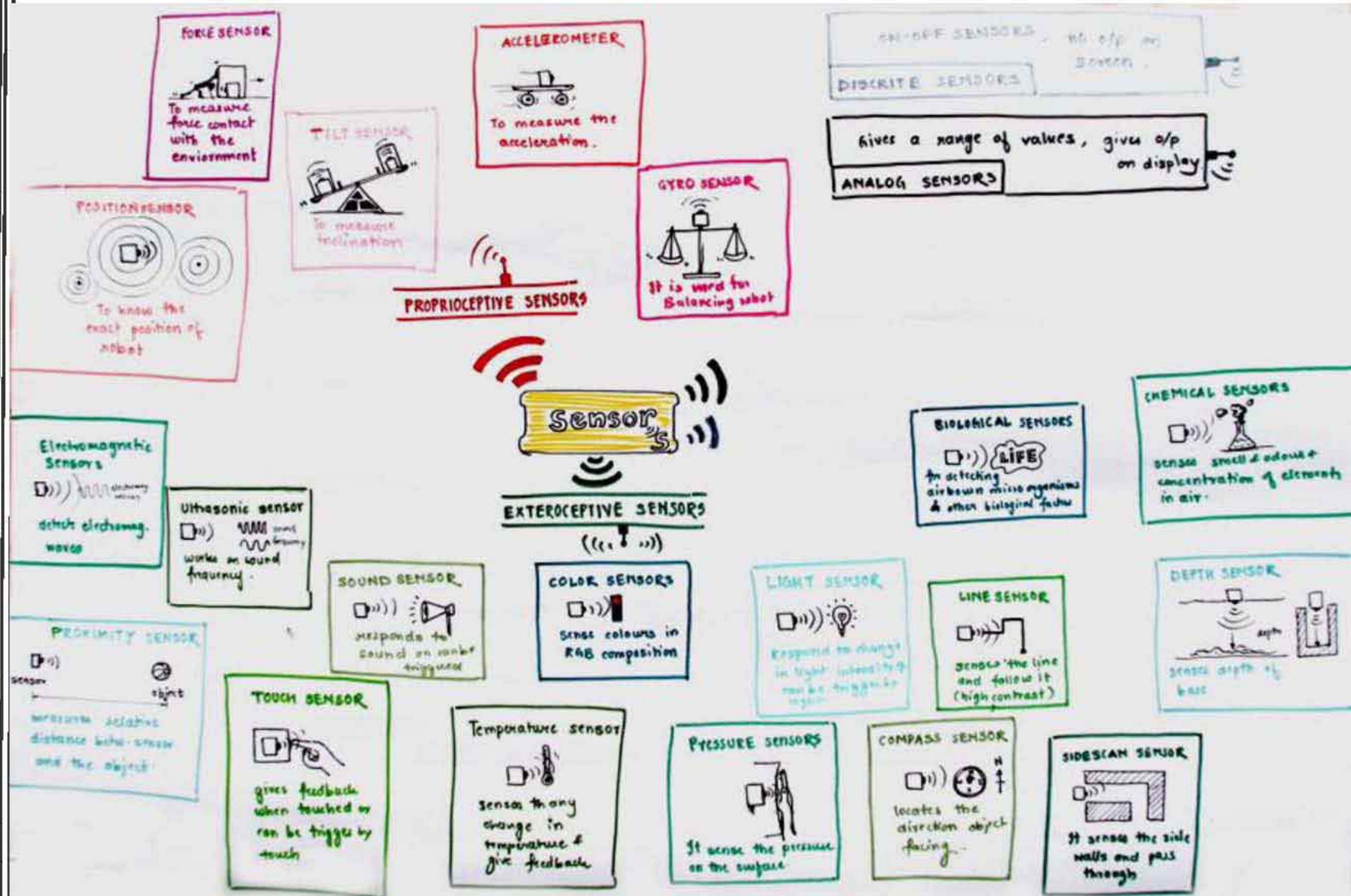




# Sensors



## Sensors map





# Robotic Competitions

Basically robotics competition encourages enthusiasts to build 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 Robotics

**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.

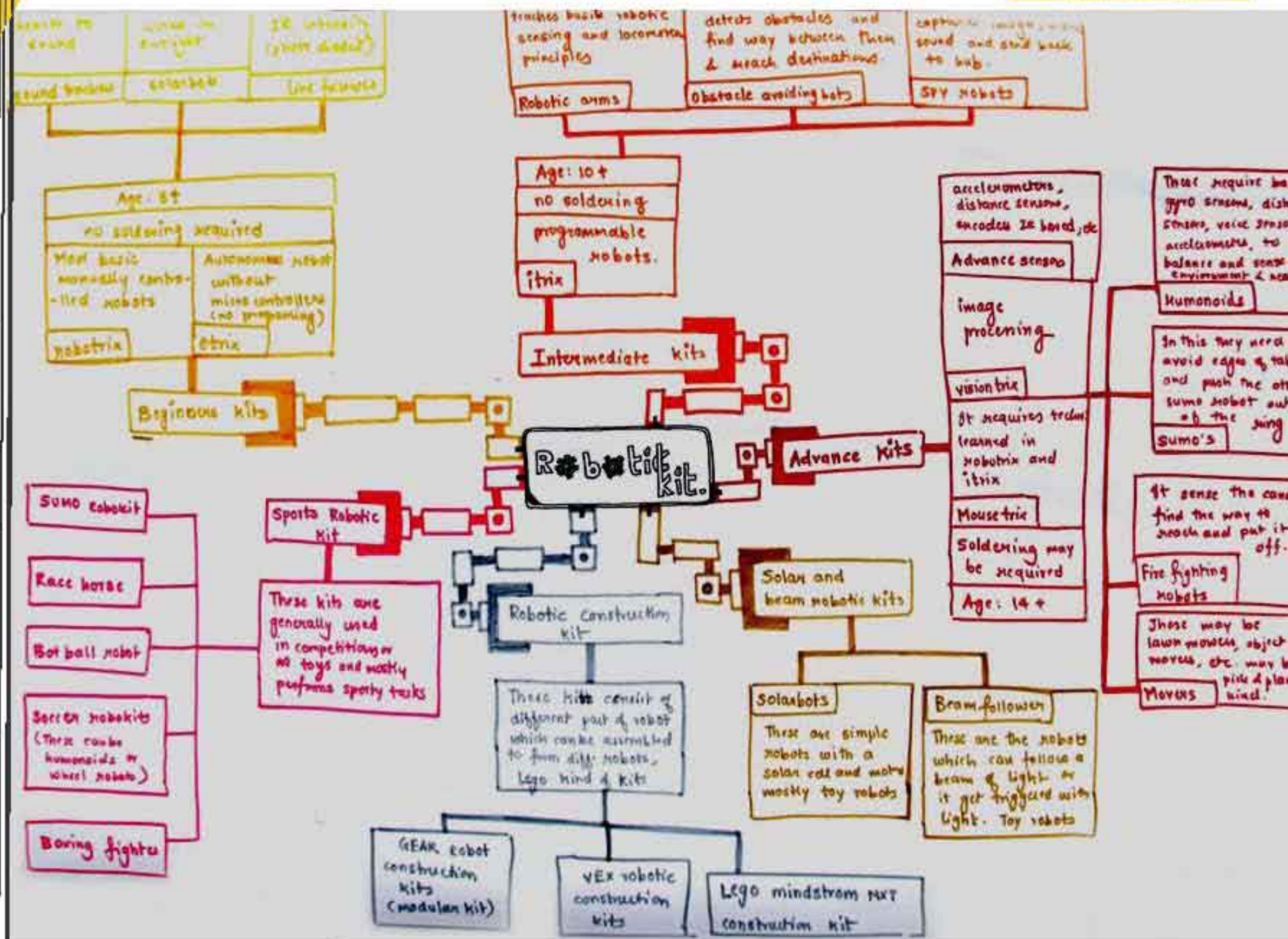
## Analysis

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



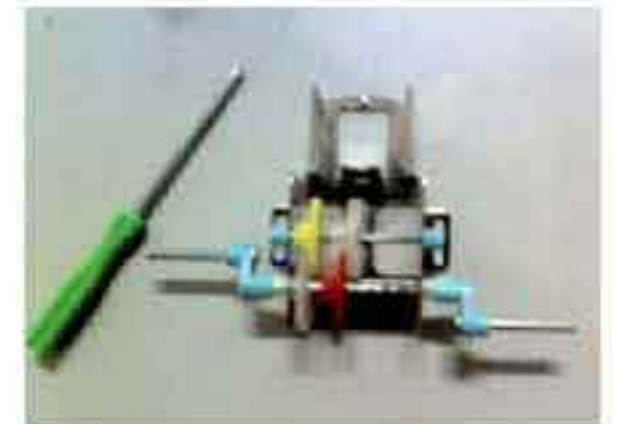


# Study of Robotic Kits



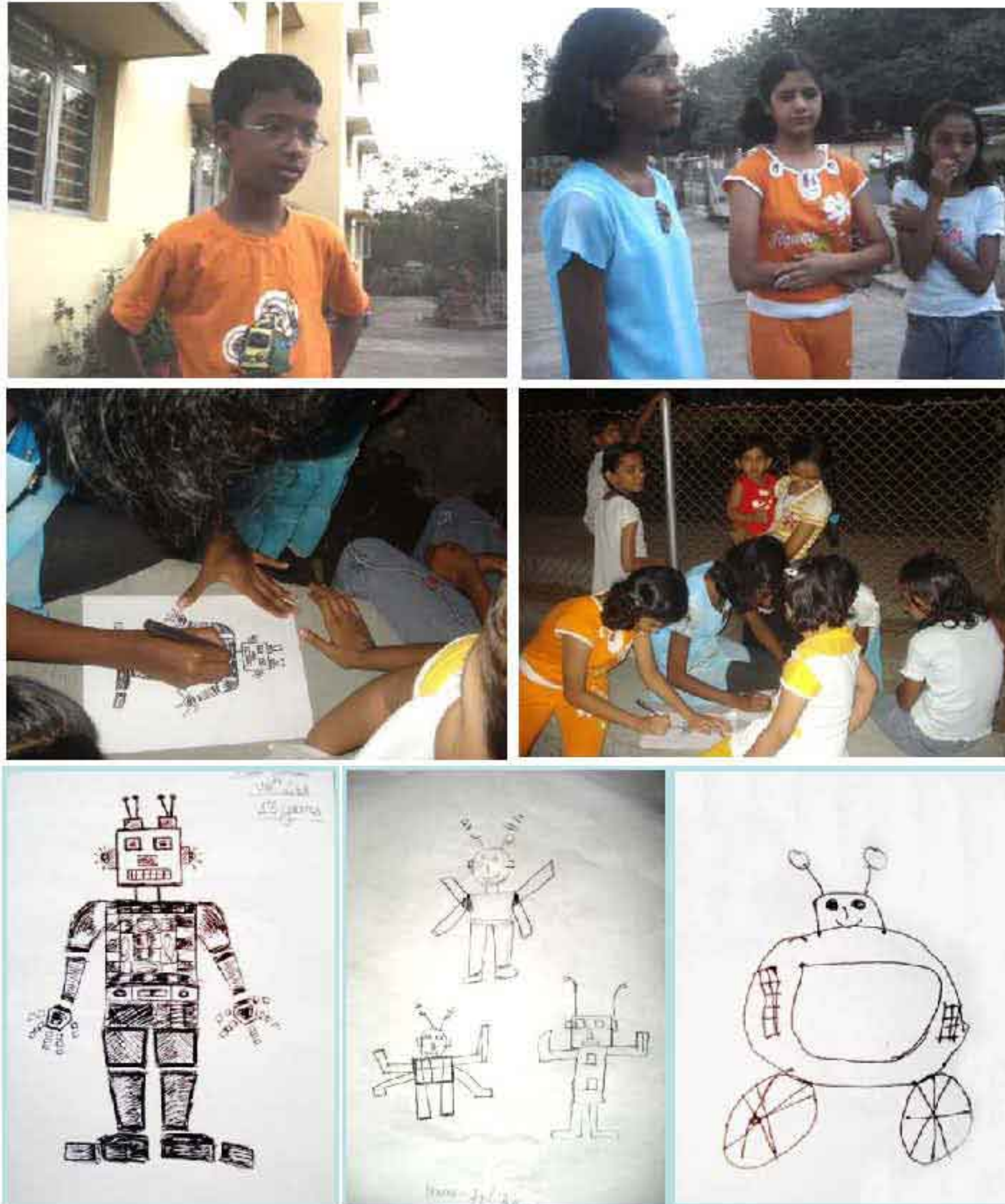
## Insights

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





# User Study



## User statements

- क्या स्पीड है
- सबको बचाता है
- कुछ भी कर सकता है
- रोबोट से हम कुछ भी करवा सकते हैं
- रोबोट स्टील का होता है
- रिमोट कण्ट्रोल 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 their order
- Speed matters them a lot
- They think robots 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 and 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 and light feedbacks from robot
- They like multi-tasking robots.





# User group



So I have decided to design a kit for the age group of 8+ kids

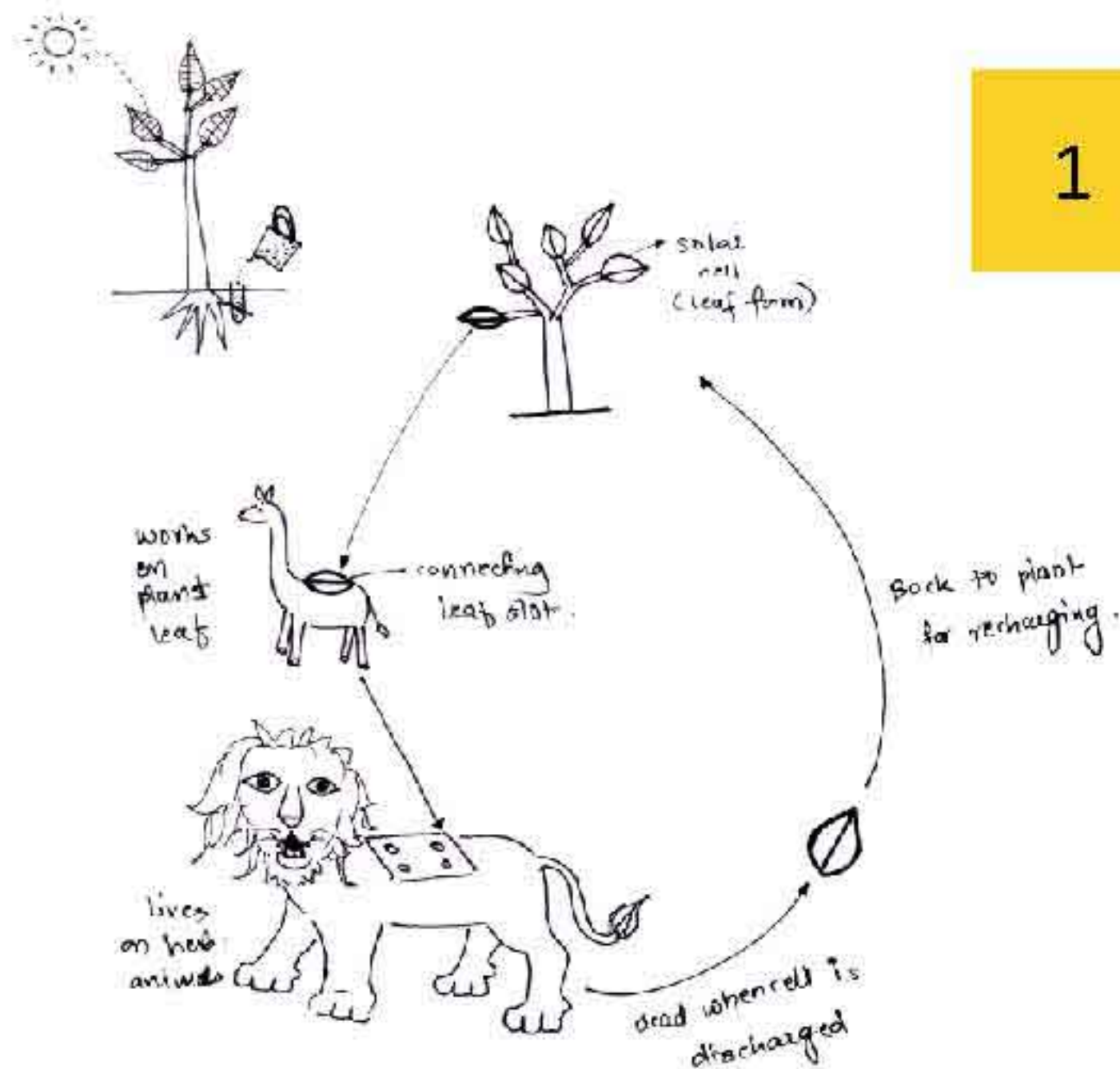
**PLAY** and **LEARN** as keywords.



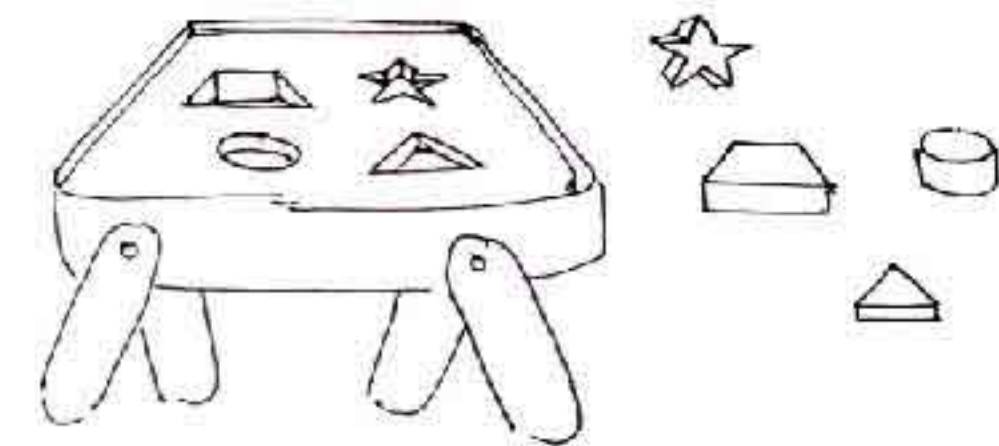
# Initial explorations



1



3

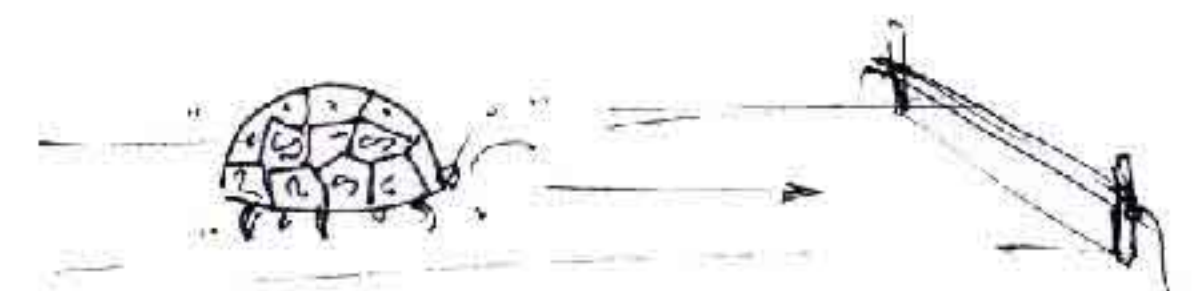
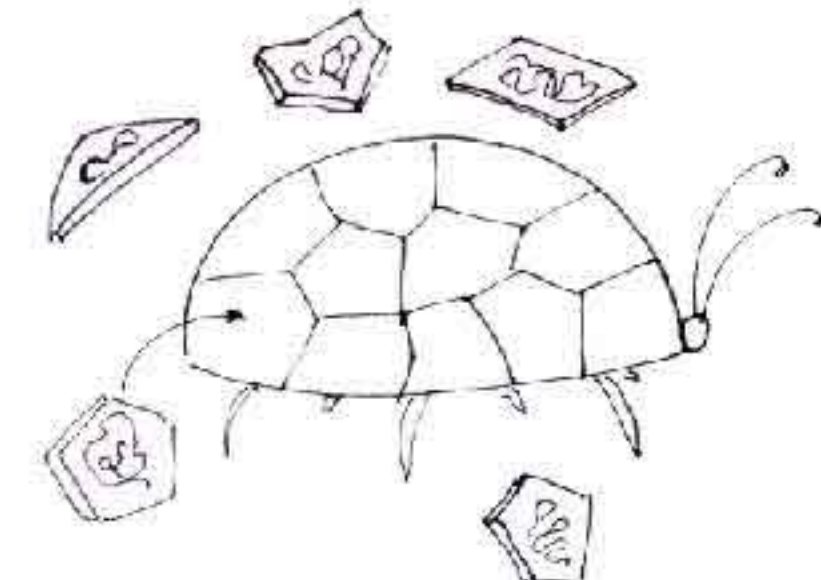


match the shapes or load shapes on back and it will walk.

2

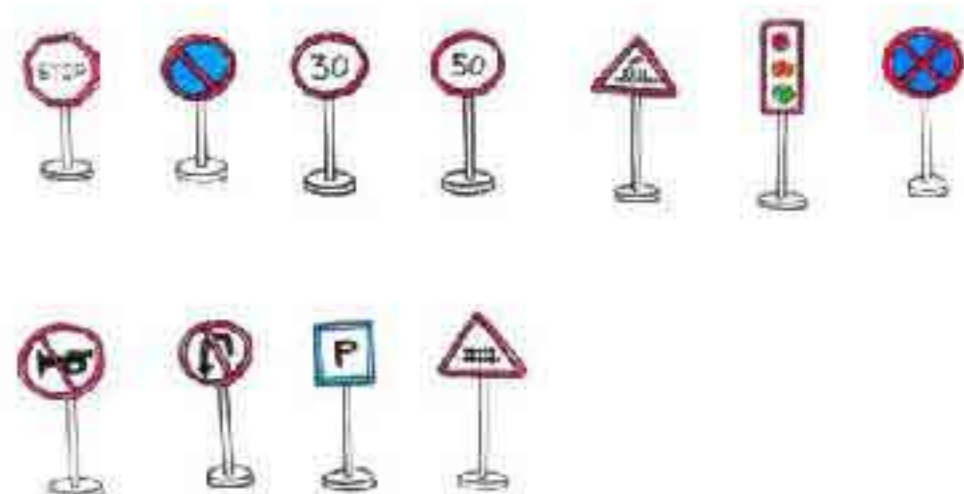
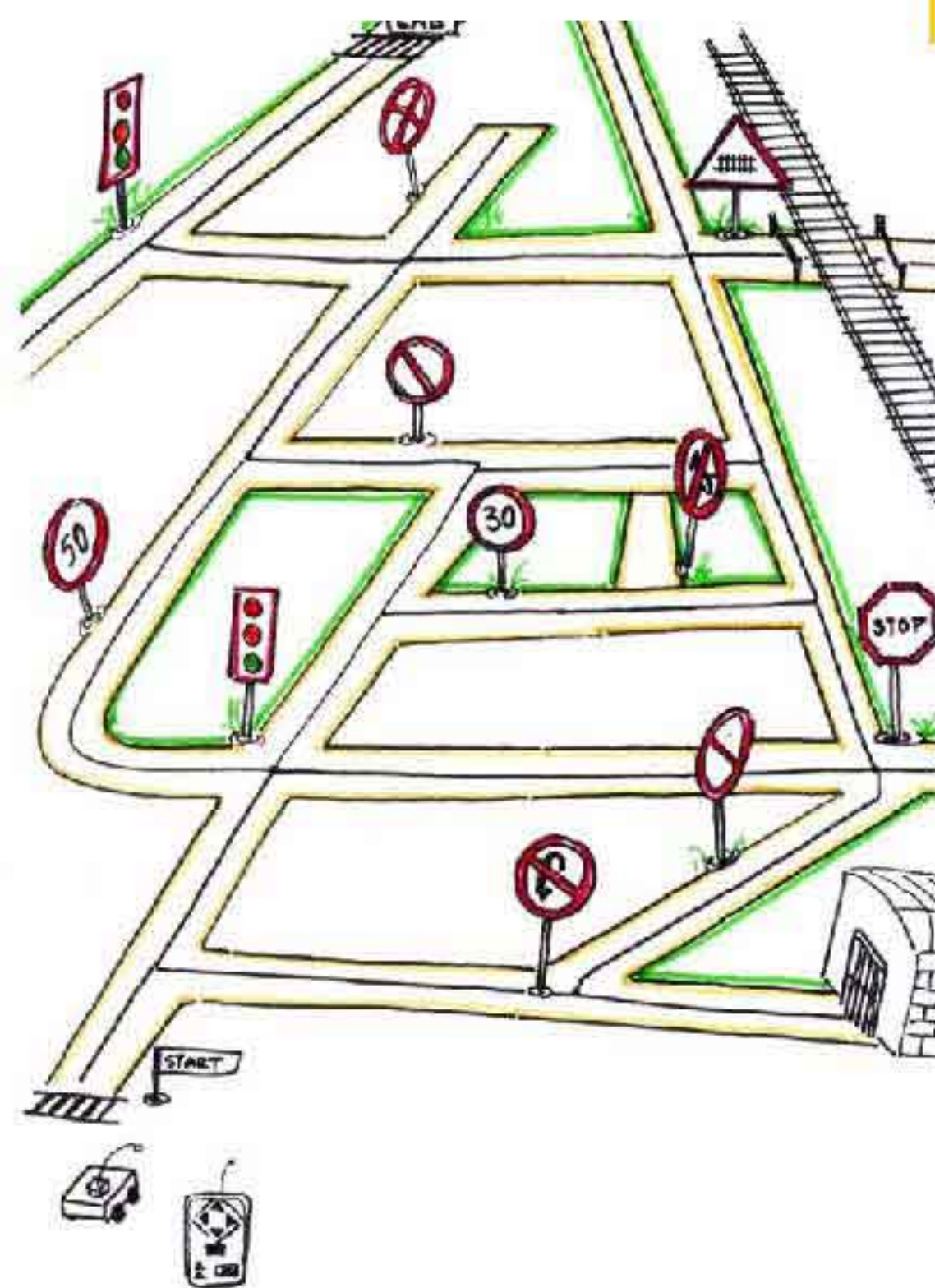


4

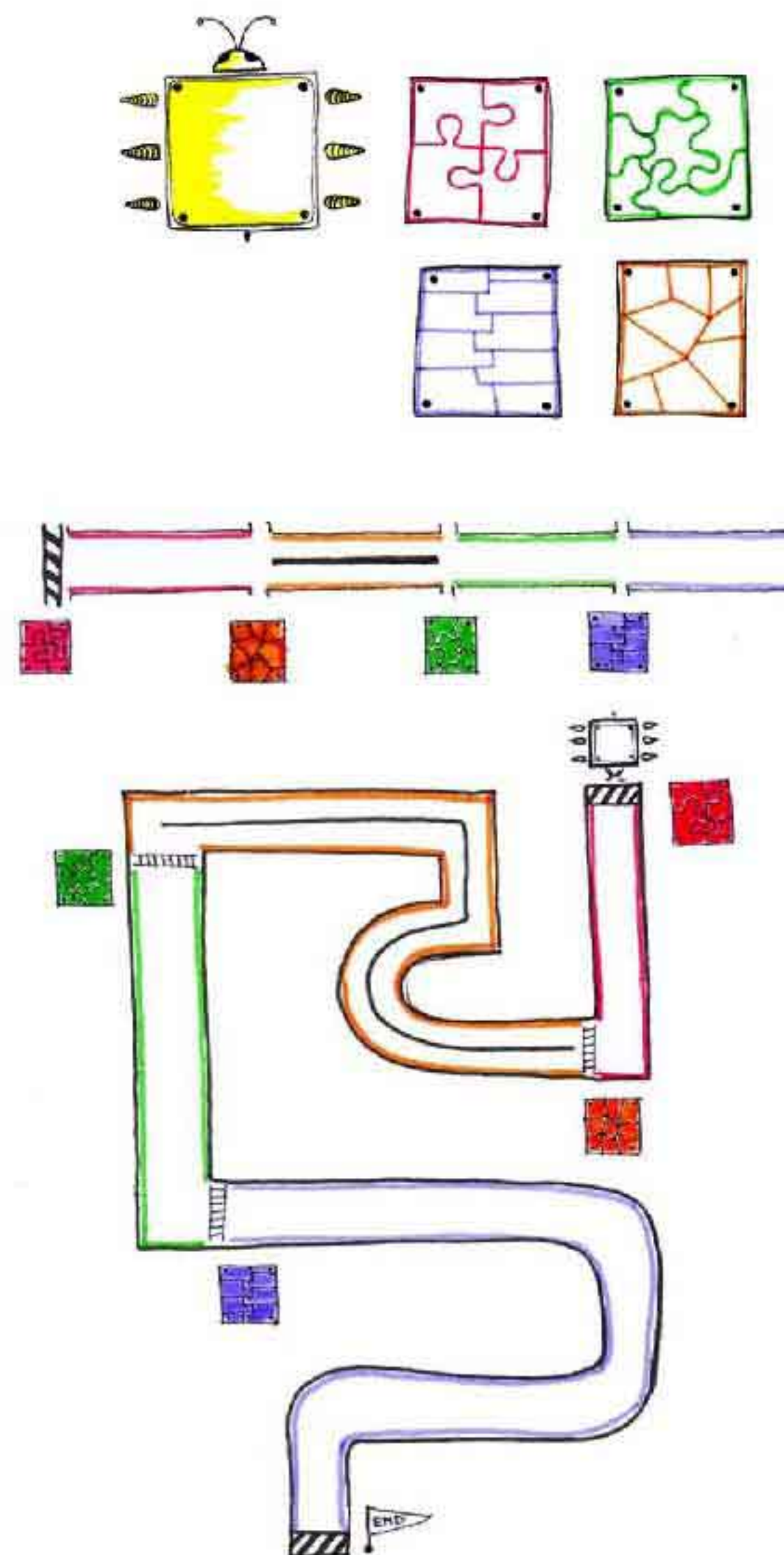




5



6





# 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

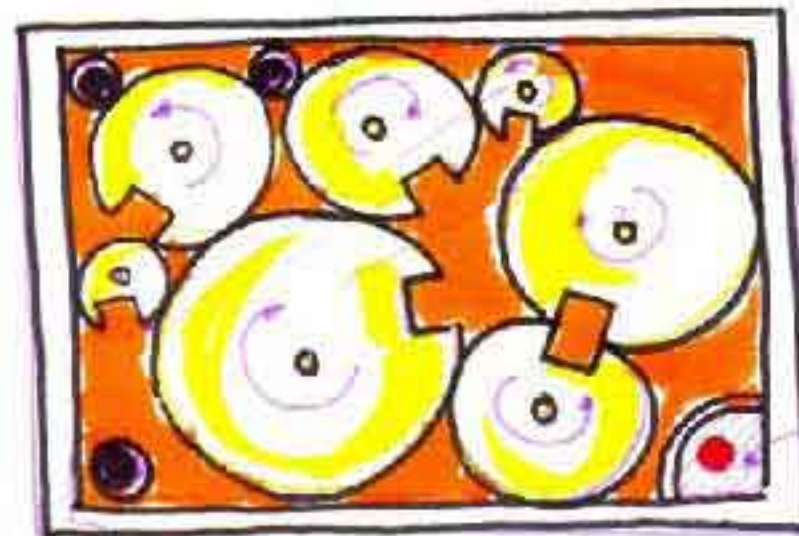
- Boy
- Girl
- family



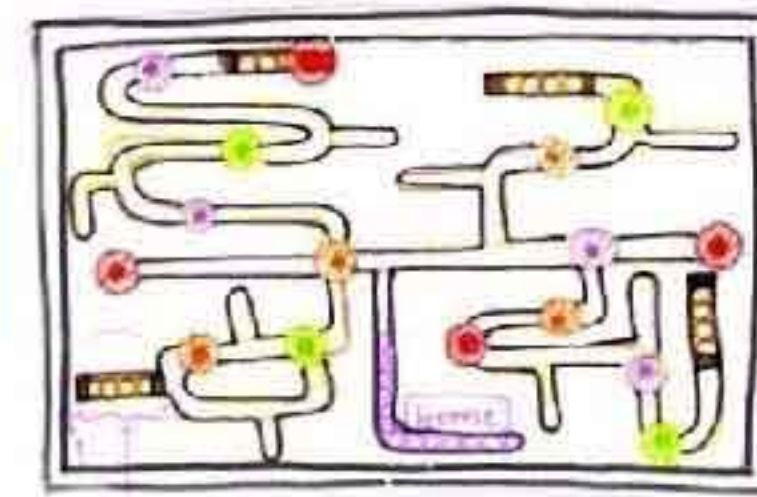
# Secondary ideations



## Ideation on activating robot



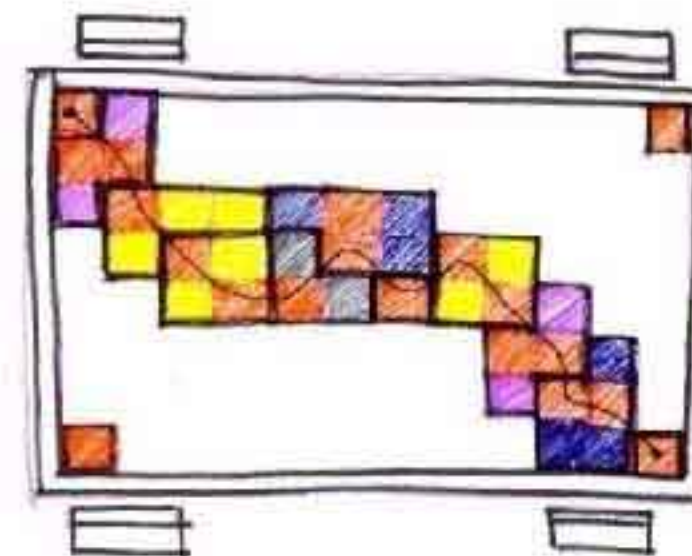
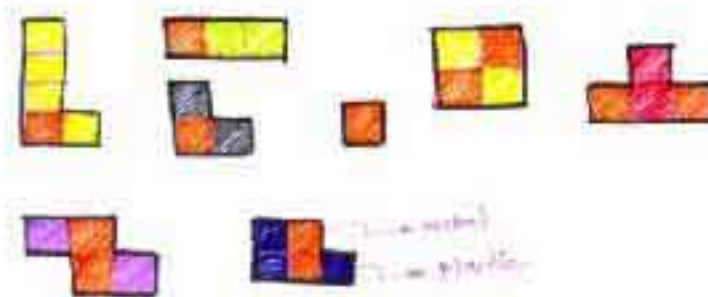
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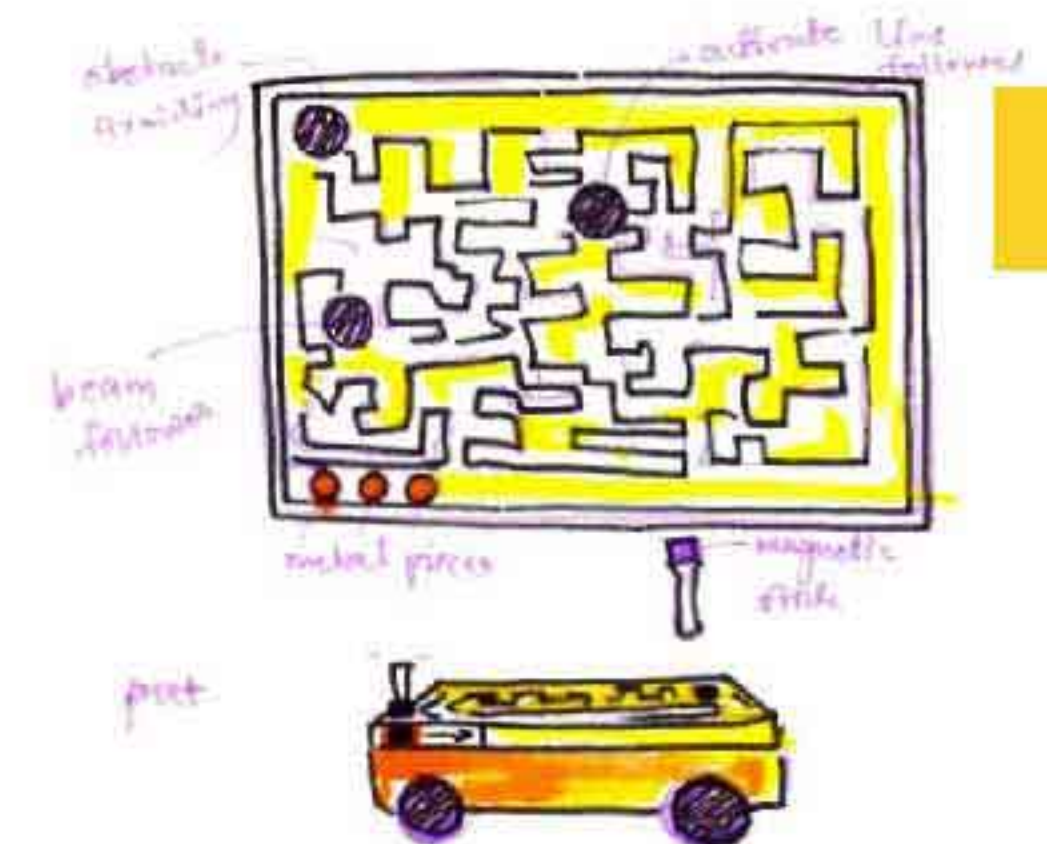
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3



4



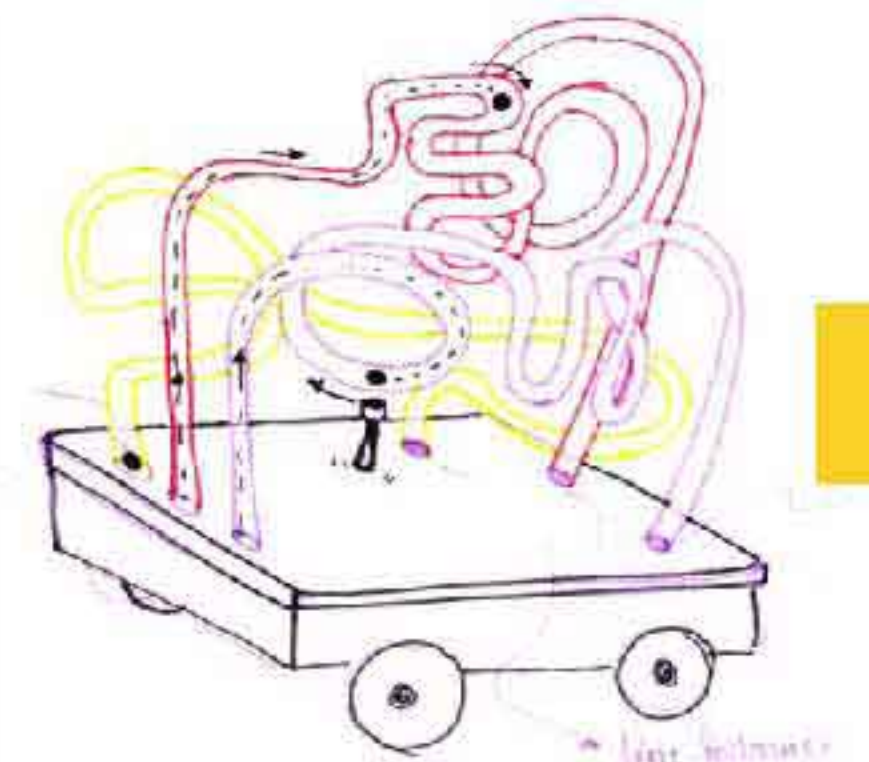
7



6



5



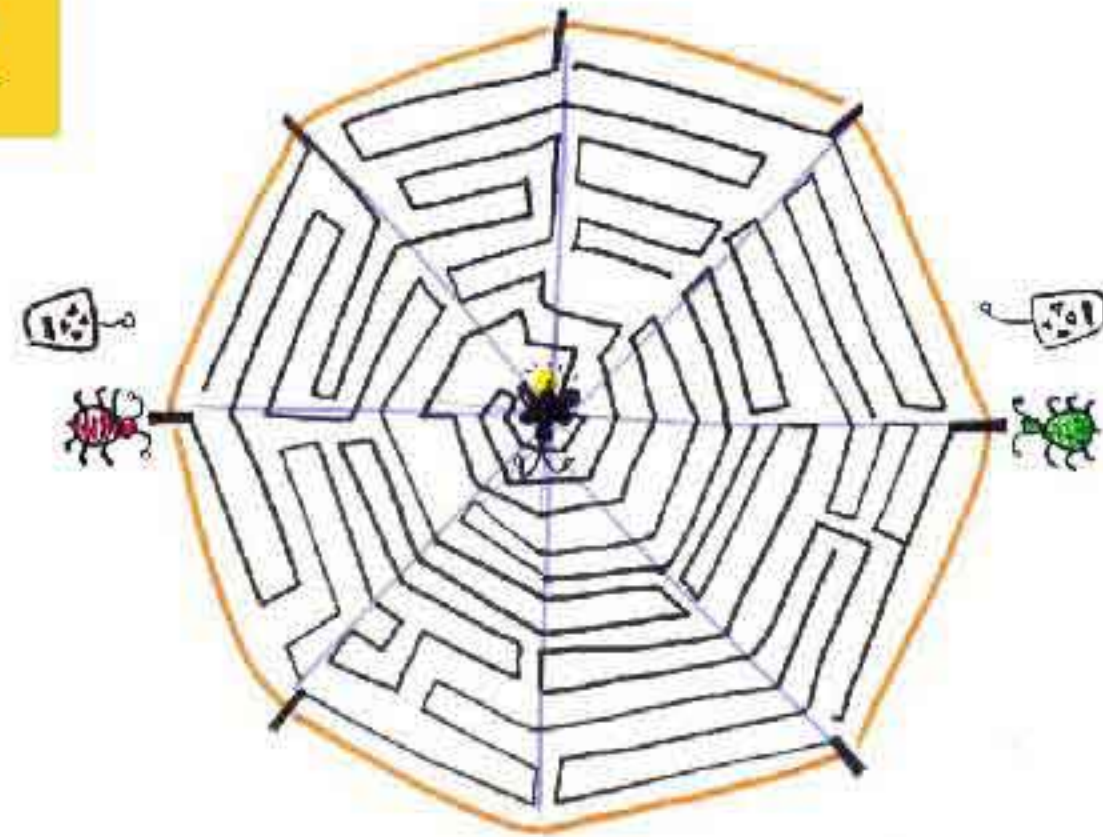


# Secondary ideations

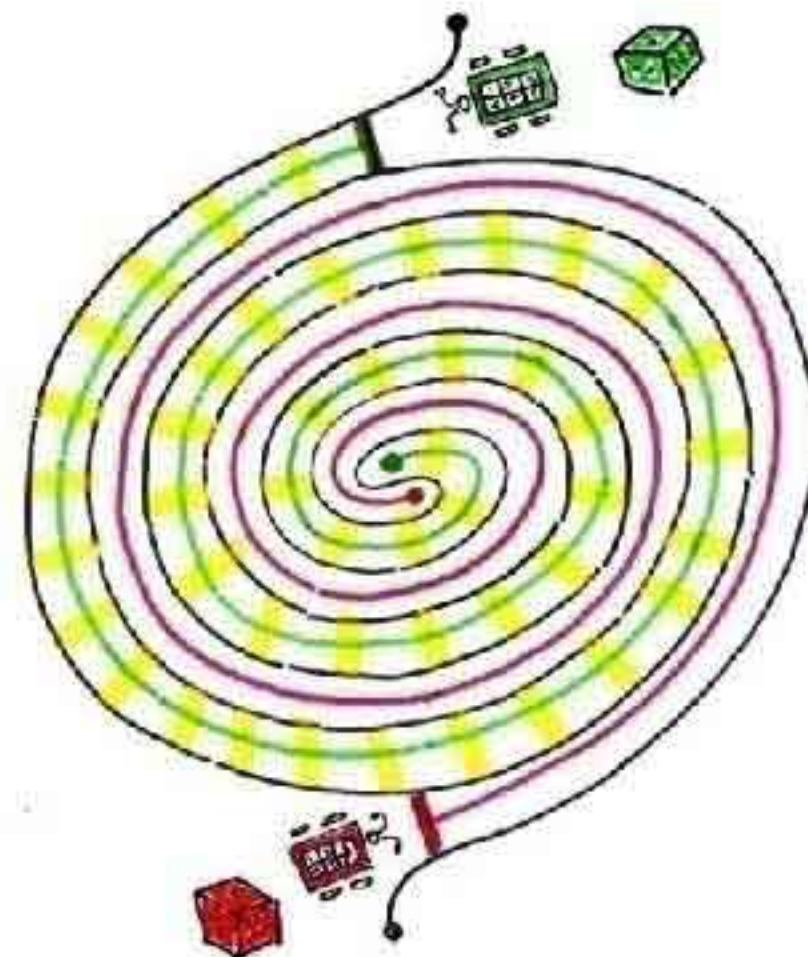


## Game ideas

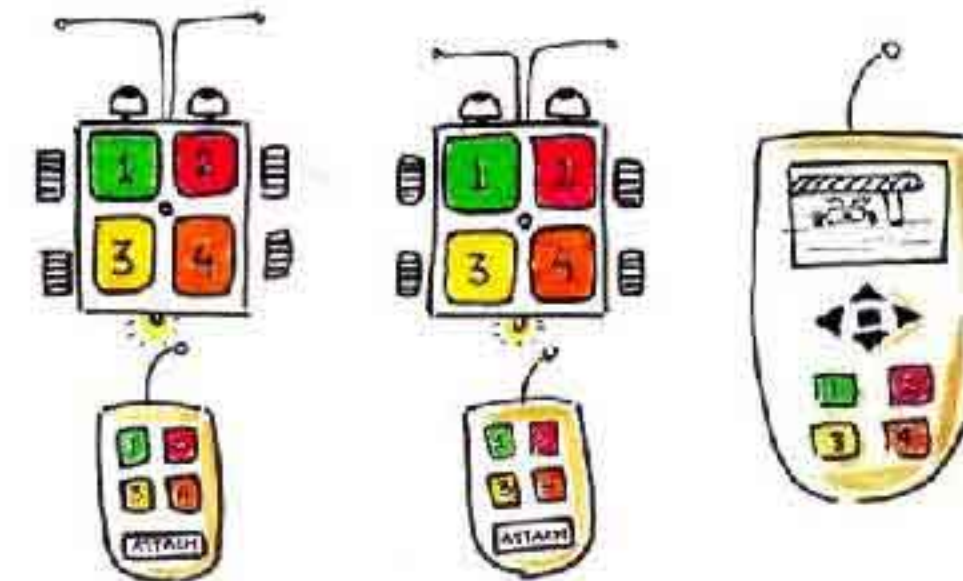
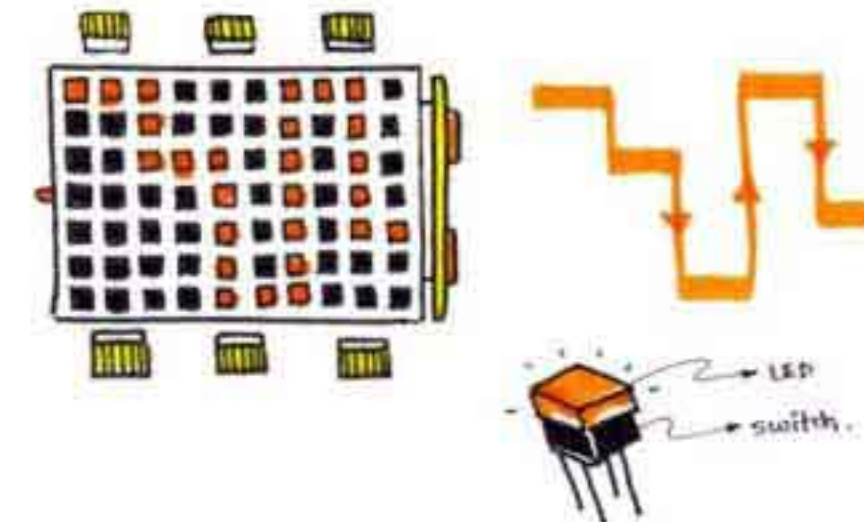
1



2



5



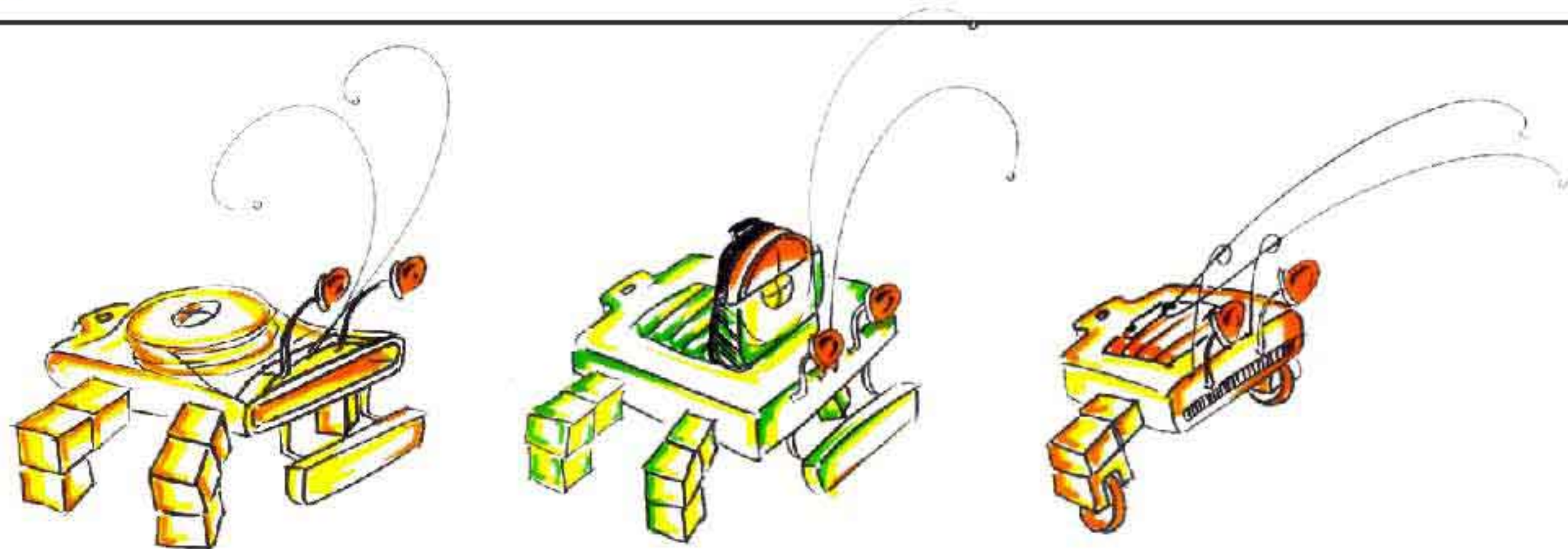
4

3





# Final idea

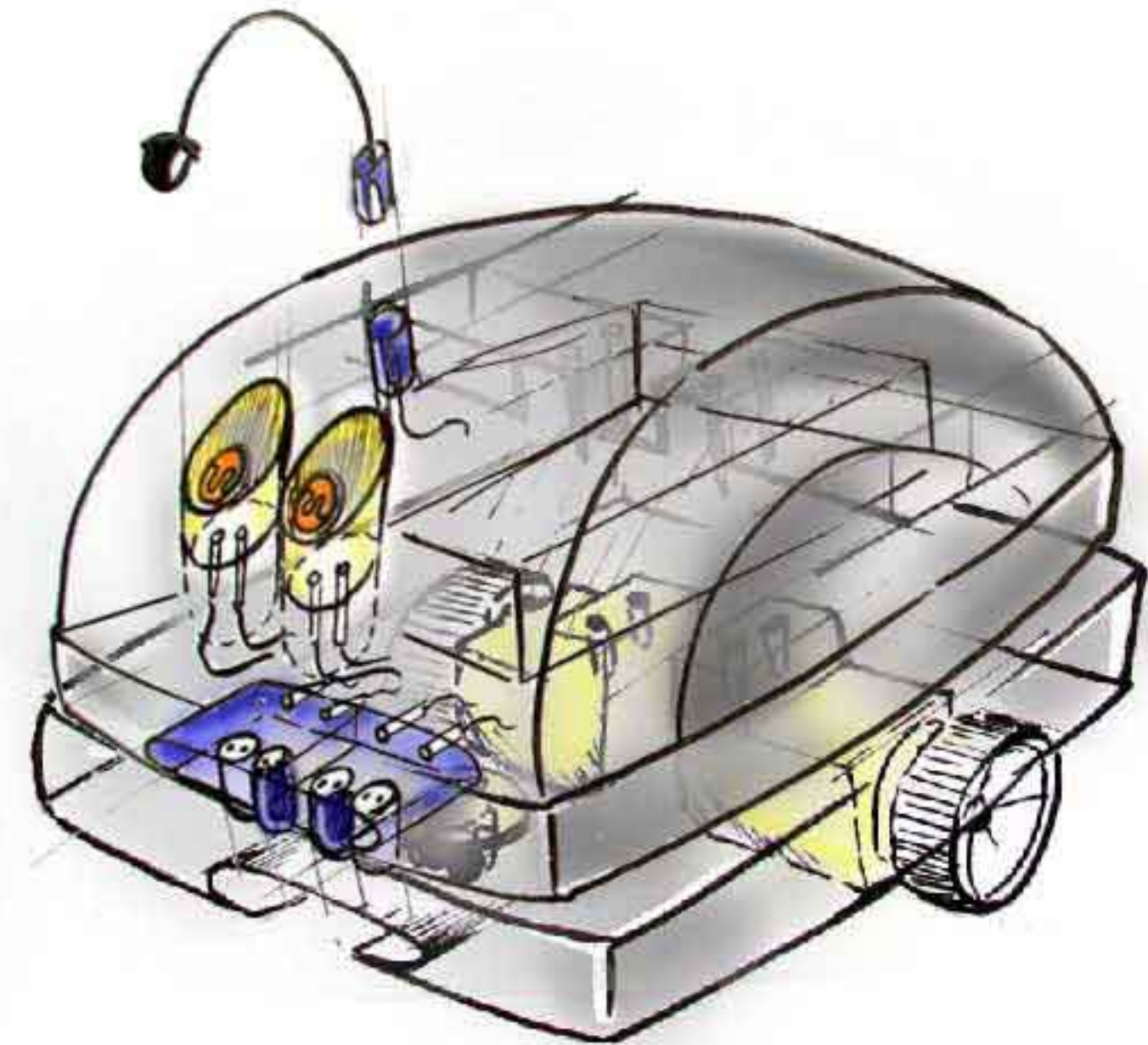
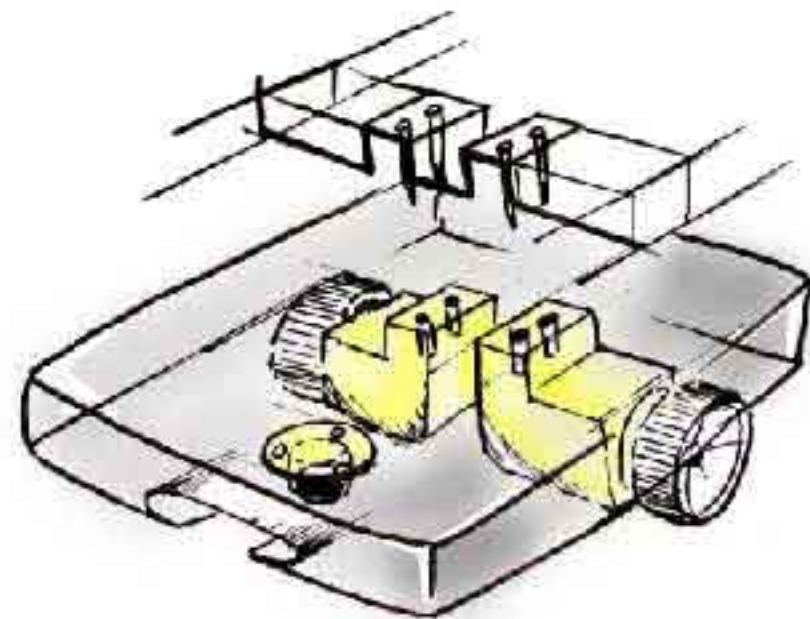
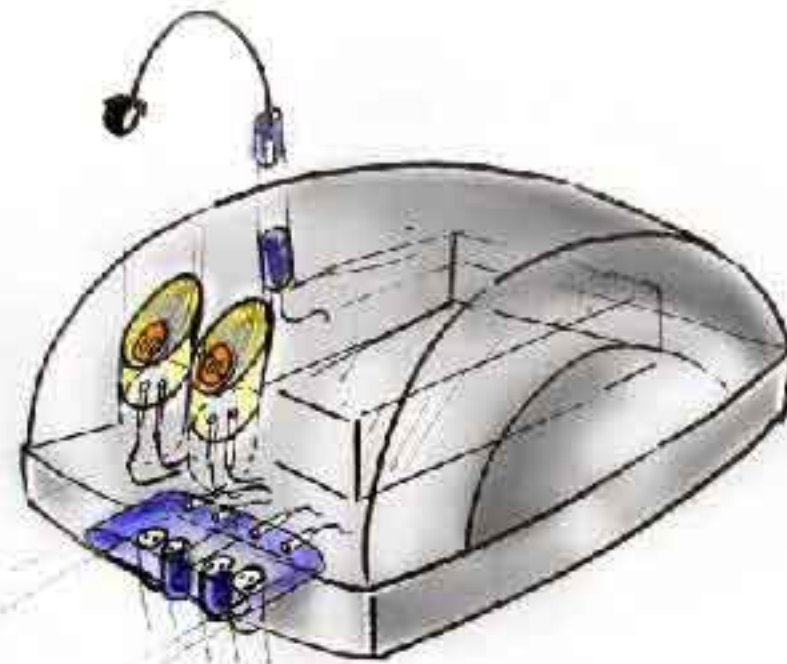
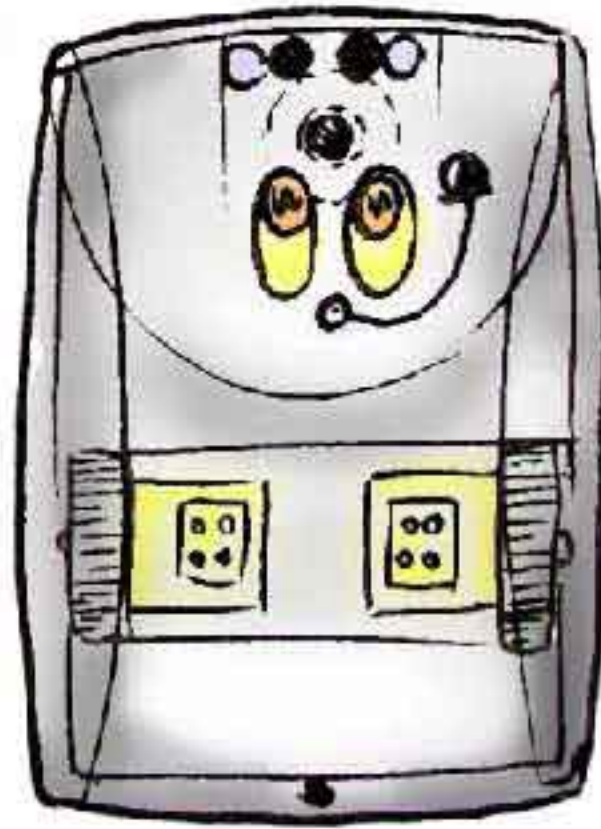




# Final Concept



## Robot assembly

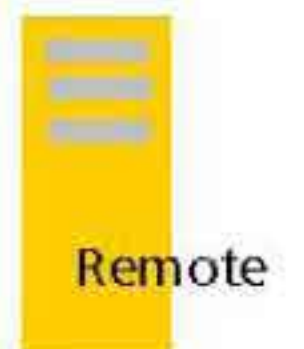
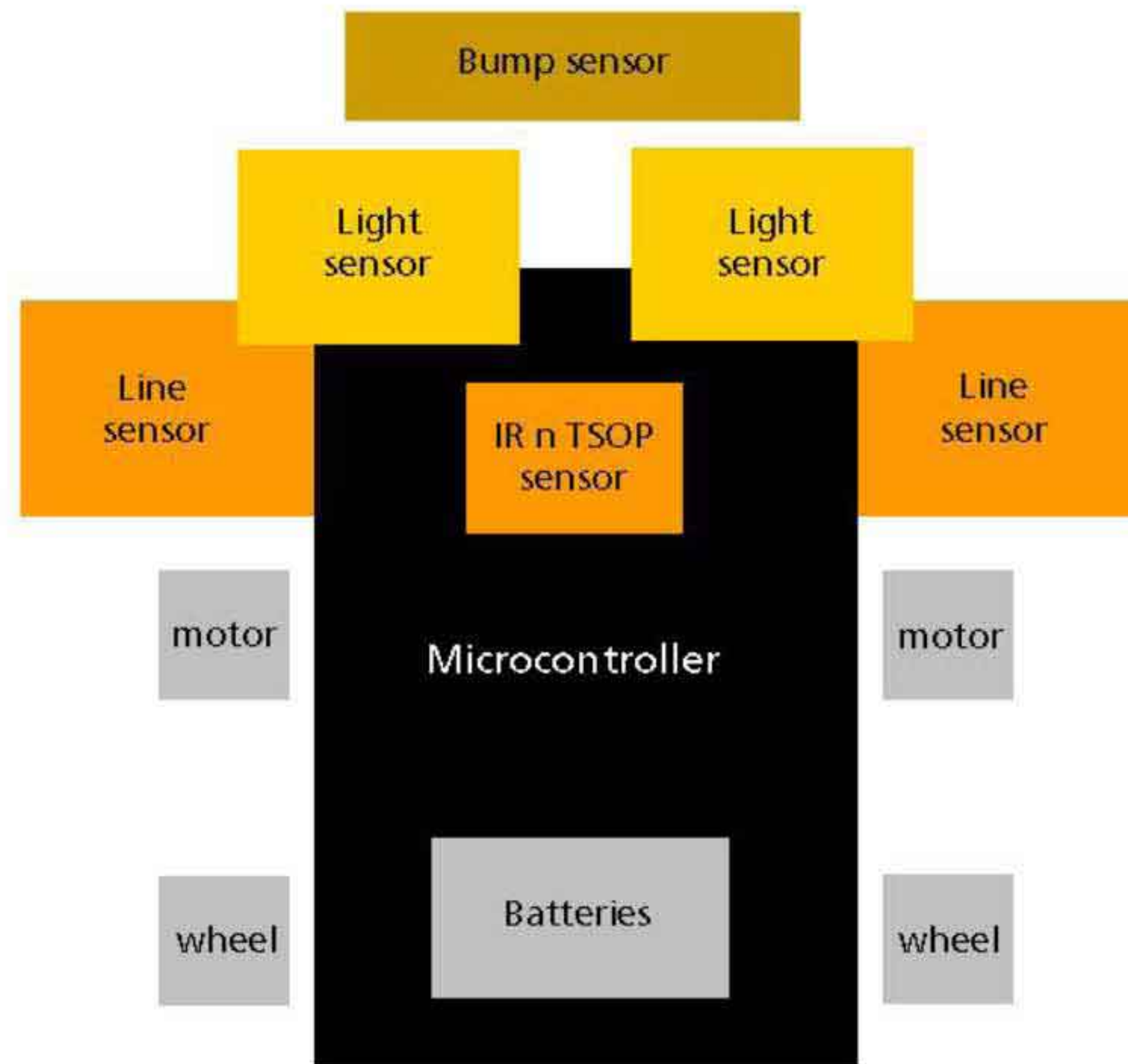




# Components of Robot



## Components block diagram of robot

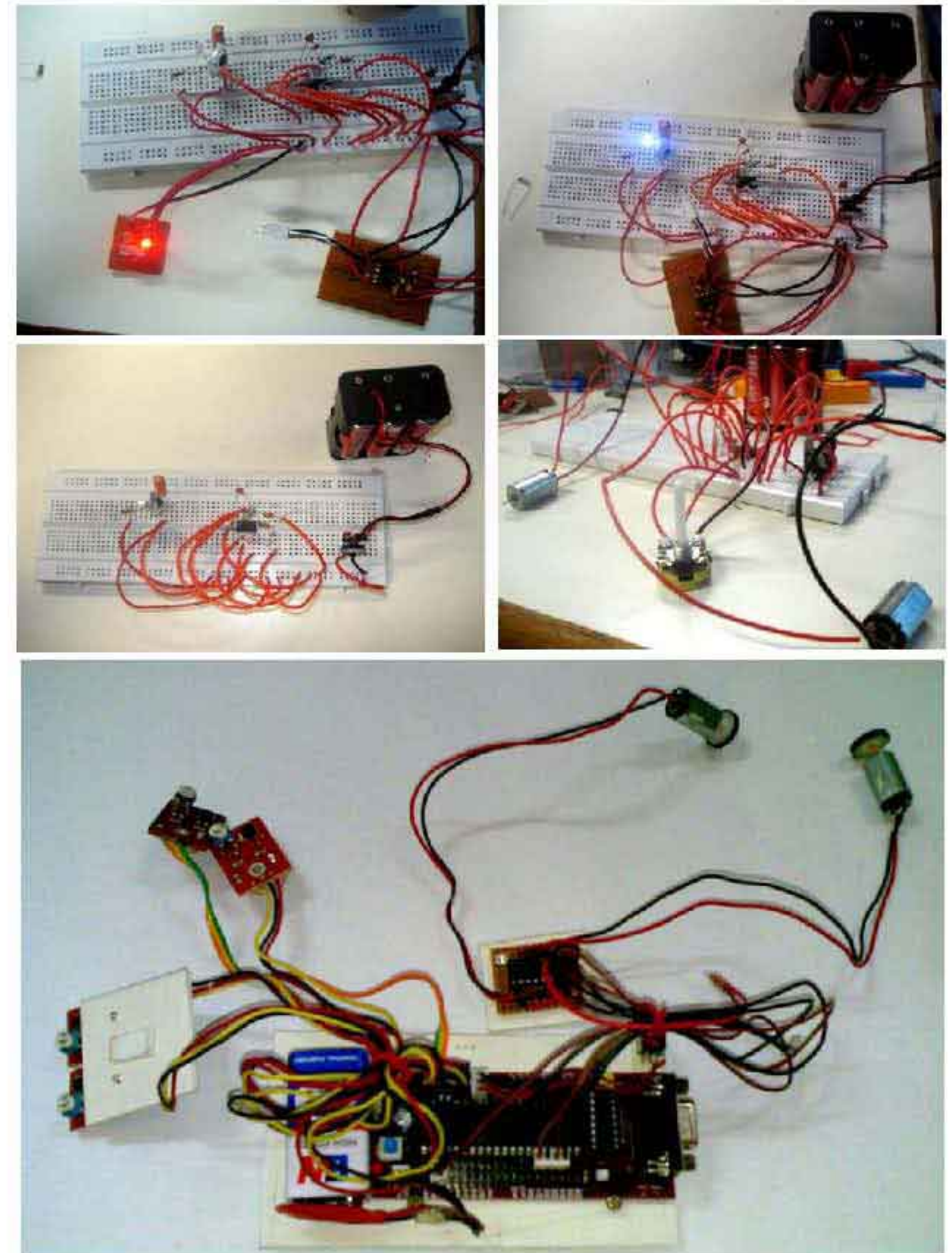




# Mock ups



## Circuit

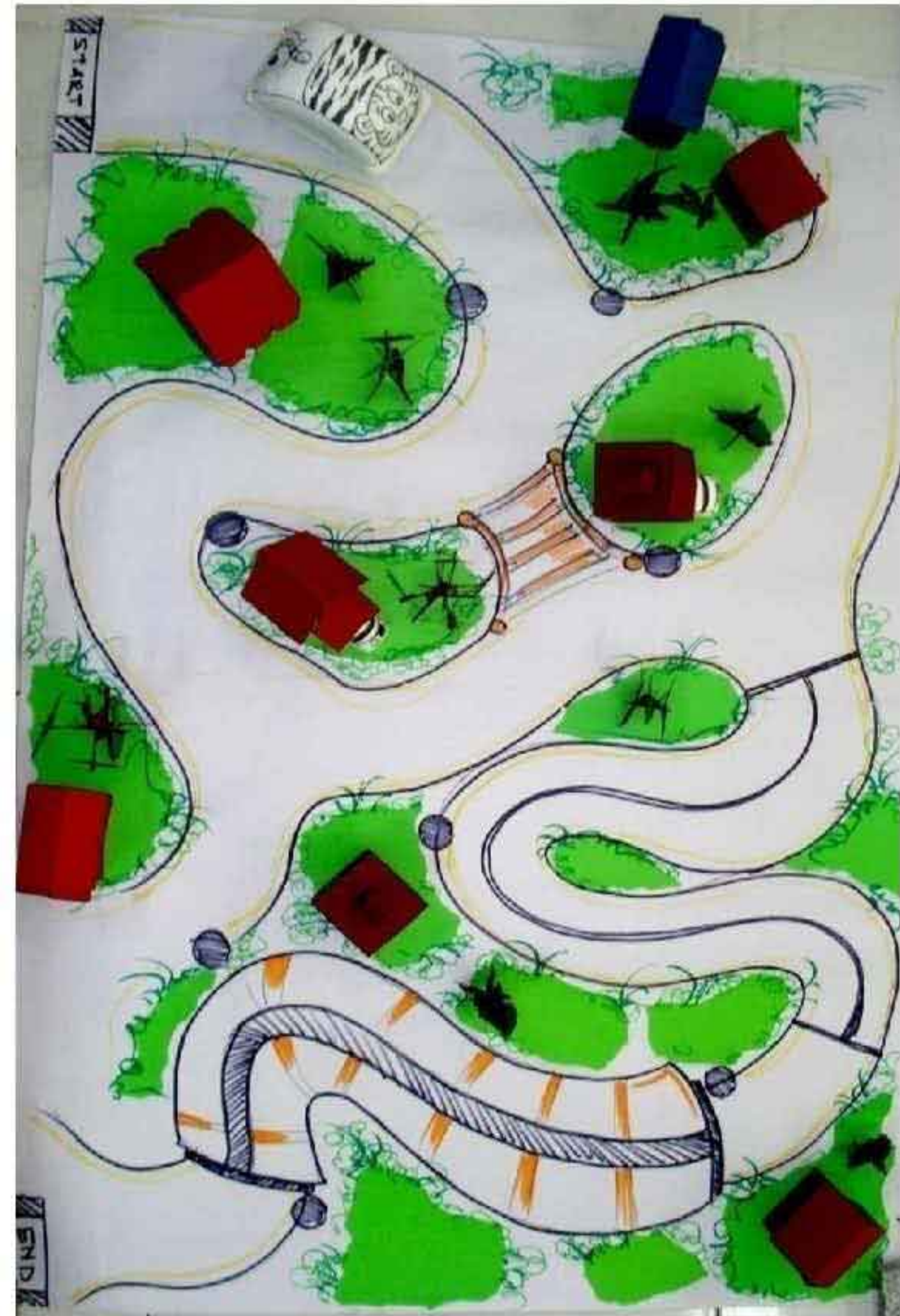




# Mock ups



## Environment





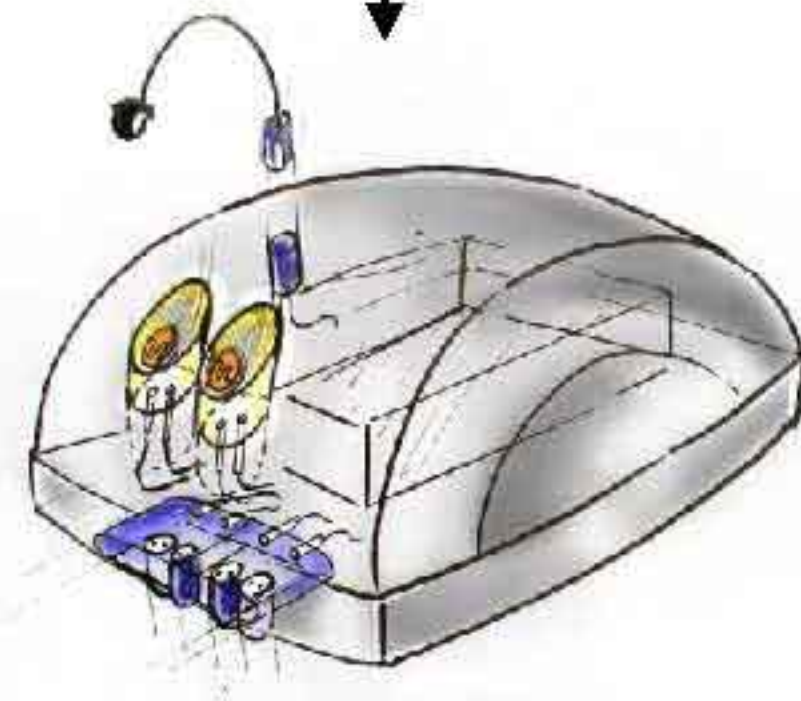
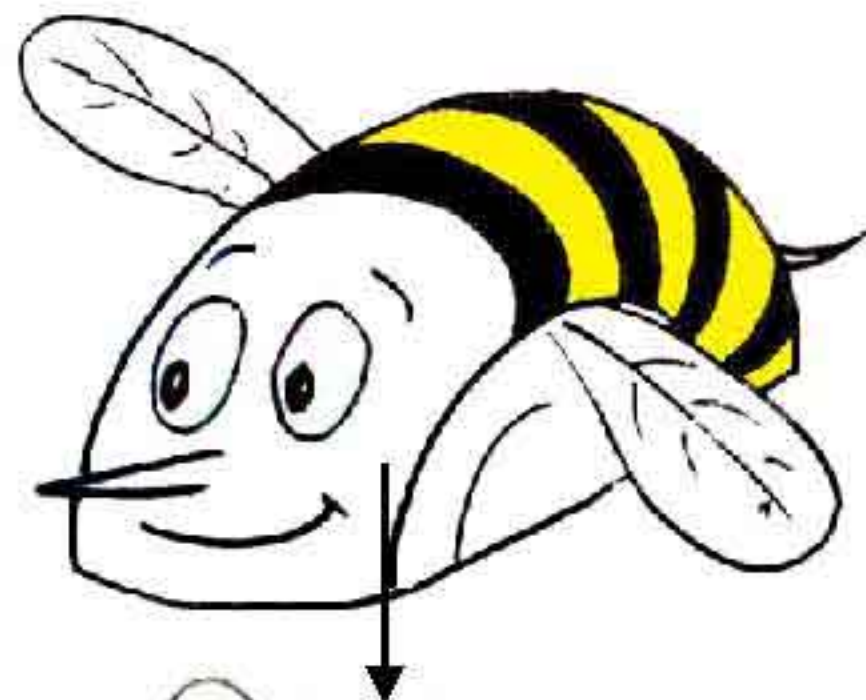
# Mock ups



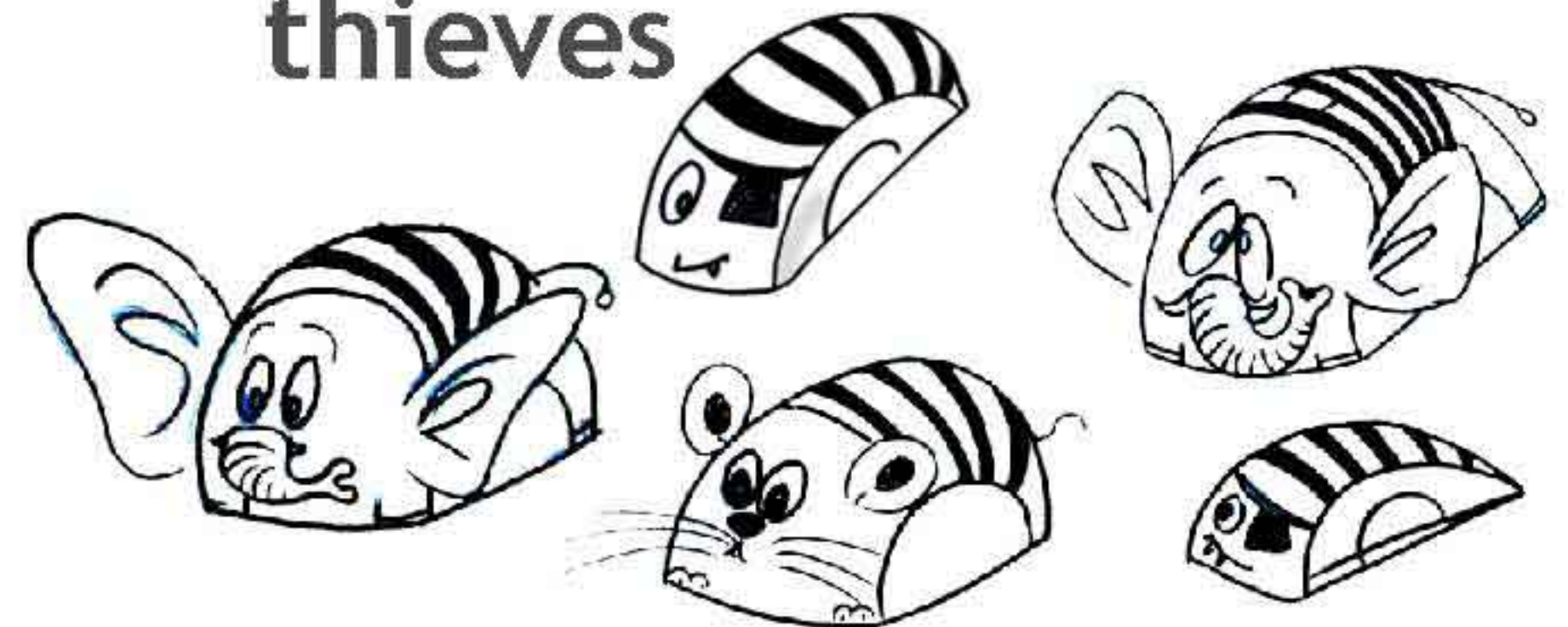
## Characters



Cop



thieves





# Mock ups





# Mock ups









# Mock ups



## Conceptual game layout

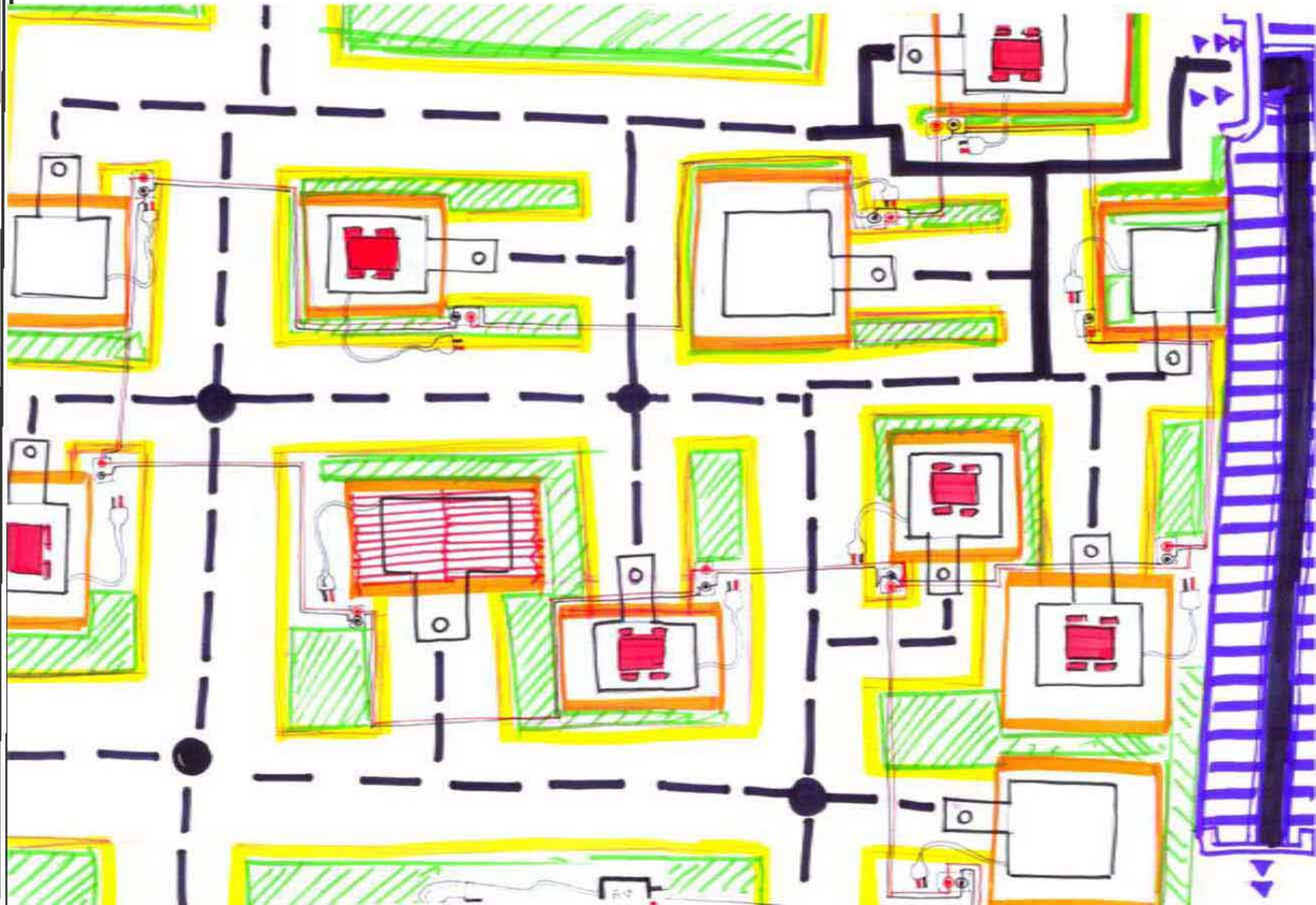




# Refinements



Conceptual game layout

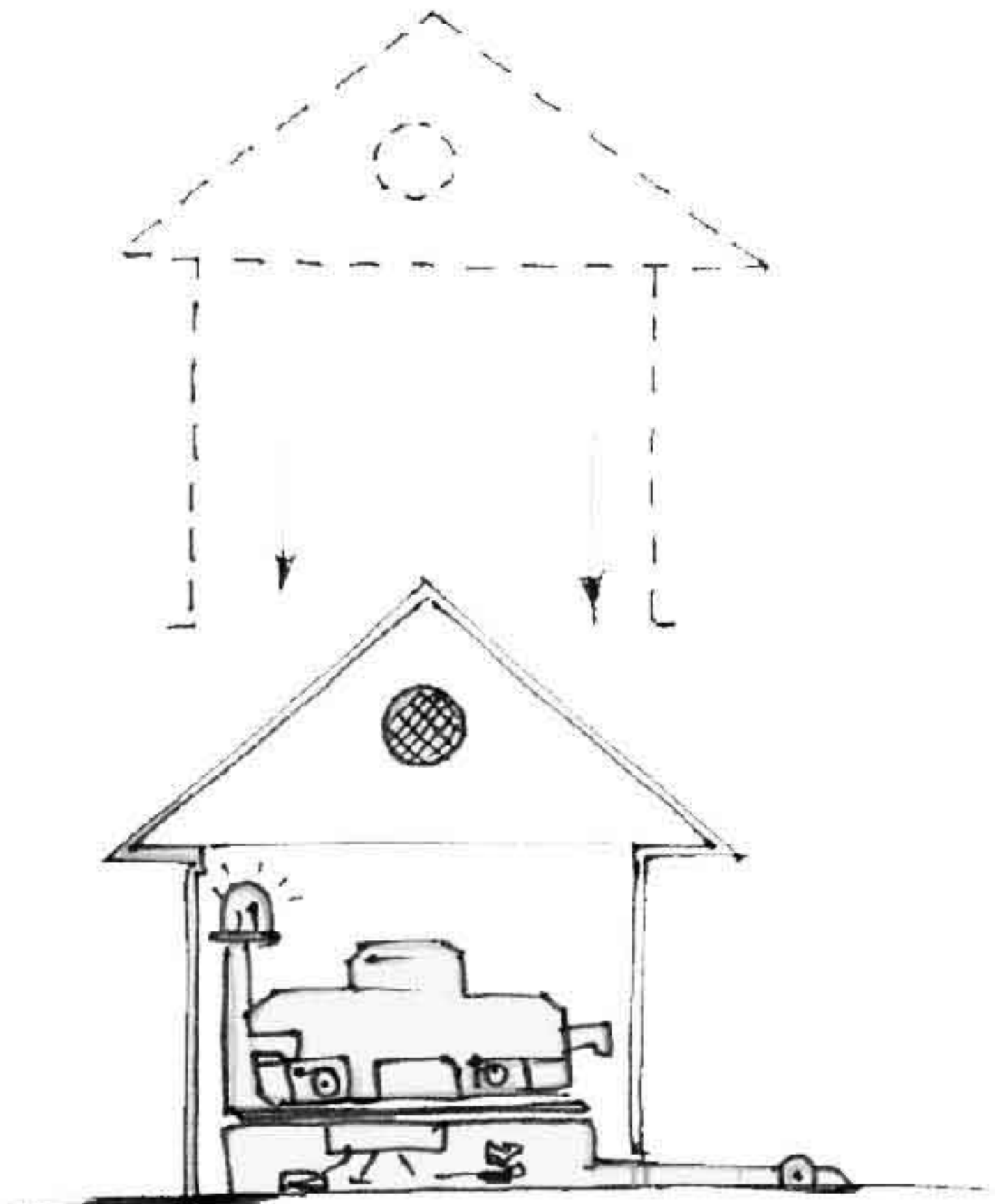
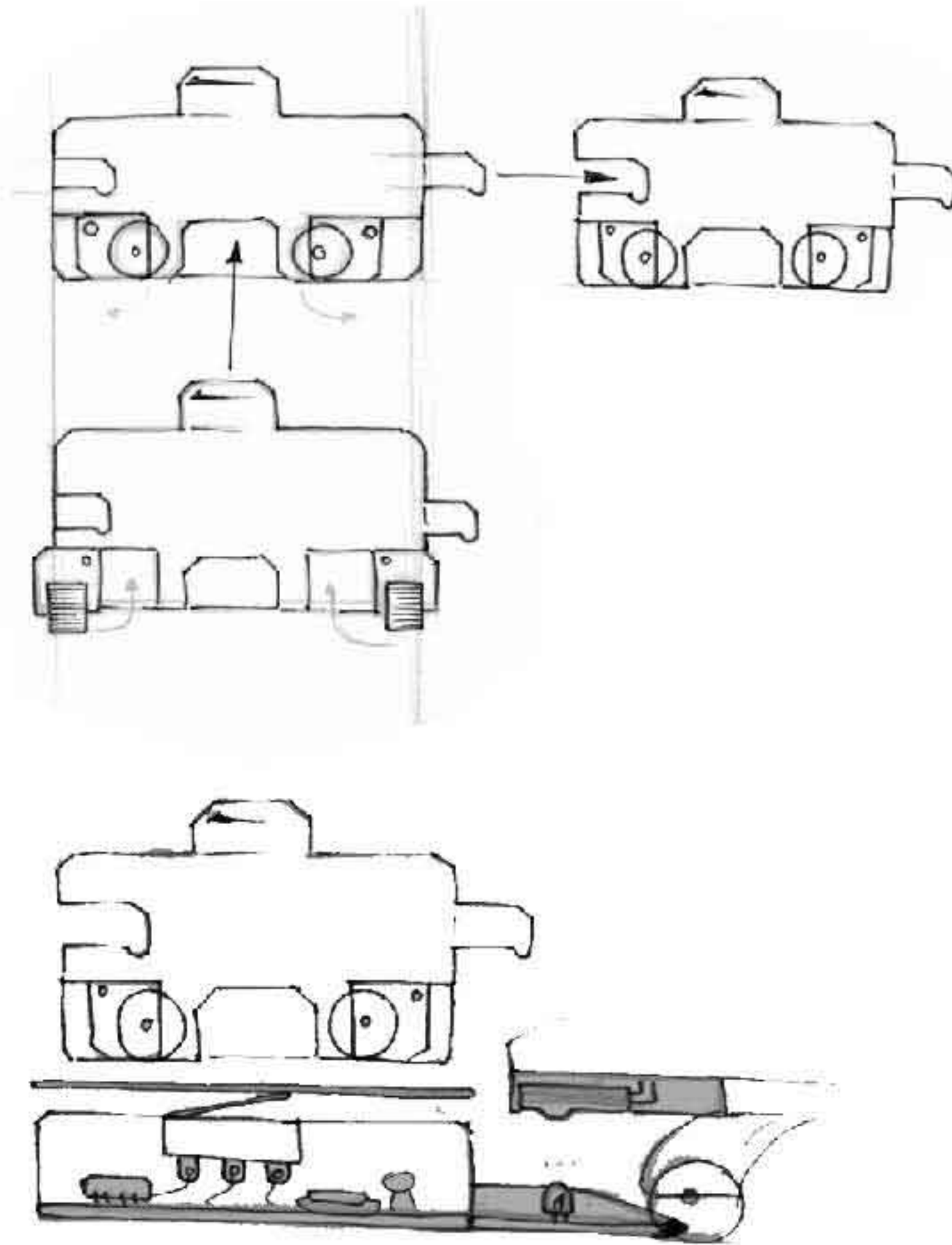




# Refinements



## Elements in the game

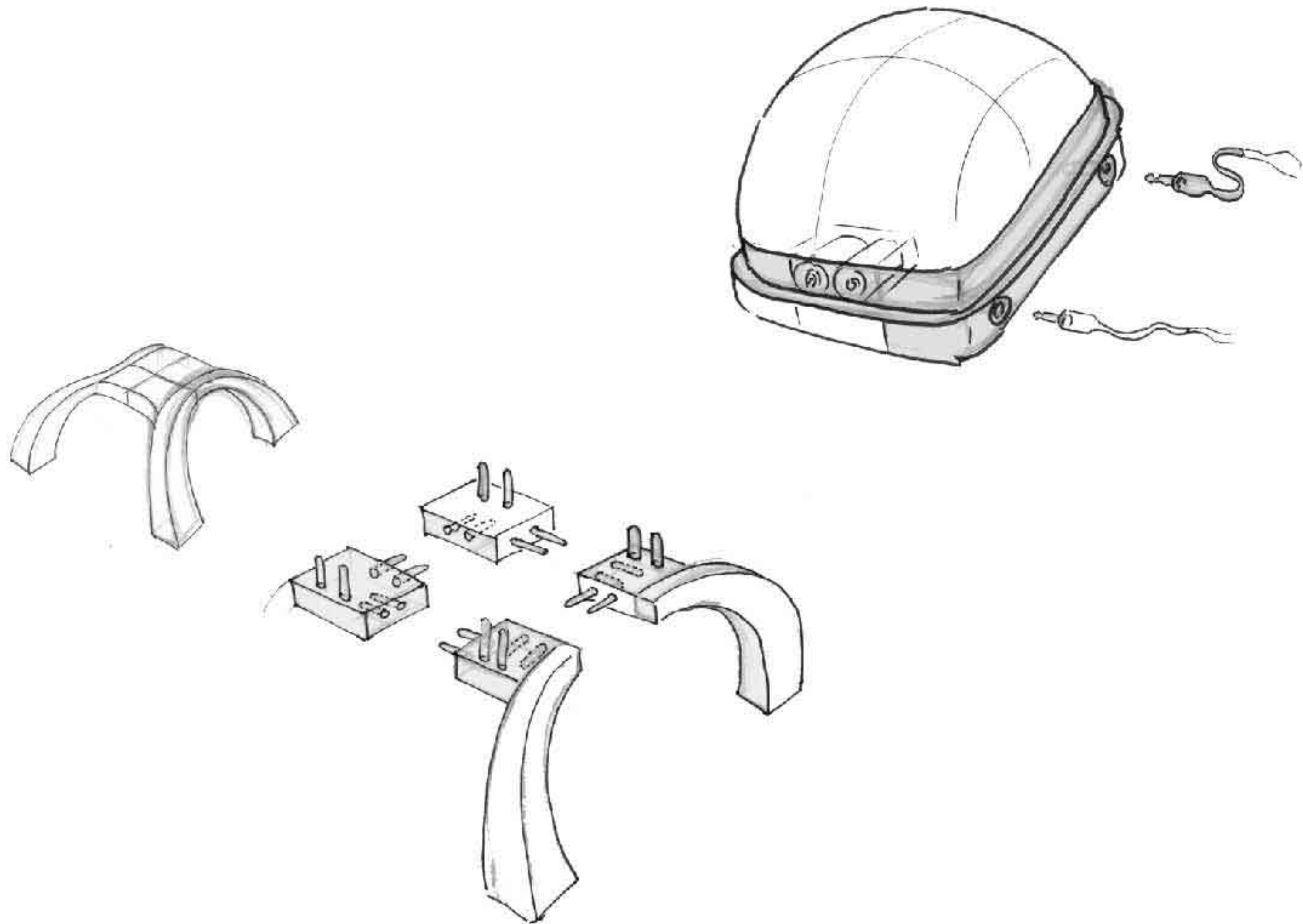




# Refinements in concept

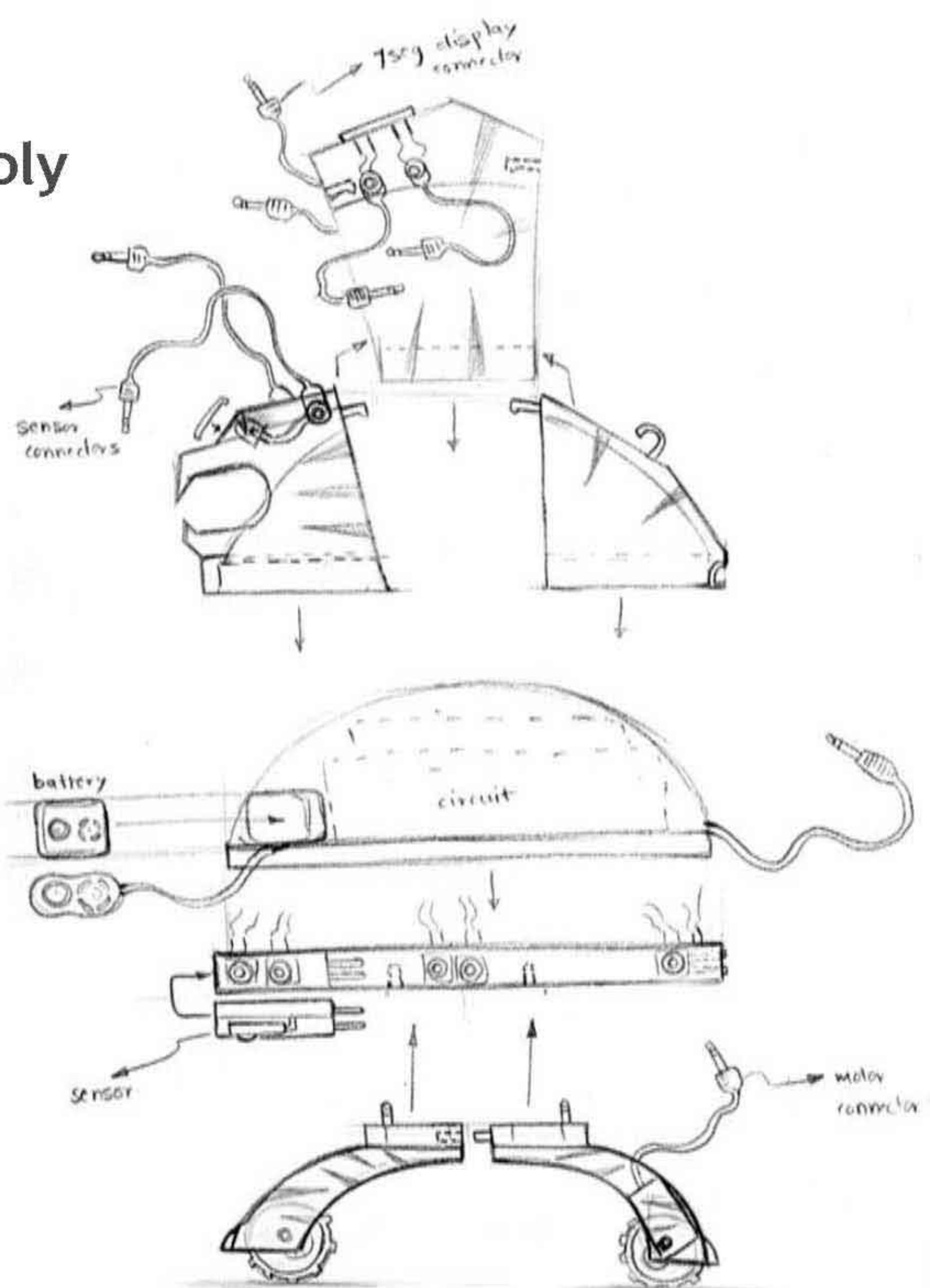


## Robot Assembly





# Robot Assembly

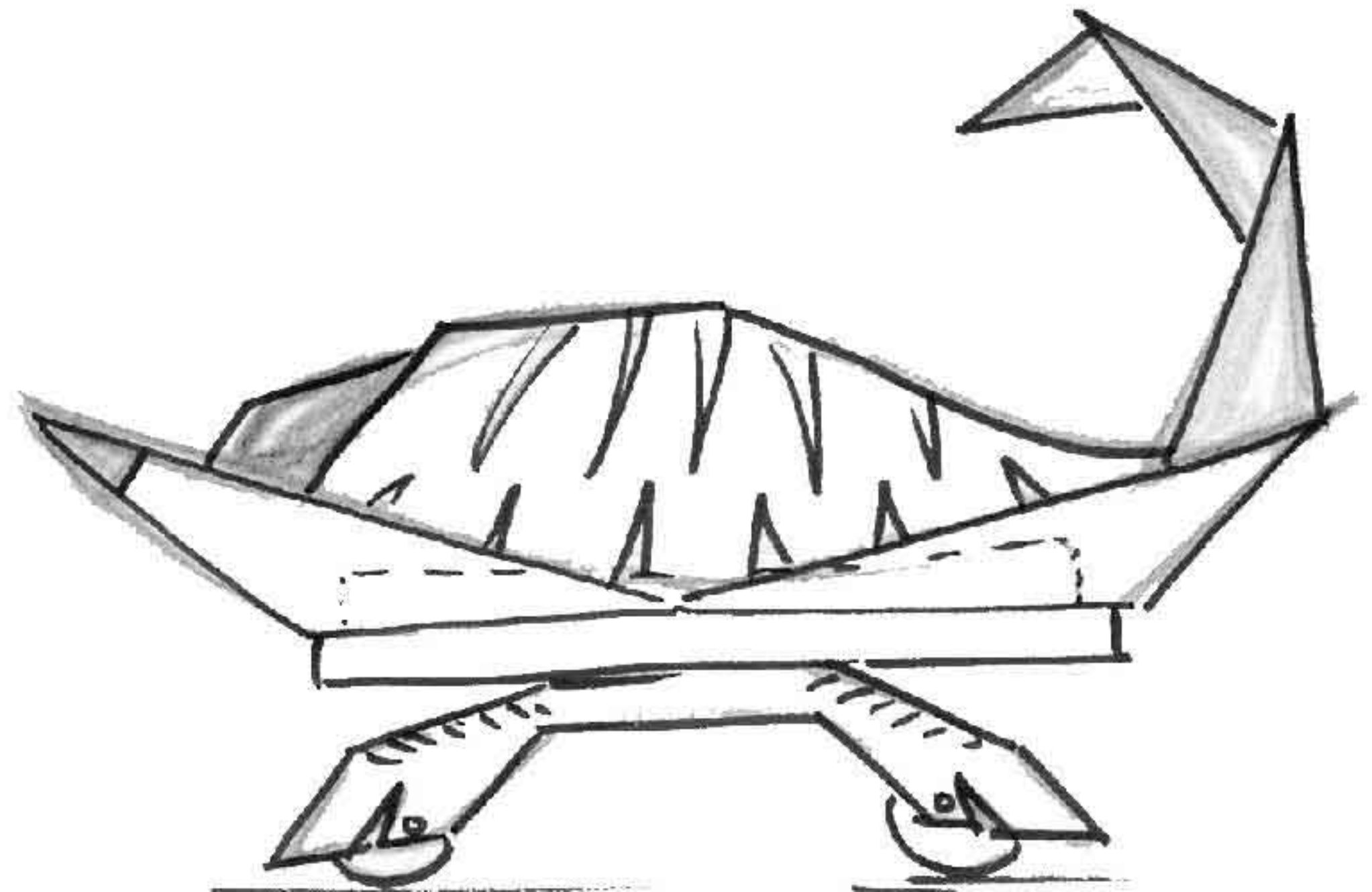
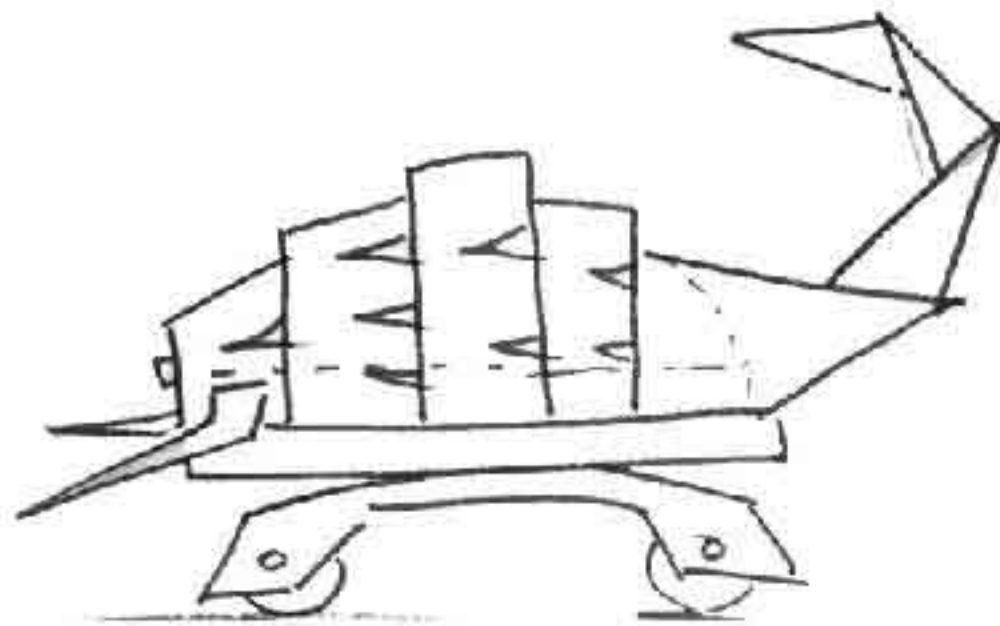




# Refinements in concept



## Robot Character (Scorpio)

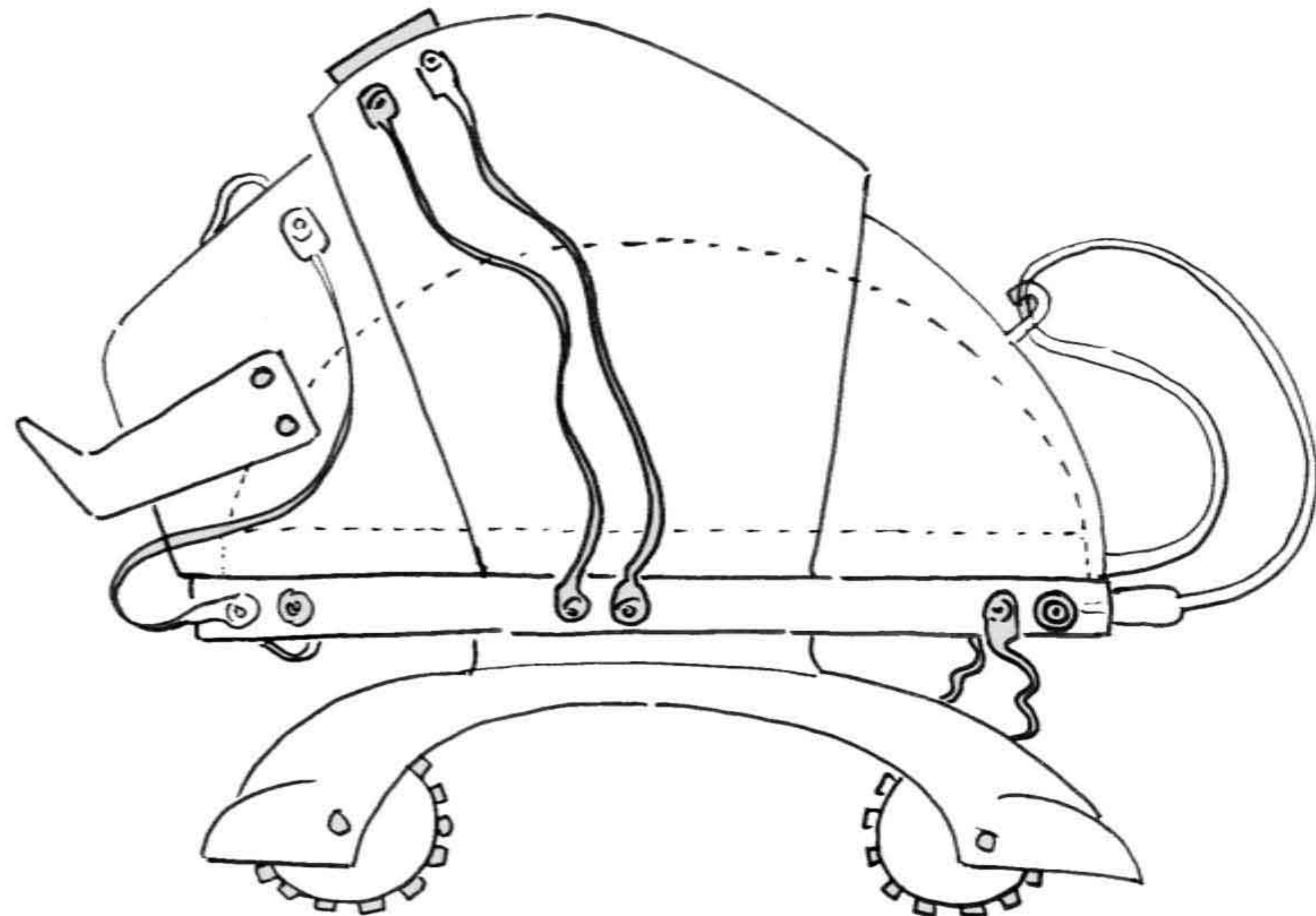
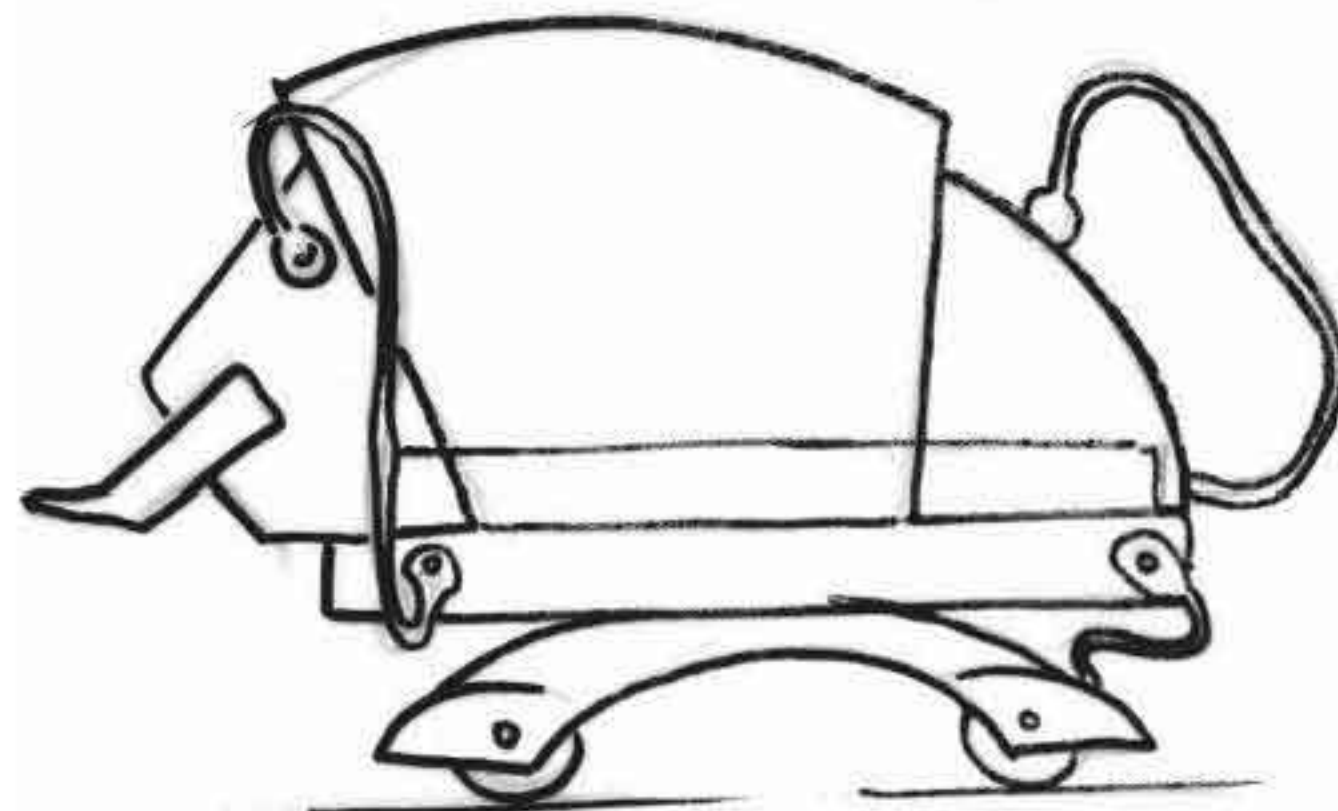
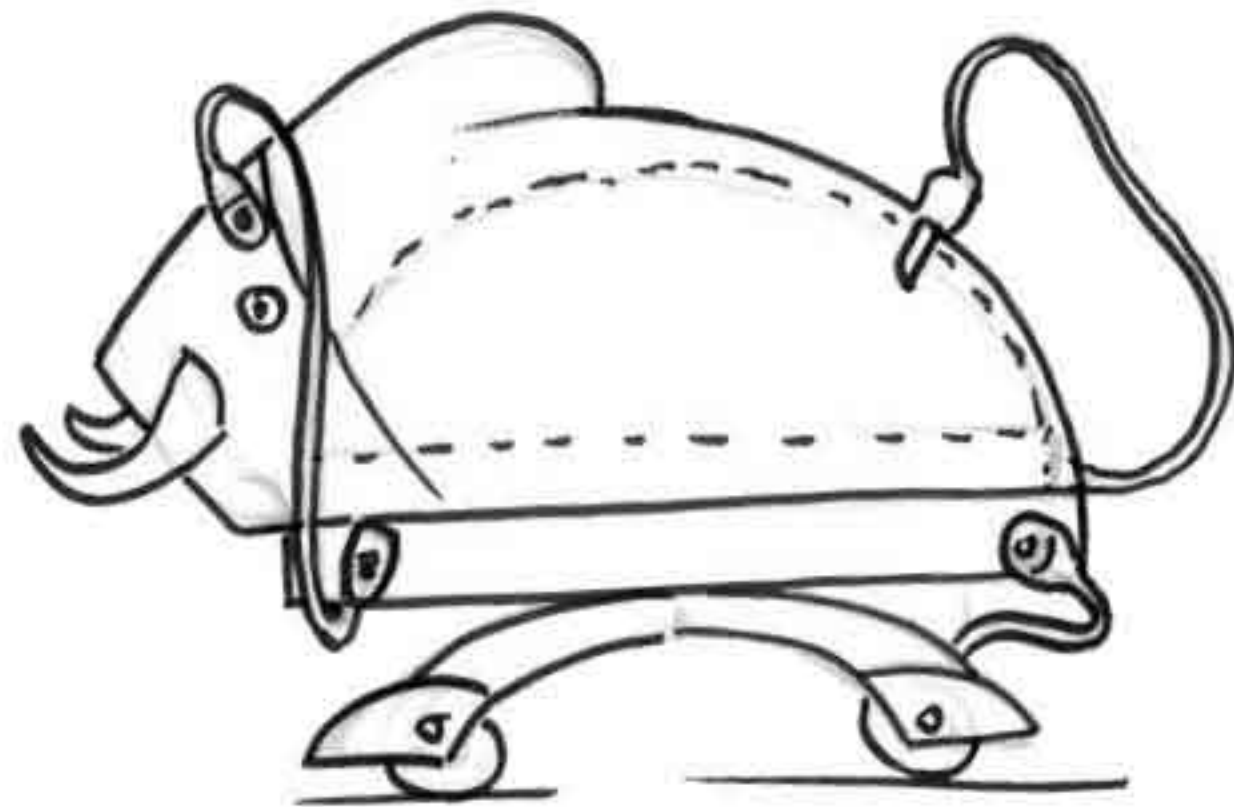




# Refinements in concept



## Robot Character (Bull)

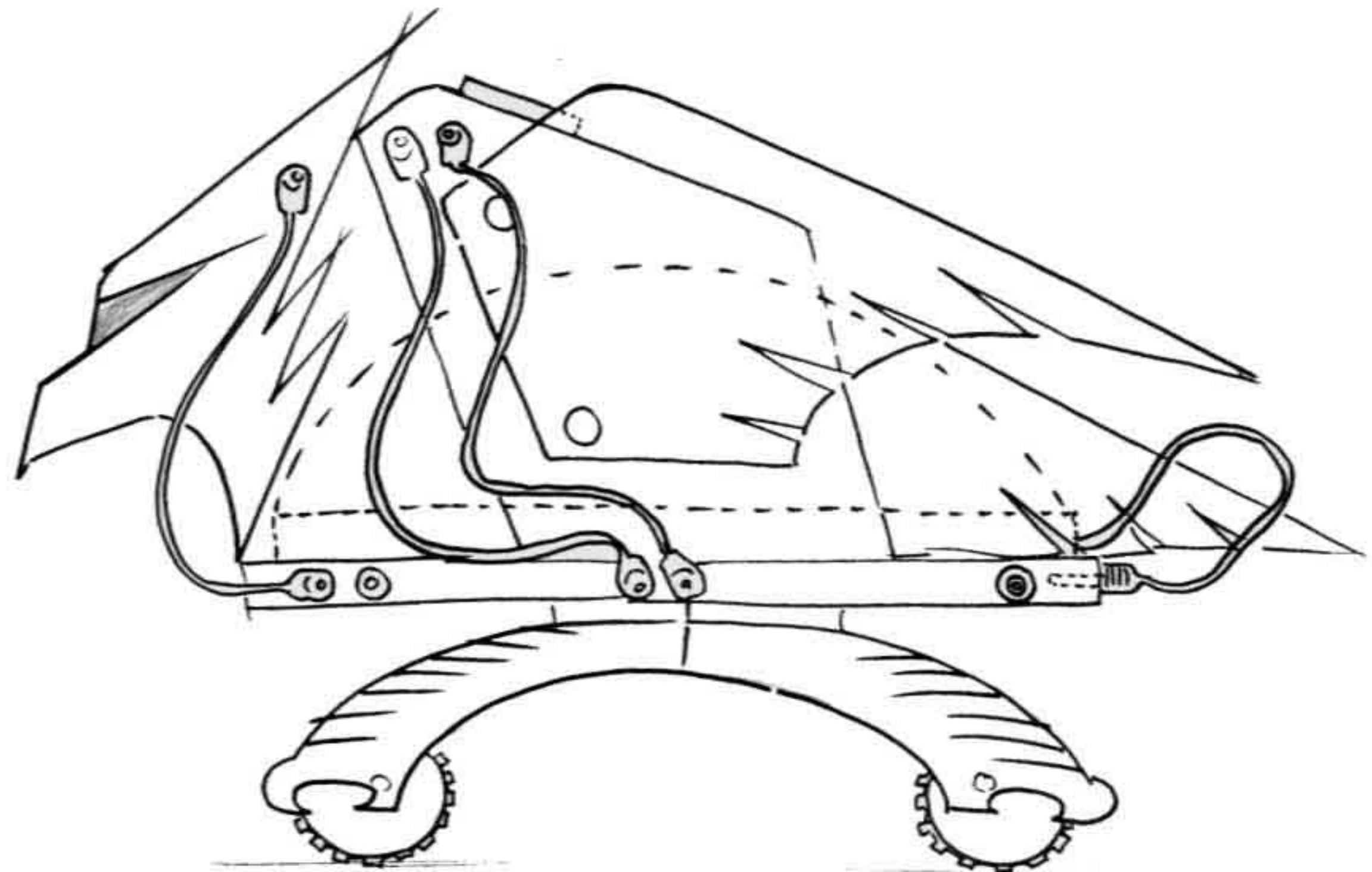
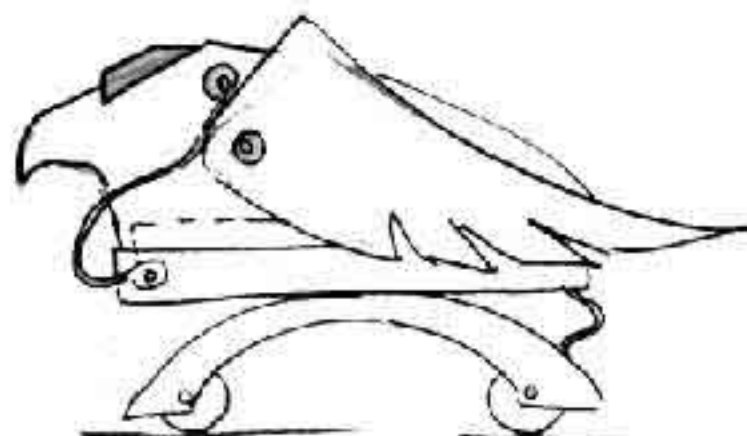
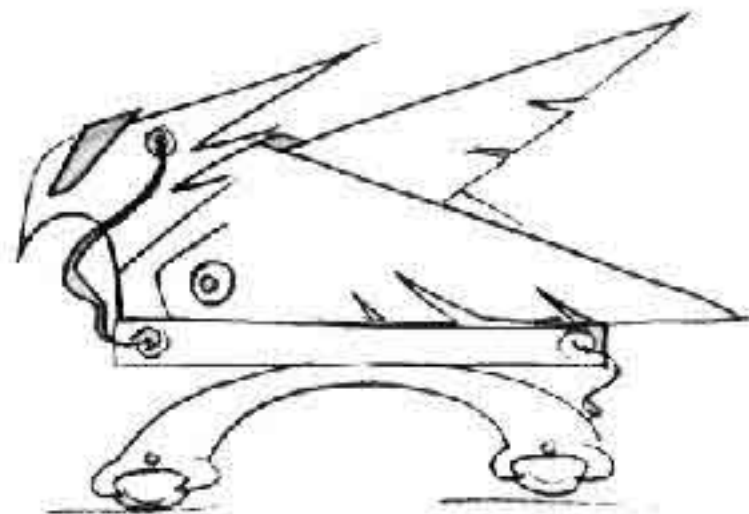
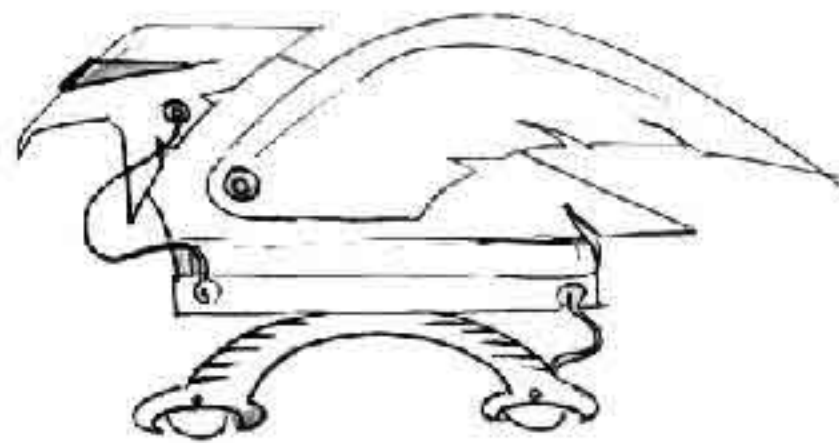
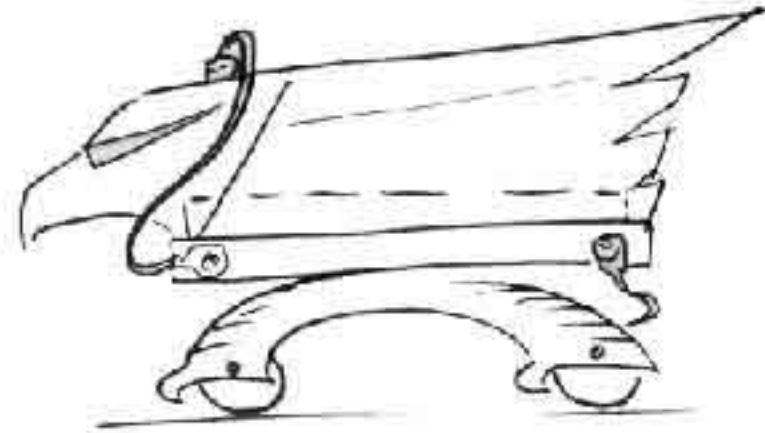




# Refinements in concept



## Robot Character (Eagle)

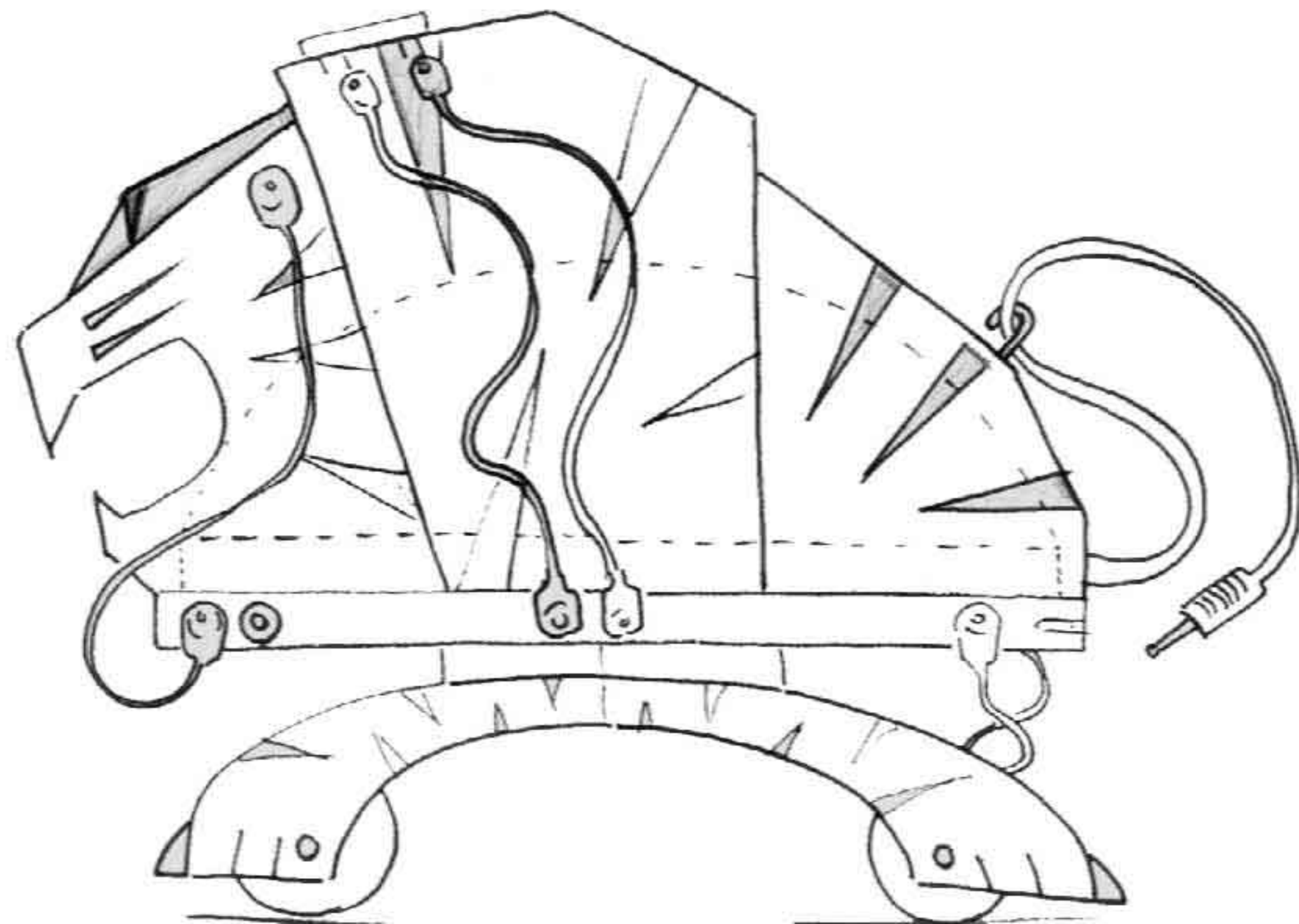
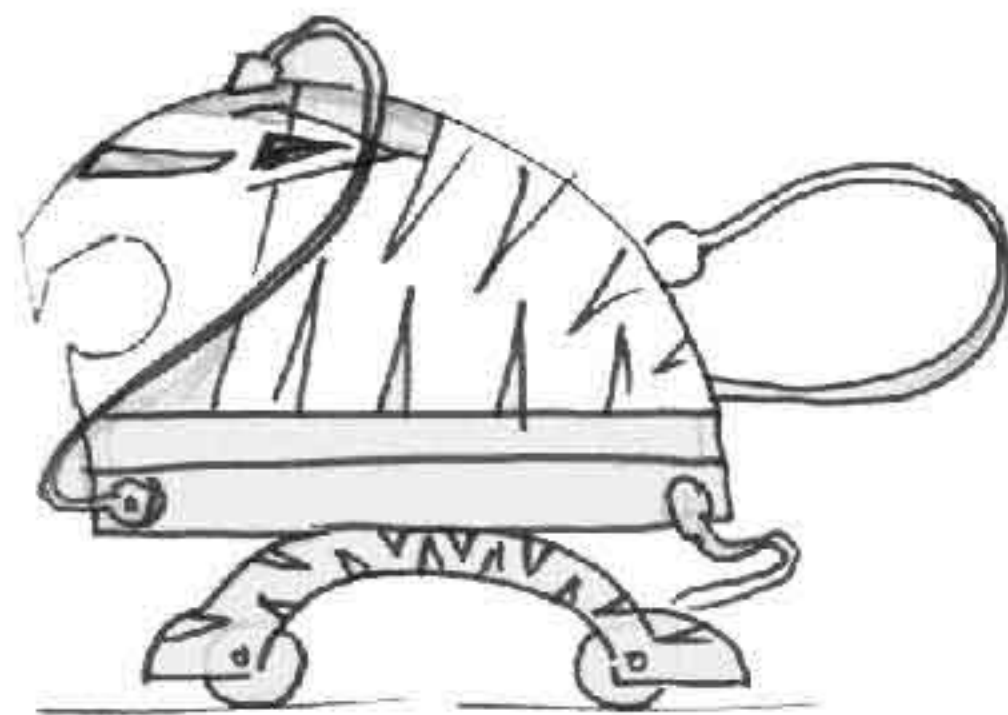
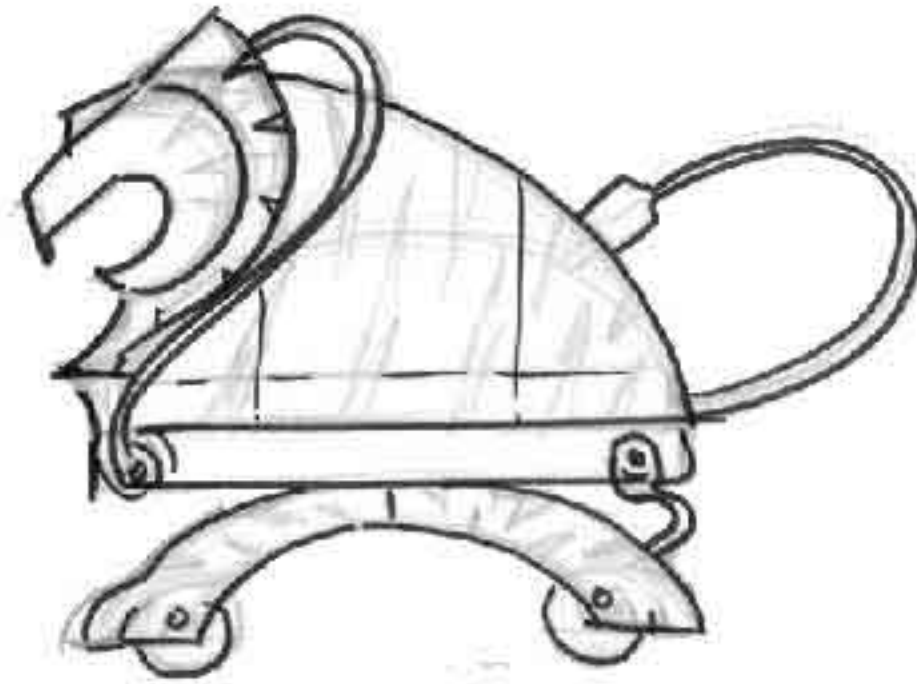




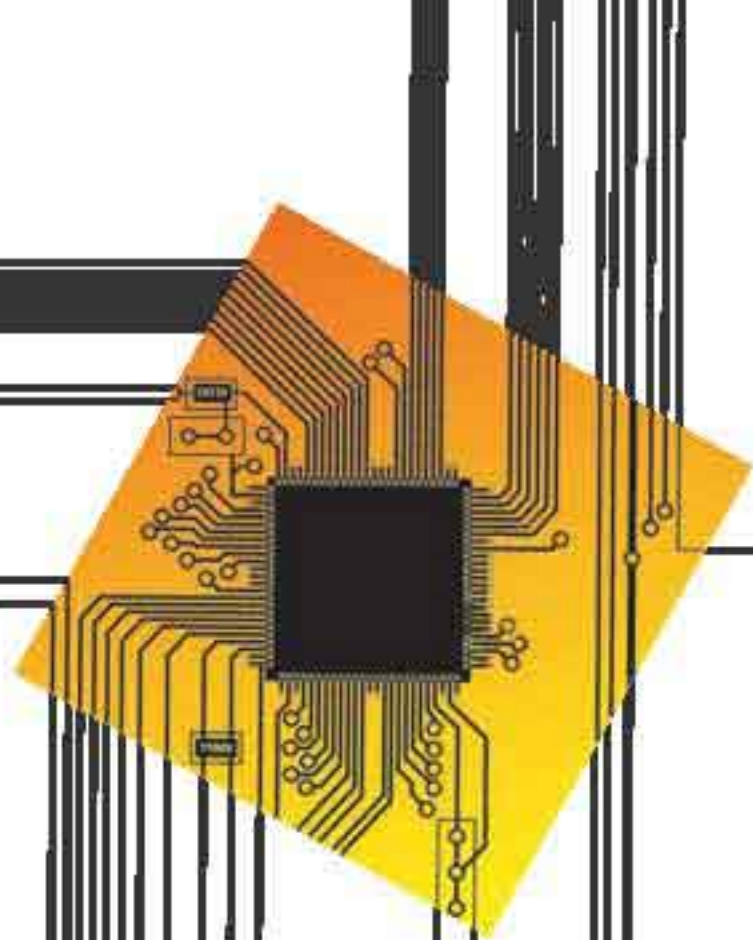
# Refinements in concept



## Robot Character (Tiger)





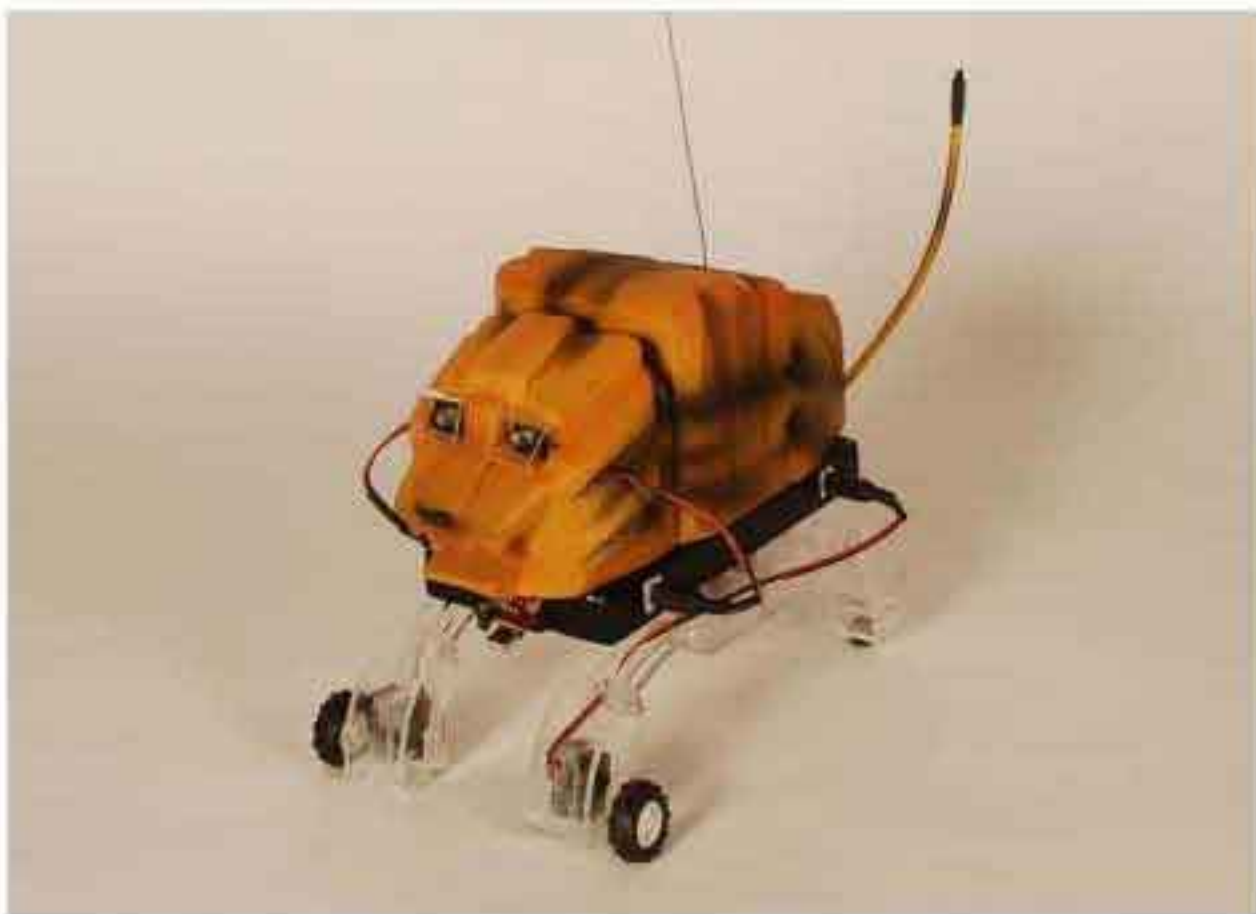
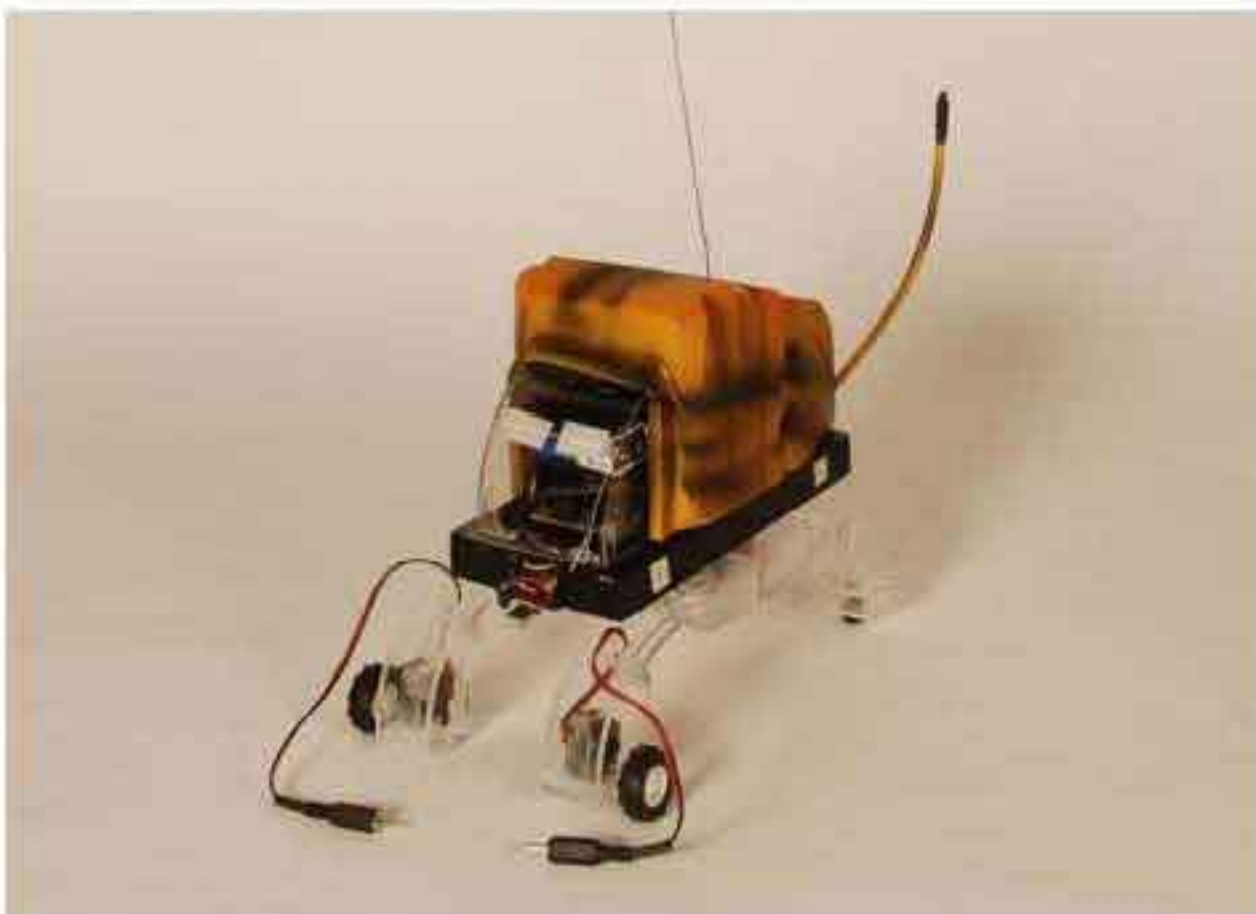
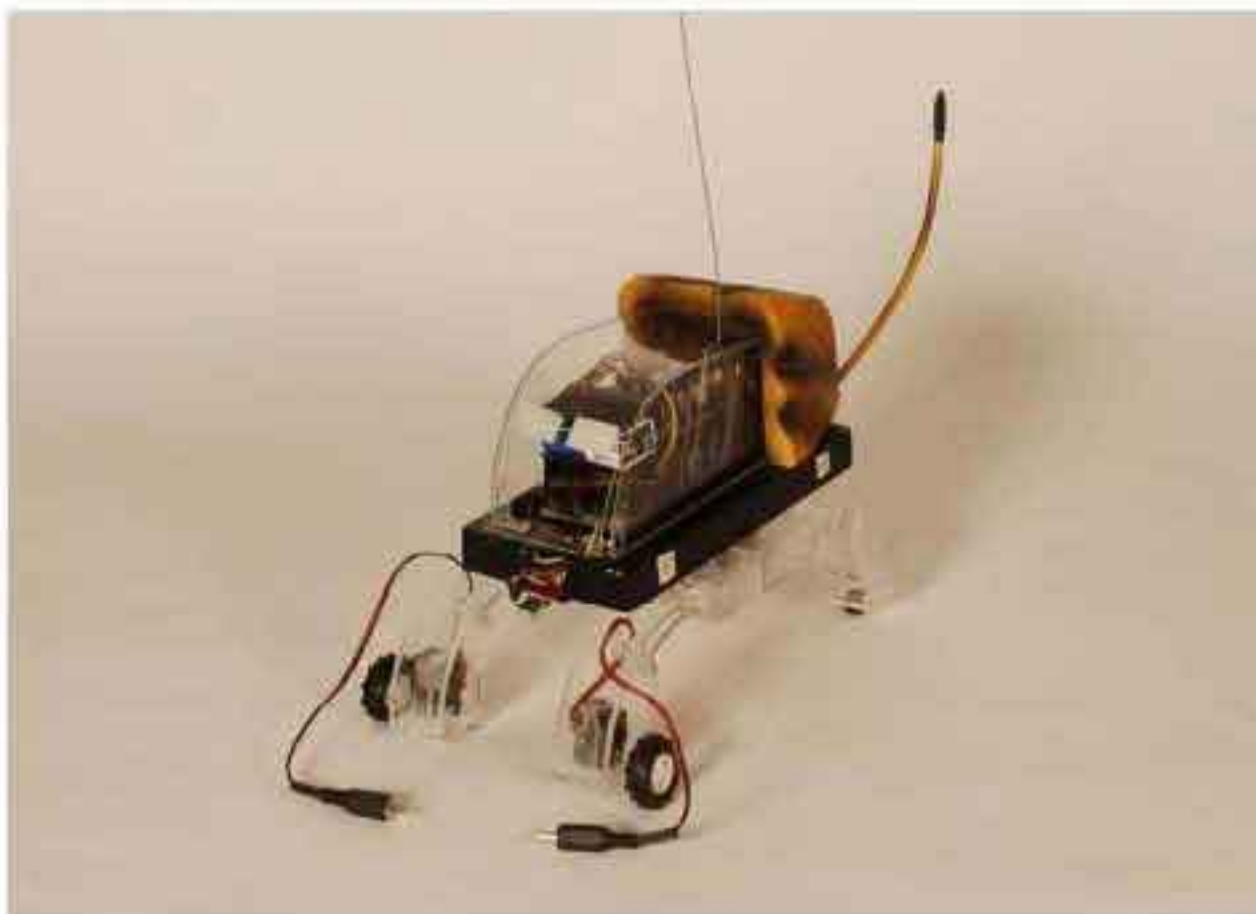
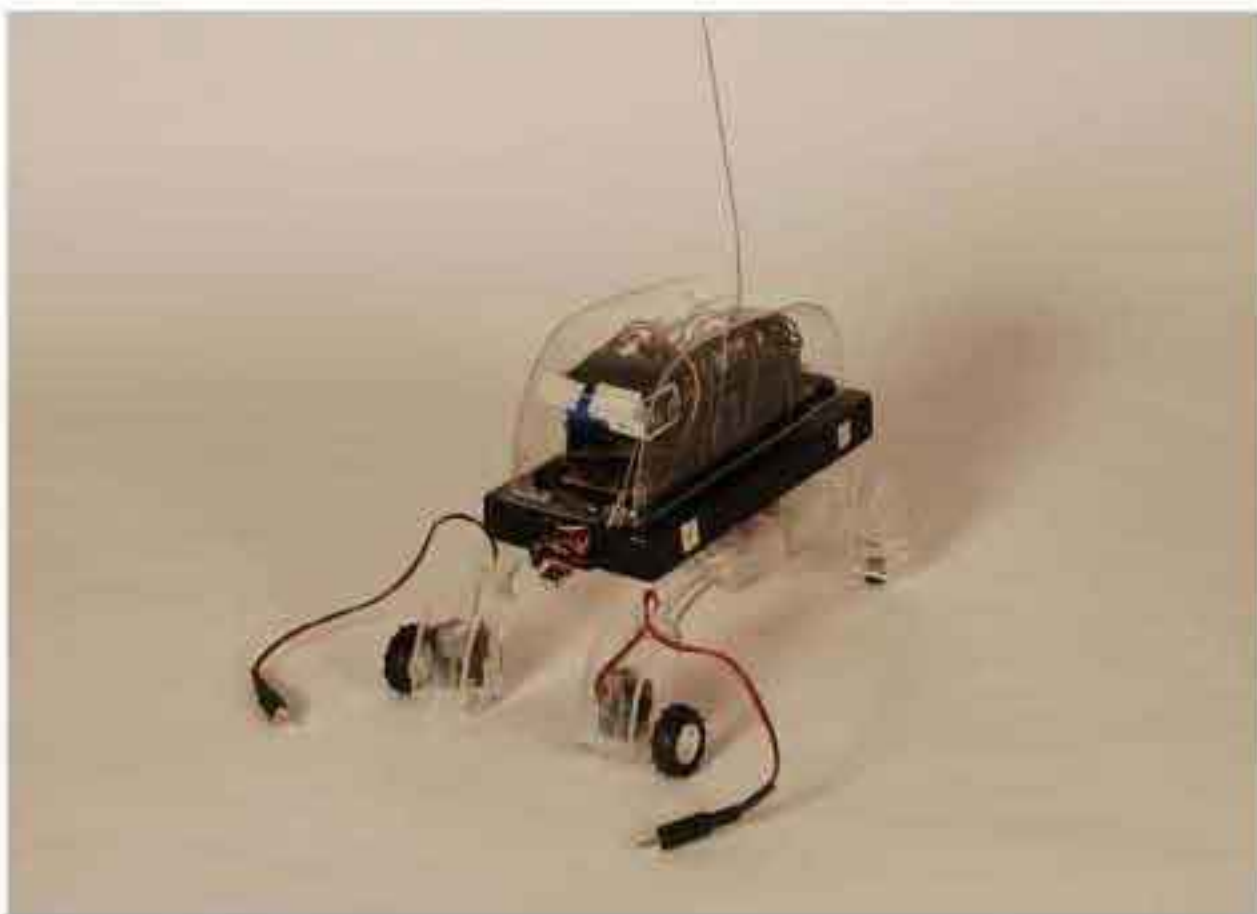
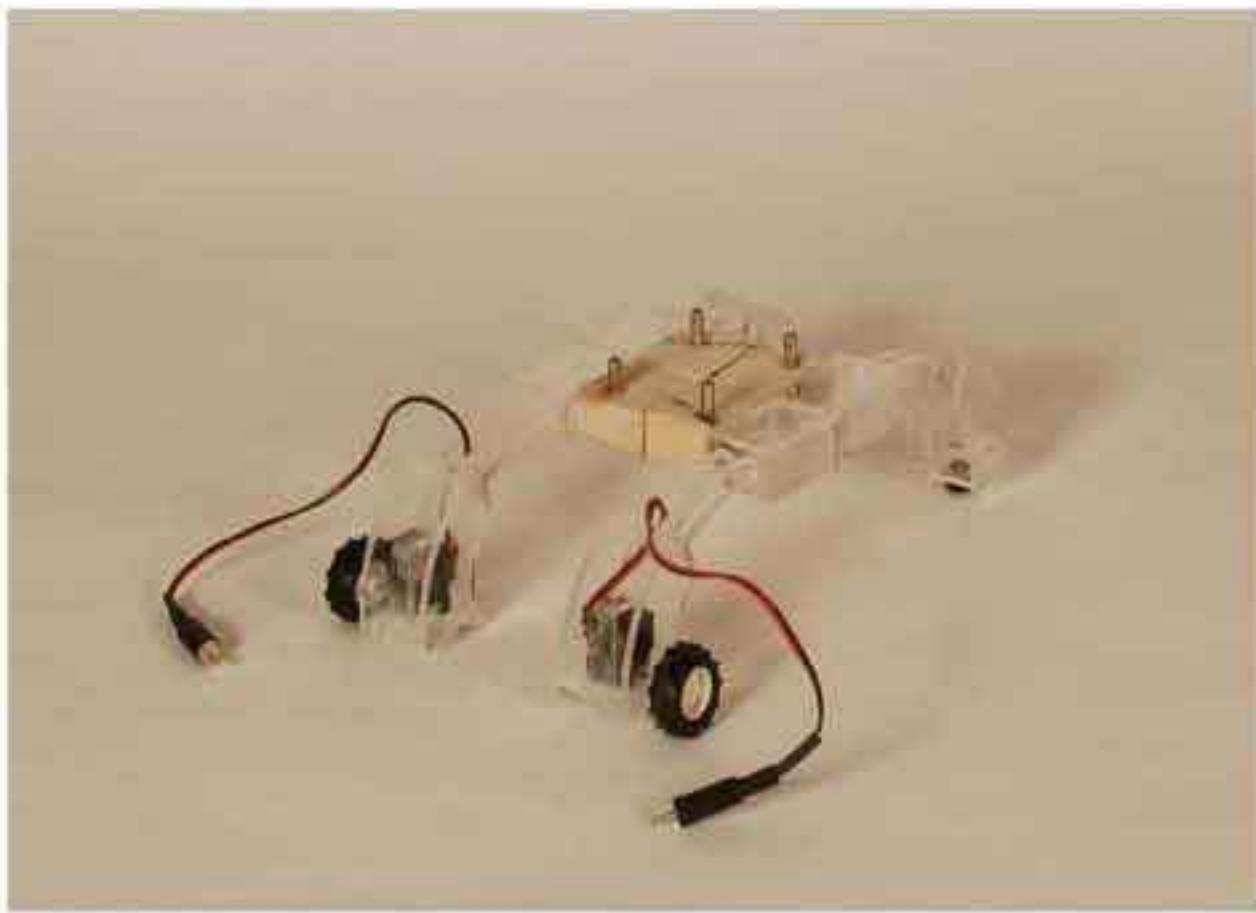
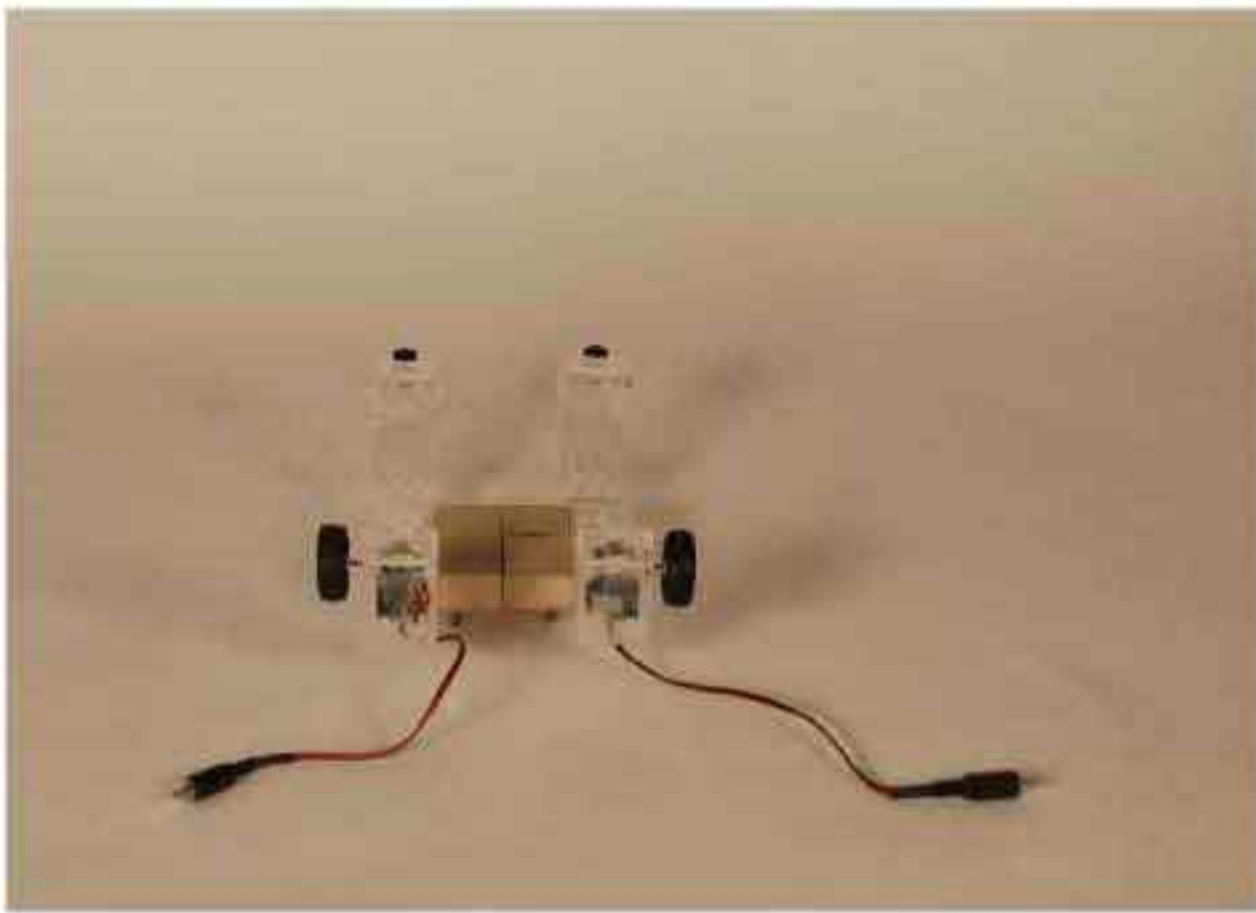
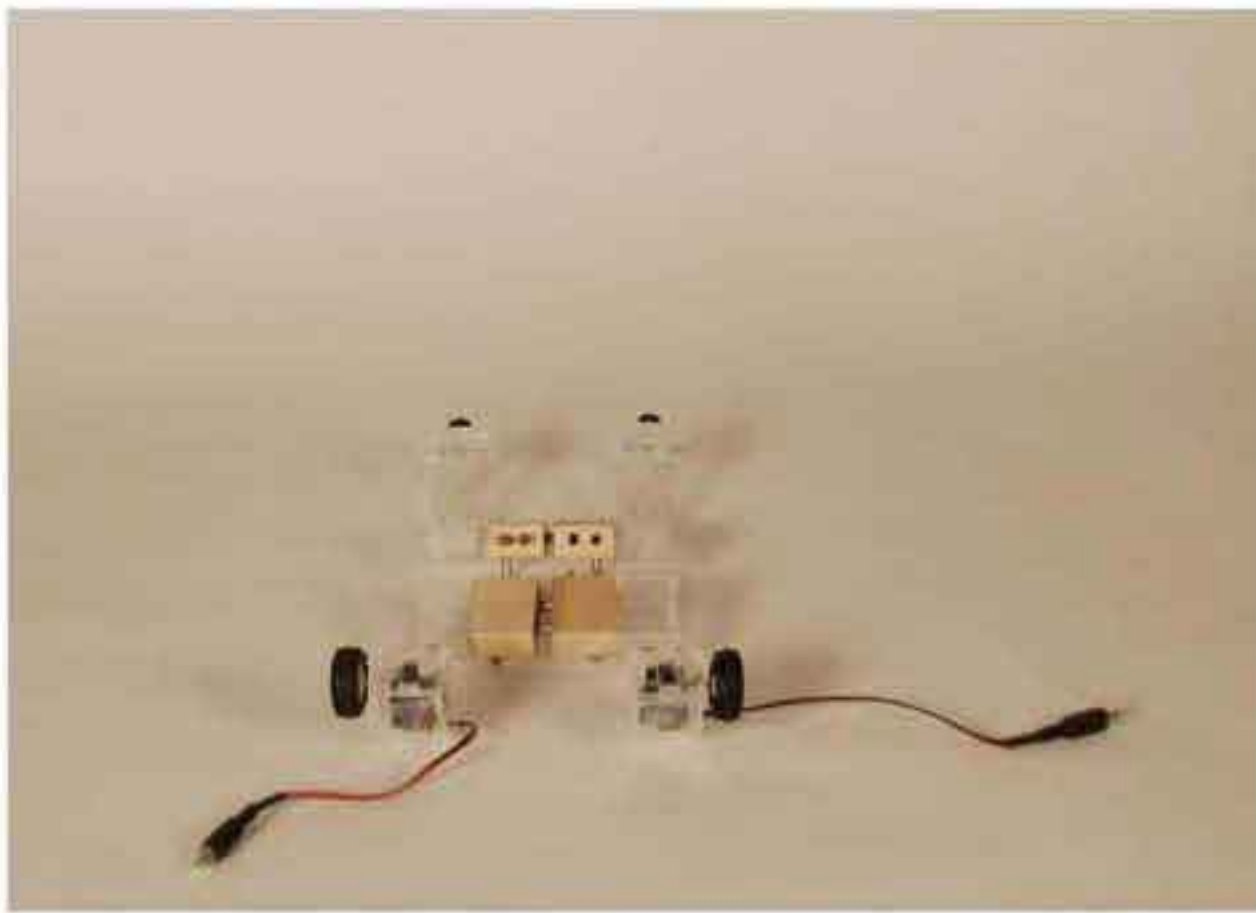
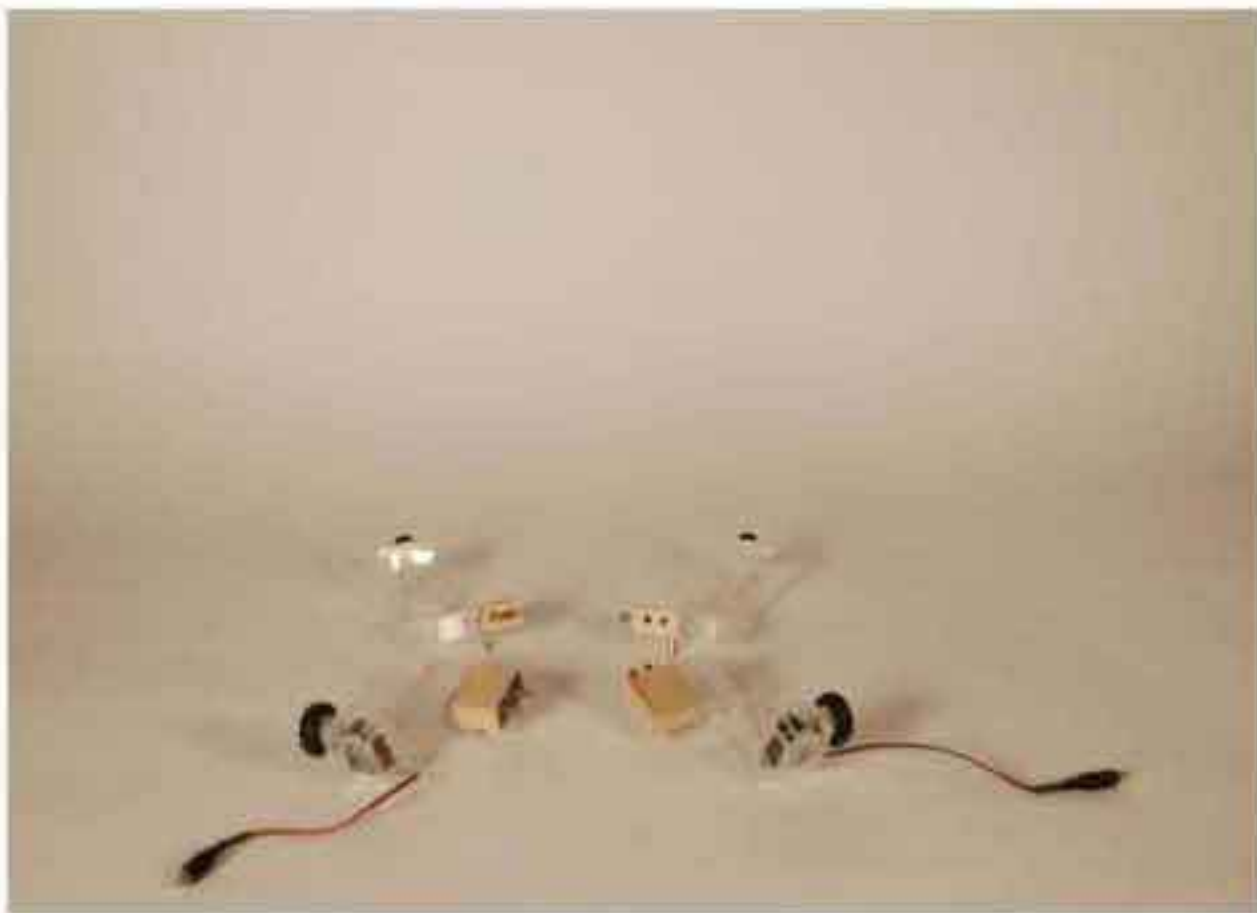


# Final Prototyping



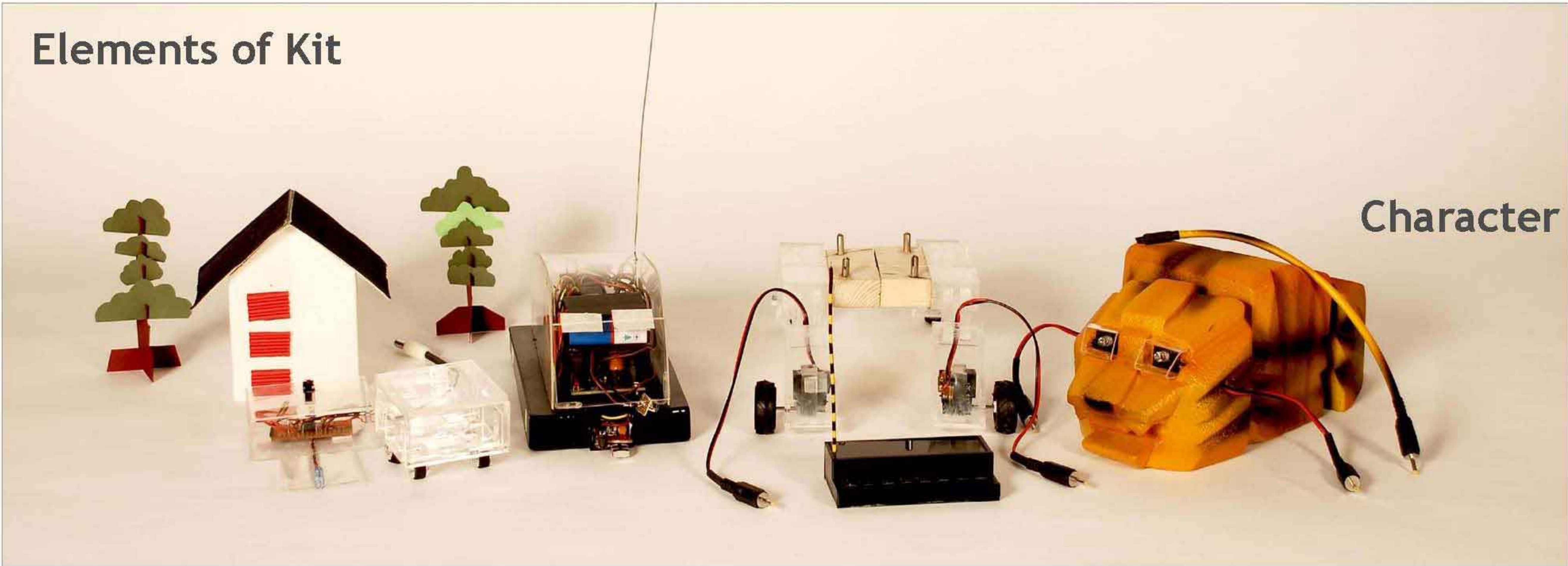
Prototype

Assembly



Elements of Kit

Character





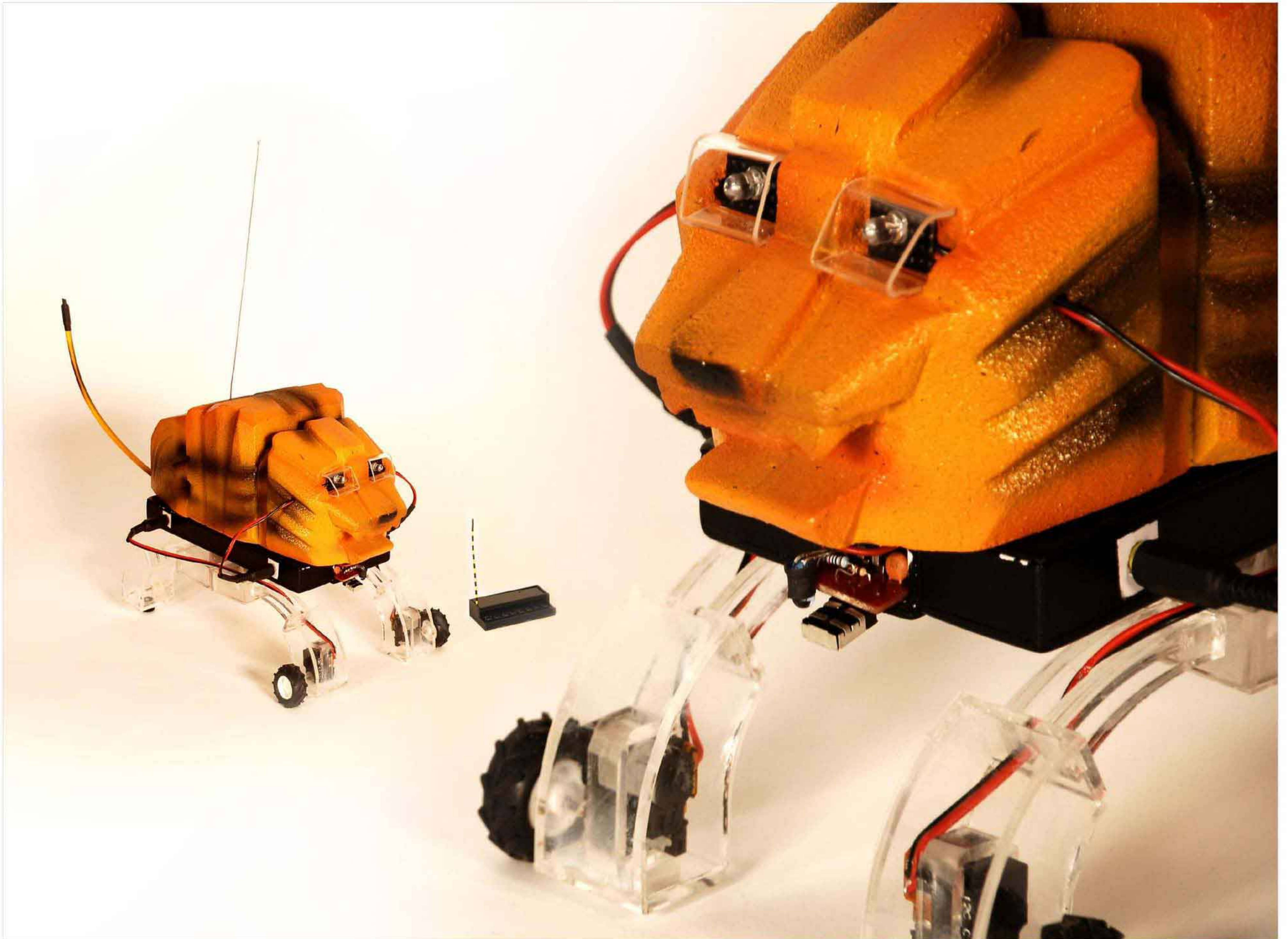
# Environment













# Acknowledgement



I would like to express my sincere acknowledgements to my guide Prof. Ravi Poovaiah for his constant guidance and motivation.

My sincere thanks to Prof. Anirudha Joshi for their valuable inputs during stage presentations.

Also my sincere thanks to my TRI friends Mr. Gagan , Mr. Anand, Mr. Adwait and Mr.Muffadal for providing me required prototyping support.

I thank workshop people for supporting for making model.

Finally thanks to my batchmates Prajkta, Vinay, Rasika, Hemant, Shashi, Shashank, Chetan, Ketki and all my friends who helped me directly or indirectly for completing this project.



Thank you

