# Redesigning shopping mall cart

Industrial Design Project 3


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# Aim of the project

Gradually mall culture has evolved and so the super markets in India. In metros like Mumbai utilizing space is a major factor. Malls use the space for their maximum benefit like displaying goods and storing more & more products. As a result the gangways become narrow making it difficult for people to move with their cart.

**Aim of the Project is to Redesign the Existing shopping mall trolley. Shopping cart is one of the important factor which contributes to the problem faced while shopping**.

# Data collection

**Product study:** Aim was to study different types of trolleys, the kinds of materials used, their sizes, their form and purpose.

- Special Trolleys for children
- Special Trolleys for handicap person
- New kind of baskets
- Trolleys with Locking system
- Trolleys using New technology
- Exploring New forms of trolley

# Product study

## Trolley for children

- Separate attachment
- New form
- Cushioned seats
- Attractive colors
- Special size
- Toys attached


## Special trolley for Handicap

- Wheel chair can be attached to the trolley

# Product study

## New kind of baskets

- Trolley with frames
- Multiple handles
- Telescopic handles
- Stack ability

## Trolley with locking system

- Need to insert dollar coin to unlock
- In order to take the dollar back one need to keep the trolley back at the same place

# Product study

## Exploring New forms of trolley

- New form
- Stack ability
- Materials
- IDEO trolley to solve the problem of compartments

# User studies

Aim of the user study was to find out various problems faced by users of the metro cities, while using the shopping trolley in the mall and various issues related to it.

# Problems using the trolley

- **Taking the Trolley**

- **Moving with the trolley on the gang way**

# Problems using the trolley

- **Problem faced at the billing counter**

- **Leaving the trolley**

# Problems with the trolley

- **No Extra compartments**

• Doesn't have different compartments to keep things separately

- **No use of lower space**

• Because of accessibility problem very less users use lower space

# Problems with the trolley

- **Size of the trolley**

• The bigger size of the trolley, makes it difficult for the user to walk inside

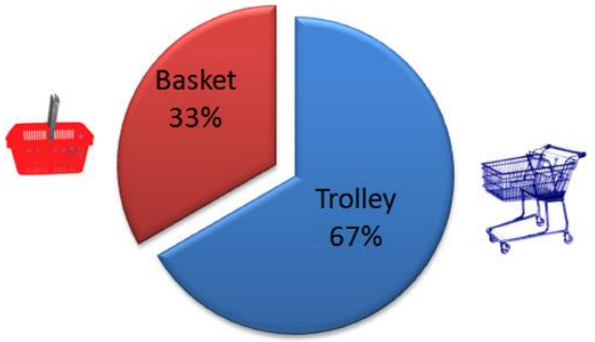

- **Child seat**

• Size of the slots of the child seat are too small, problem is faced while putting the child

# Buying pattern

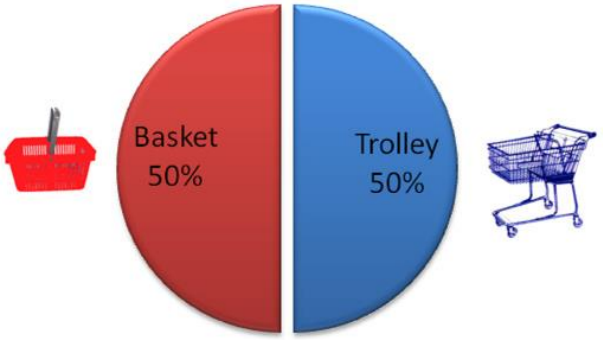
- **Week days (Less Crowd)**

• 33% of the users prefer basket
  67% of the users prefer trolley




- **Peak Hours**

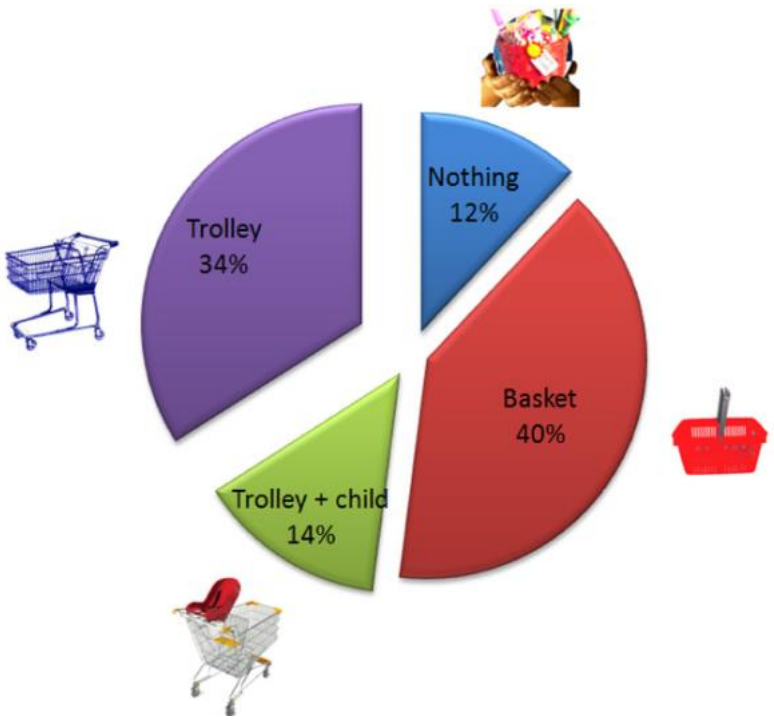
• 50% of the users prefer trolley
  50% of the users prefer basket



# Buying pattern

- **Users in peak hours**

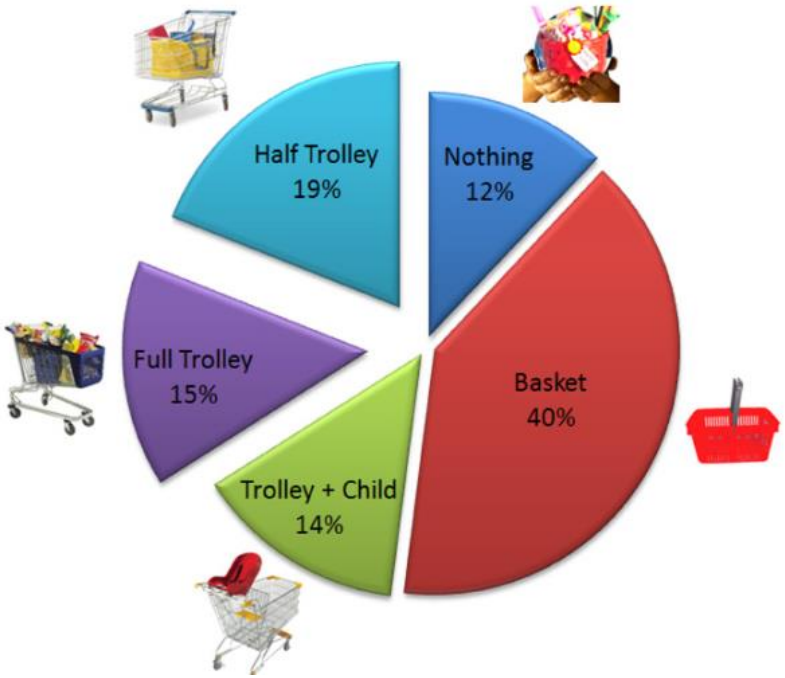
- Out of 50% of the trolley users only 14% of people carry their child in the trolley



# Buying pattern

- **Users in peak hours**

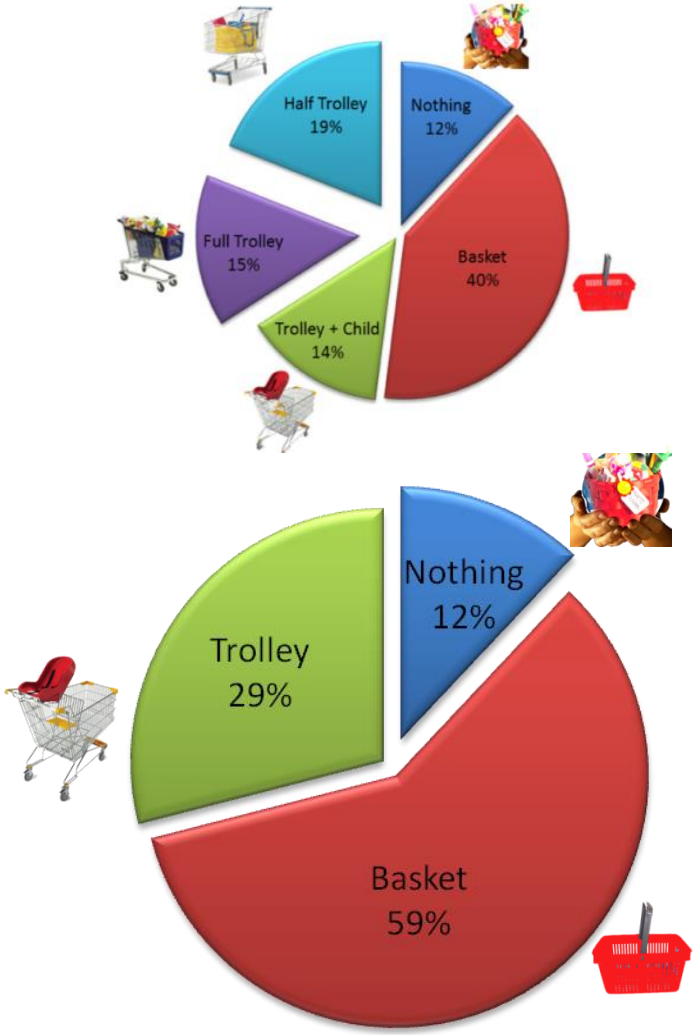
- Out of 34% of the trolley users
  only 19% of people carry their half trolley



# Analysis

**Dividing trolley into baskets**

- 40% of the users uses basket during peak hours
- Out of 50% trolley users, 19% of people use half trolley
- If 19% of trolley users are given little bigger basket, so total basket users will become 59%
- Only 29% people actually uses trolley, out of which 14% carry child in trolley and 15% uses full trolley

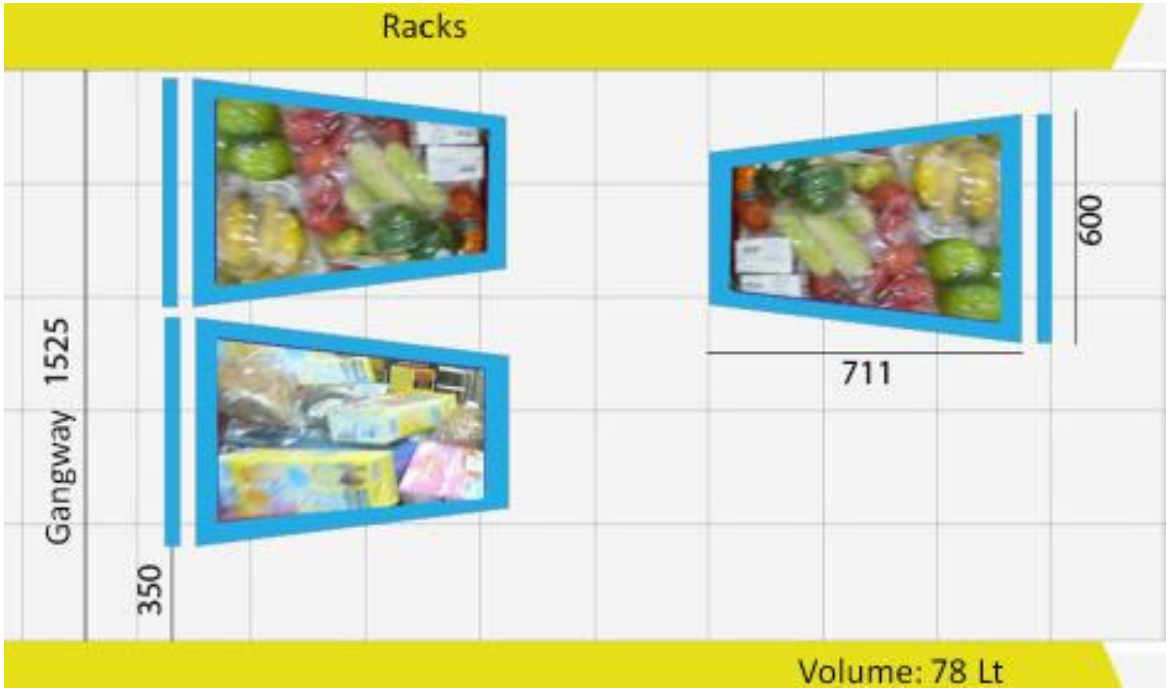


# Buying pattern

- **Time taken at billing counter**

- Time taken for 10 items – 1.15 sec
- Time taken for basket – 2.15 sec
- Time taken for half trolley – 3.30 sec
- Time taken with full trolley – 4.45 sec

# Layout of gang way




- Existing trolley size is 600 x 711 X 953 mm
- Volume of the existing trolley is 78 liters
- Foot print (space consumed) is 600 x 711 mm

# Proposed Design


- Proposed trolley size is 460 x 680 x 953 mm.
- Volume of the proposed trolley (volume of single basket) is 57 liters
- Foot print (space consumed)460 x 680 mm

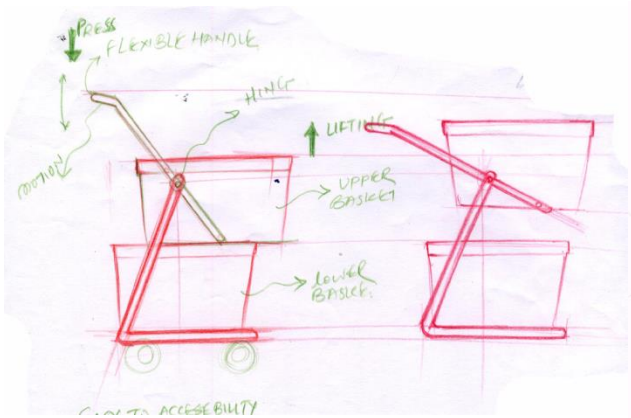
# Analysis

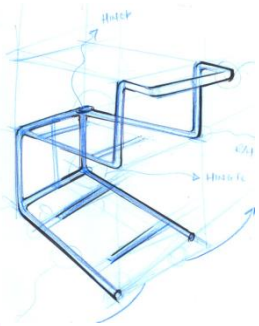
## Volume of the trolley

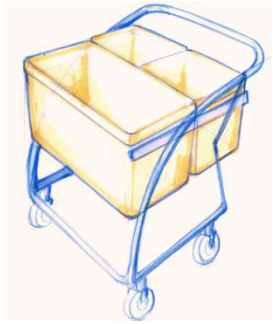
Volume of the current trolley is 78 liters, so if existing two trolleys are placed side by side, then the space left in the gangway is approximately 1 feet, from which it is impossible for a trolley or a user to pass through.

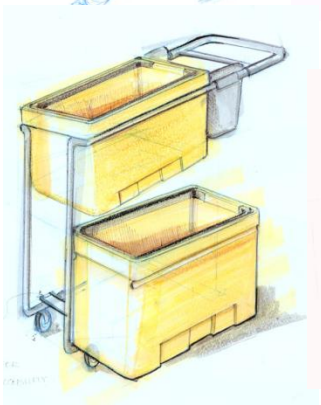
But the volume of proposed design is approximately 57+57 liters (two different baskets), so the space left in the gangway is approximately 2 feet, from which it is possible for a proposed trolley or a user to easily pass through.

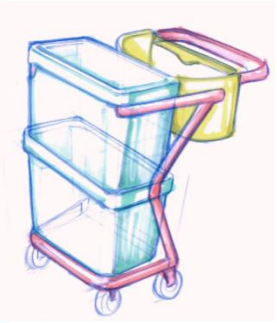
# Ideation



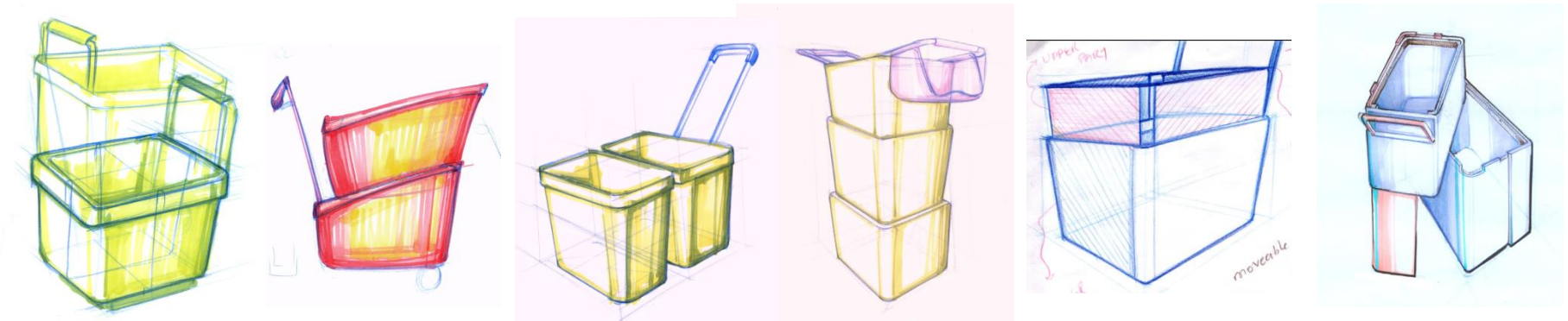






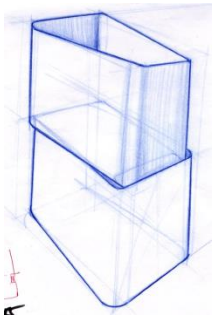
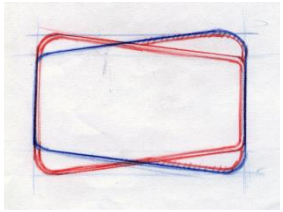
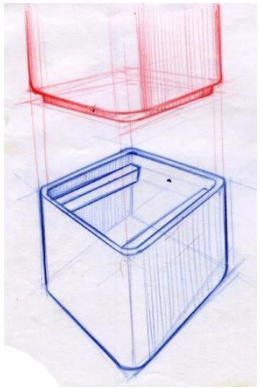
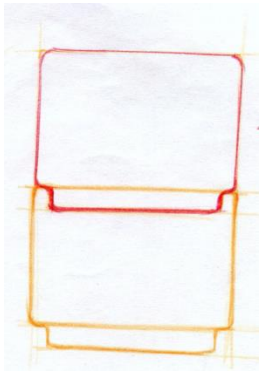
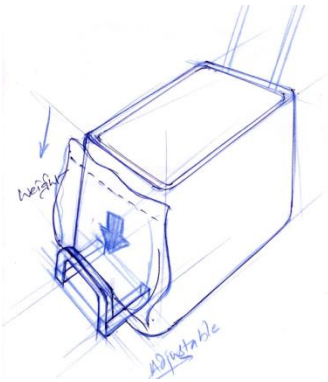
With frame structure

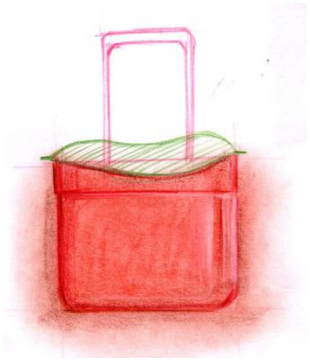
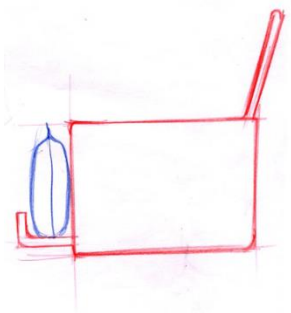
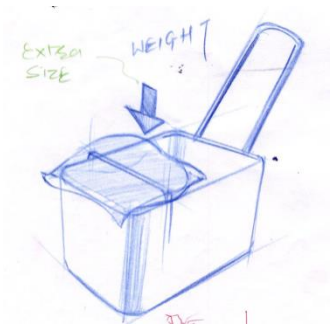
# Ideation

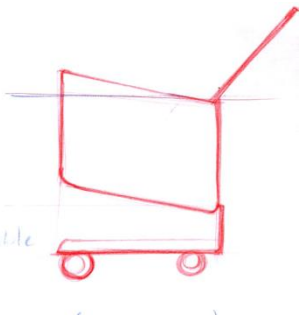



Without frame structure

# Ideation

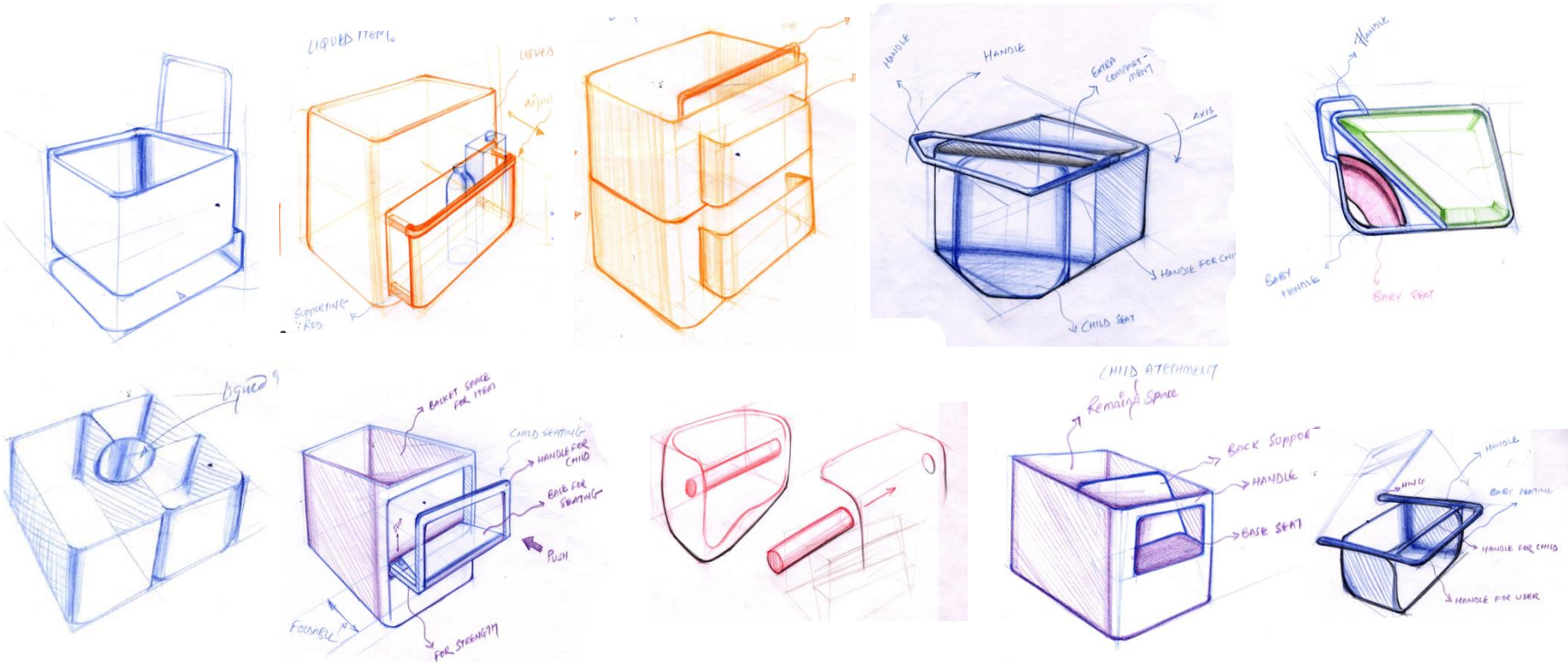








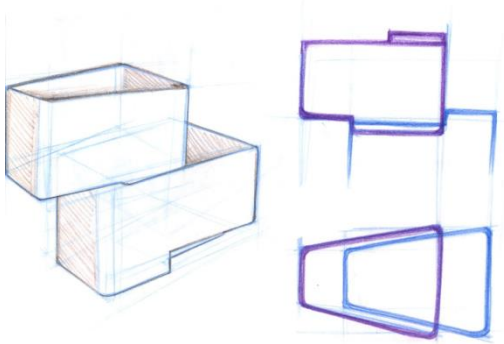
Stack ability and space for extra size items

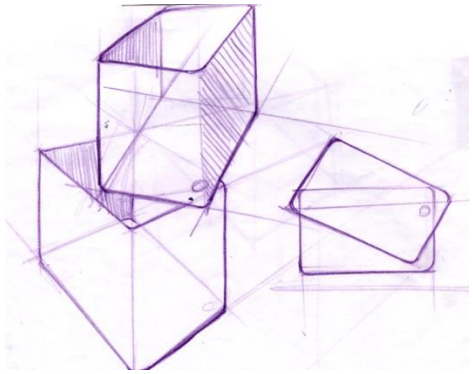
# Ideation

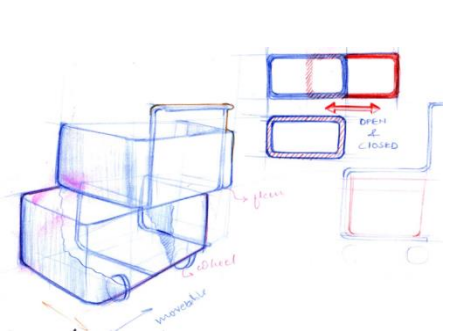


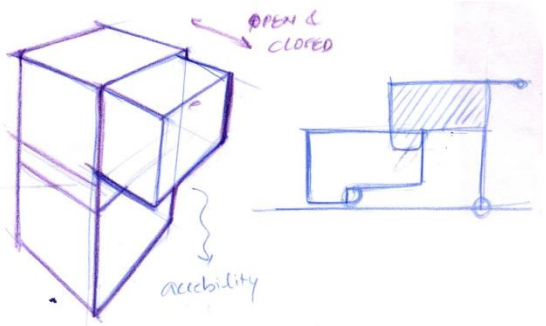

Liquid items and child seat

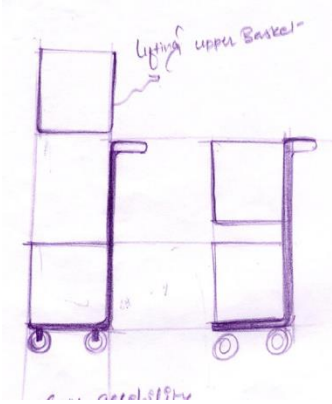
# Ideation

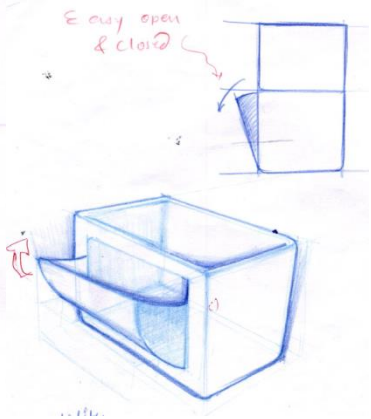






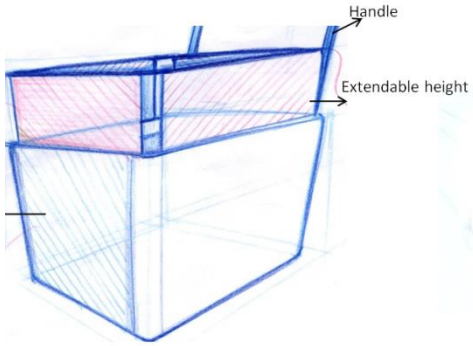



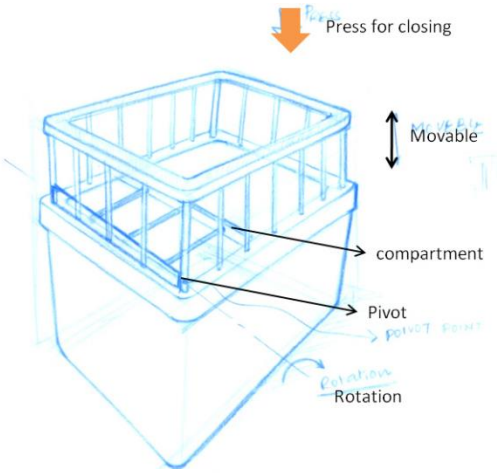



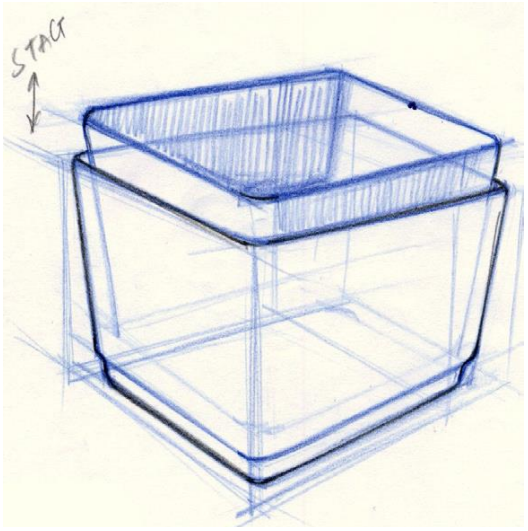



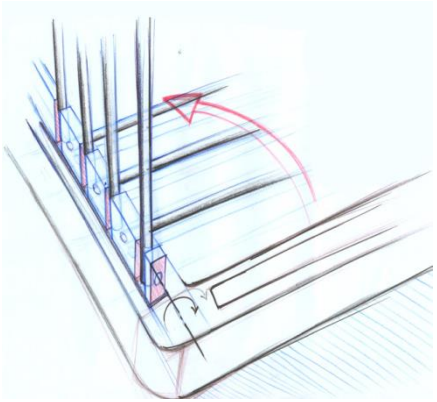

Accessibility

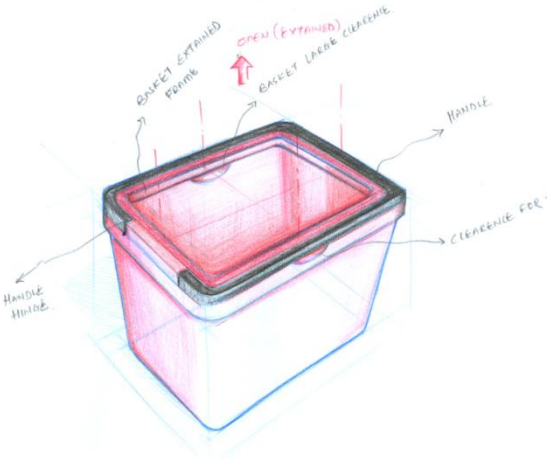
# Concept 1

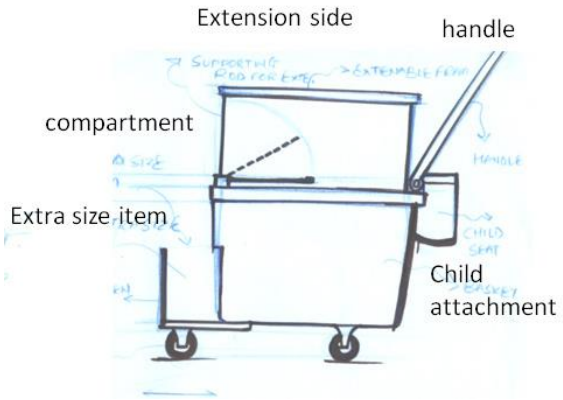

Handle
Extendable height


Press for closing
Movable
compartment
Pivot
Rotation

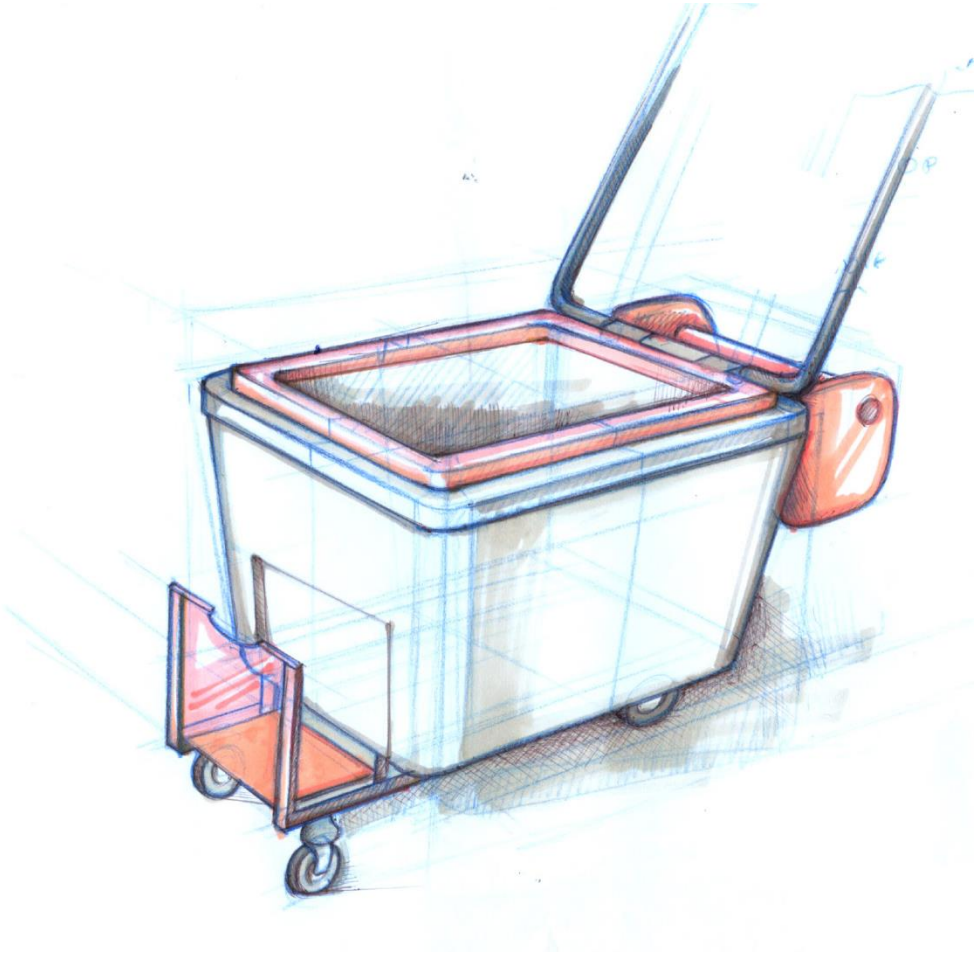

STACK




Handle


Extension side
handle
compartment
Extra size item
Child
attachment

# Concept 1



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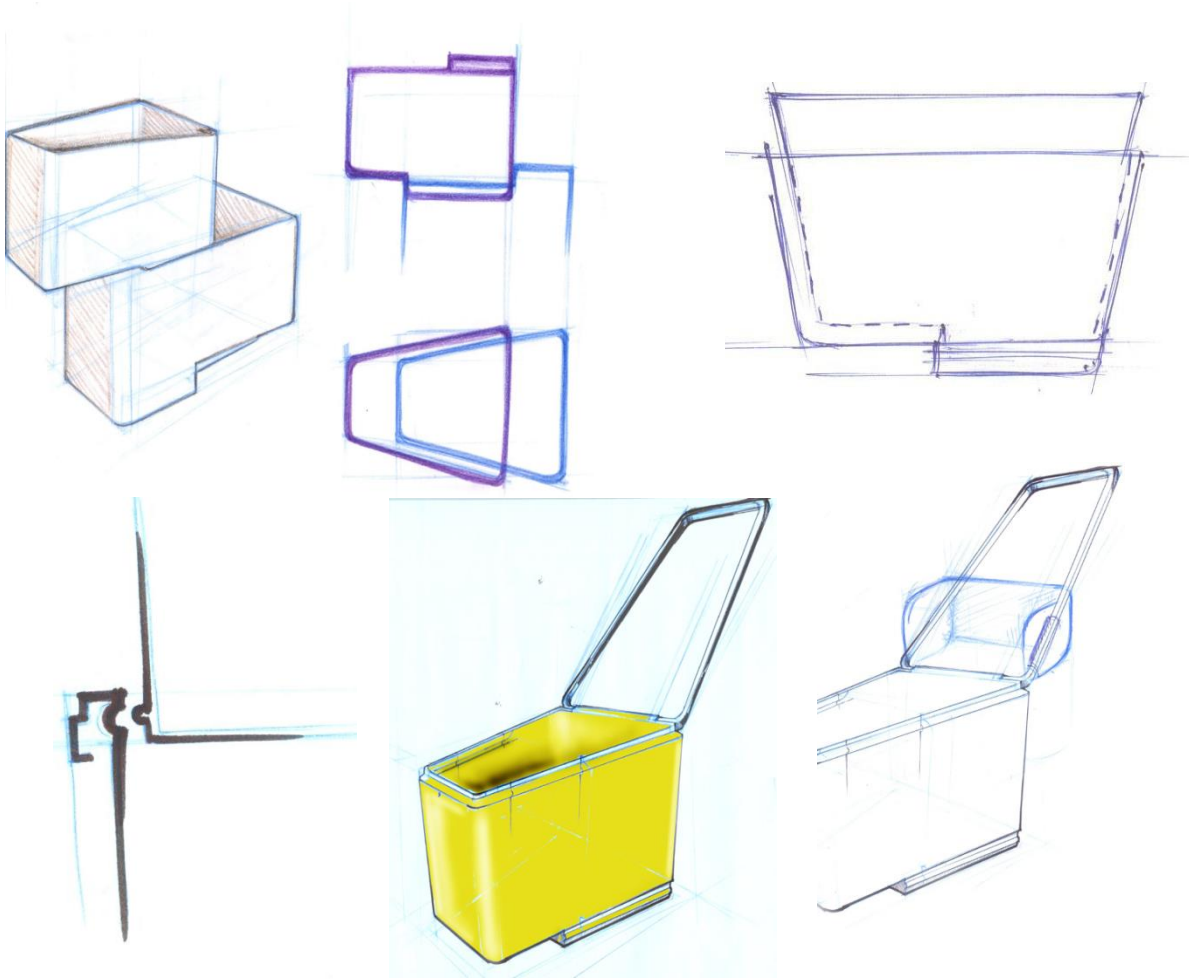
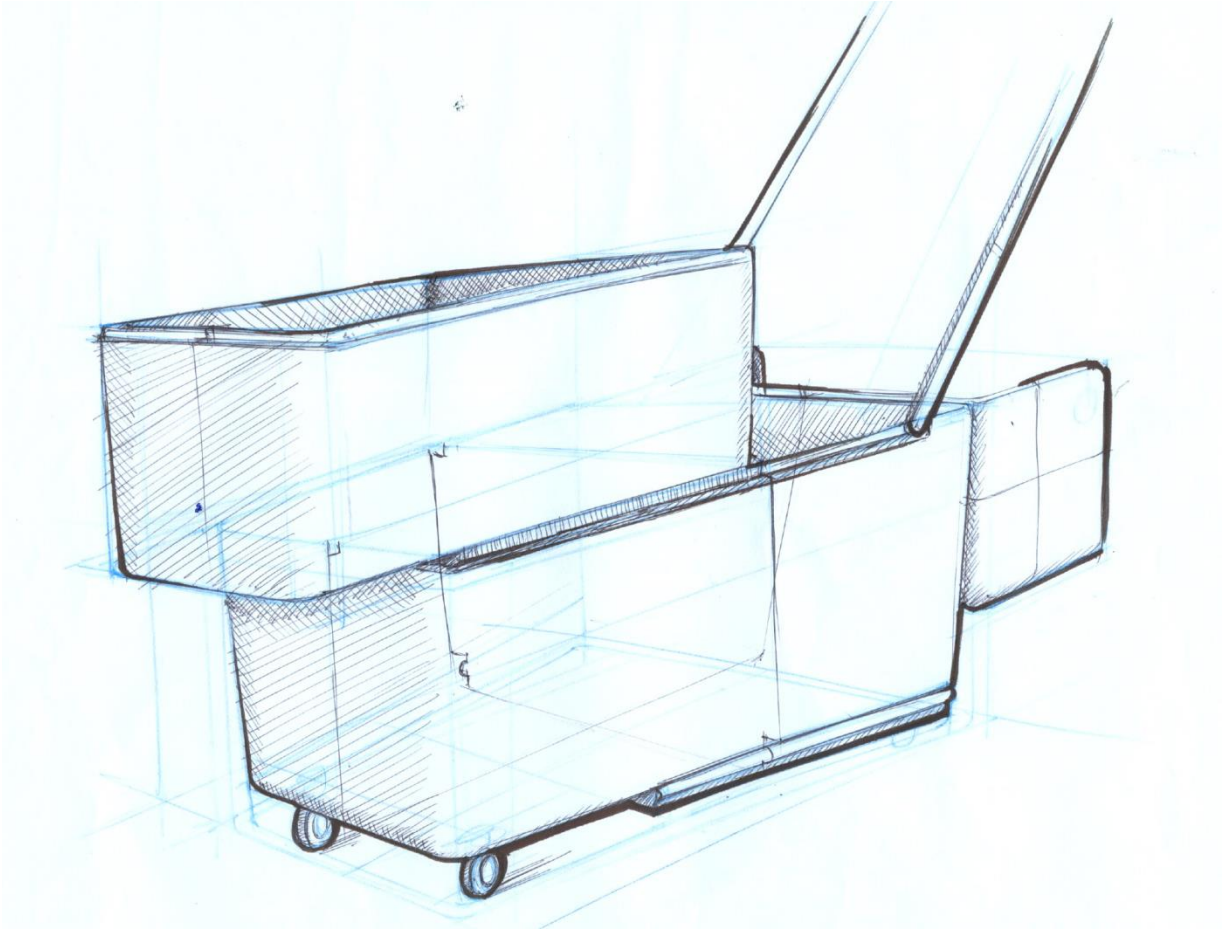
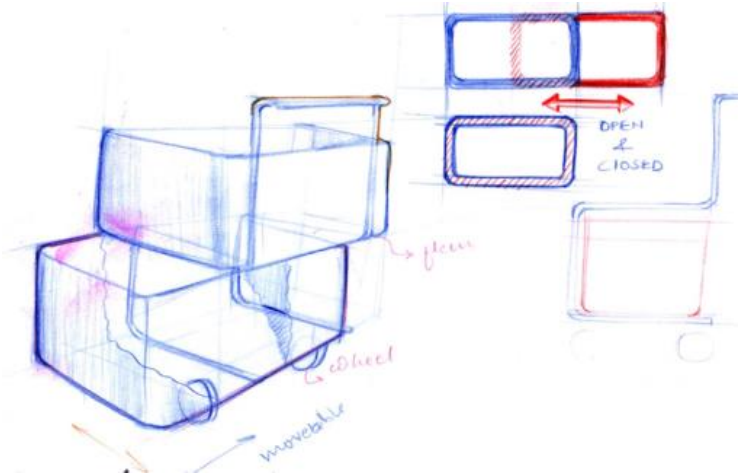
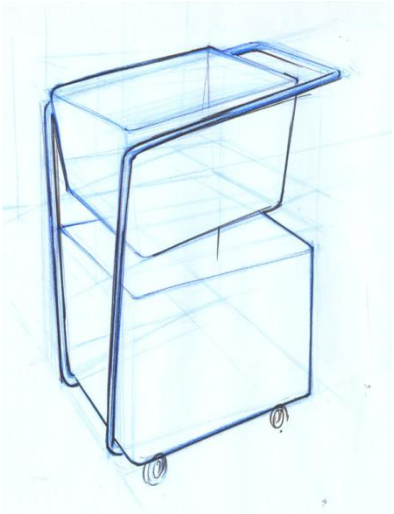


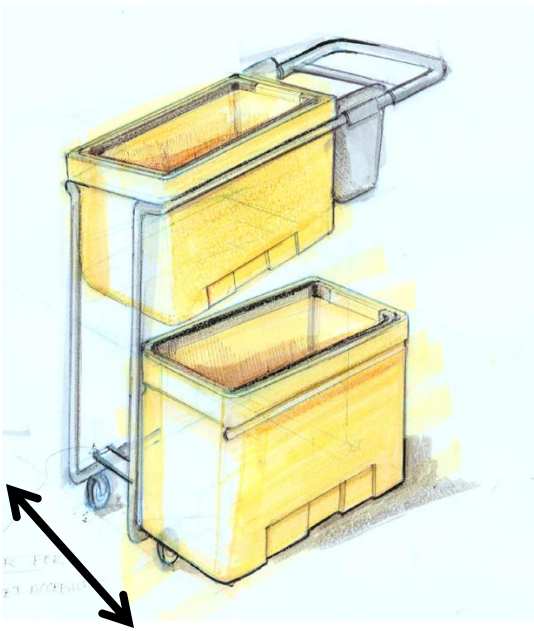
# Concept 2

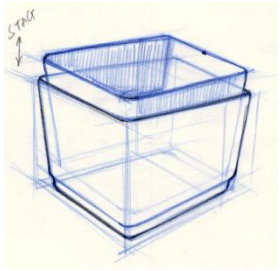


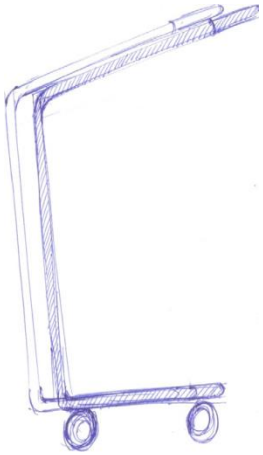
# Concept 3

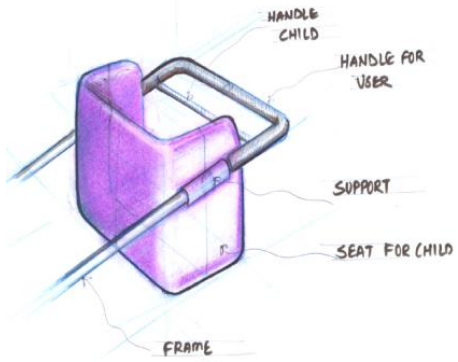

OPEN
&
CLOSED
moveable



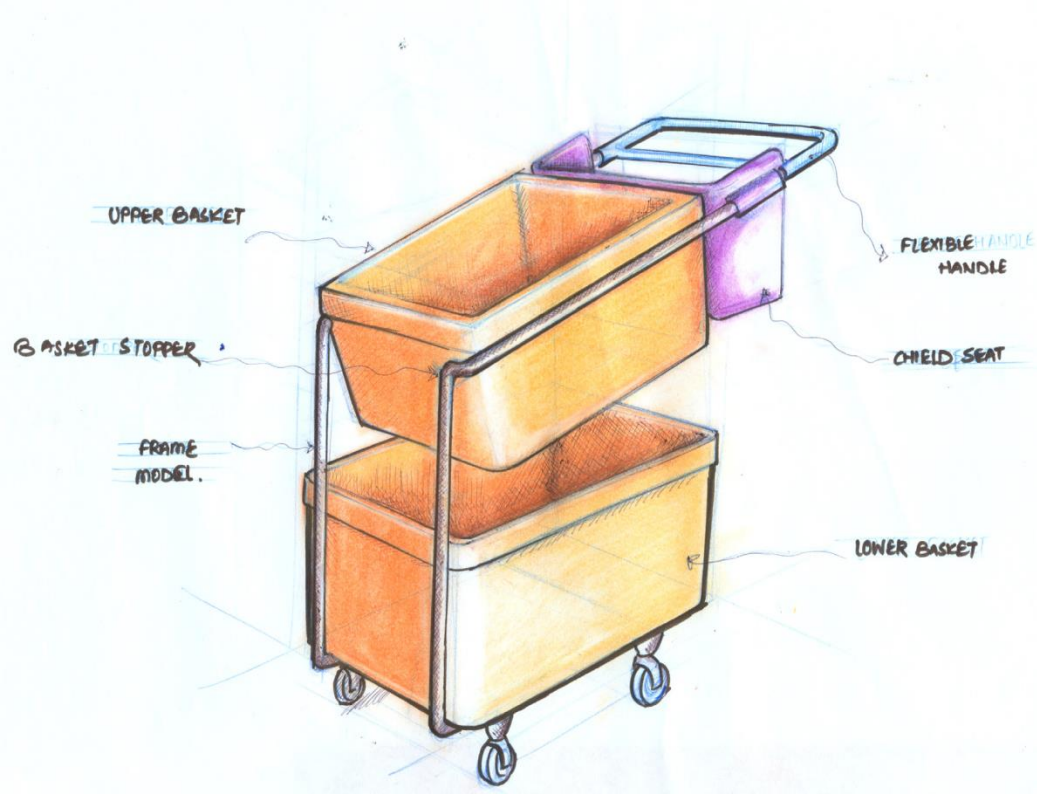




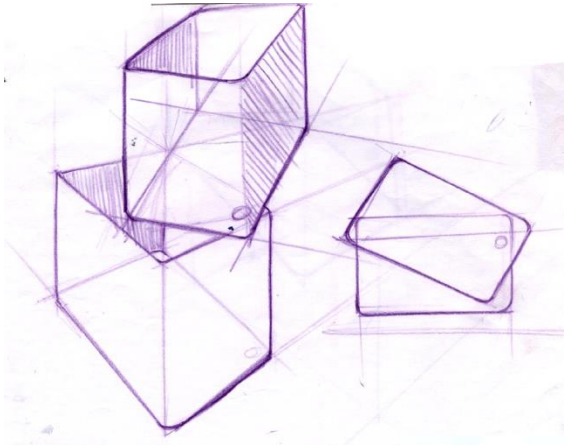


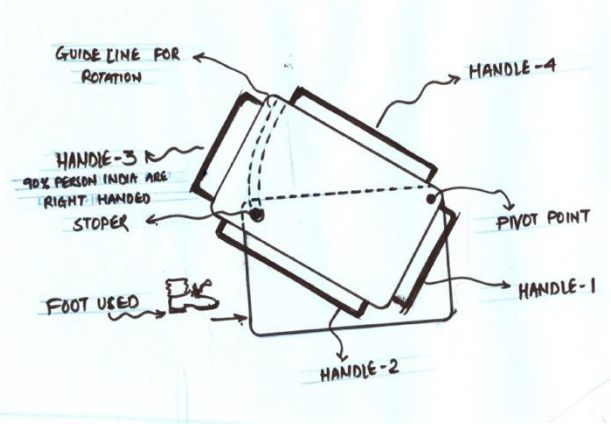

HANDLE CHILD
HANDLE FOR USER
SUPPORT
SEAT FOR CHILD
FRAME

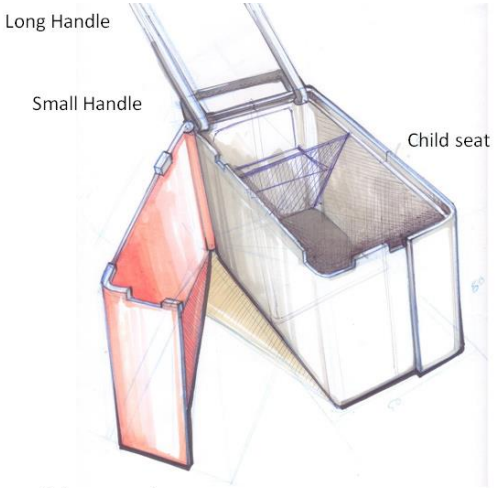
# Concept 3

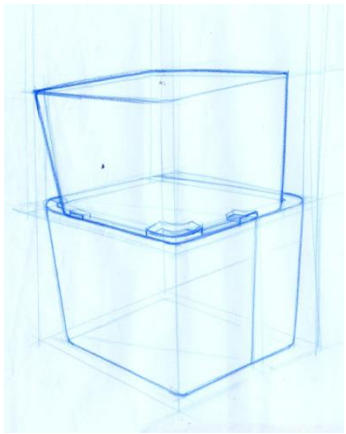

UPPER BASKET
FLEXIBLE HANDLE
BASKET STOPPER
CHILD SEAT
FRAME MODEL.
LOWER BASKET

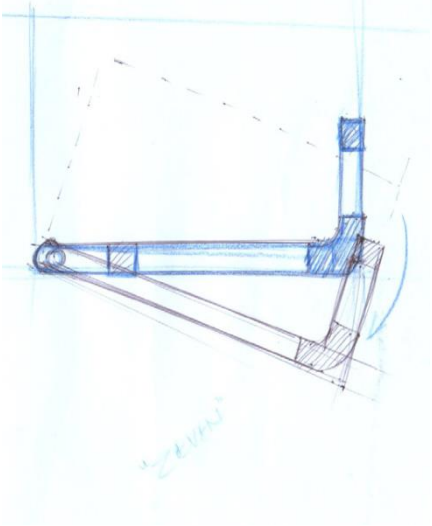
# Concept 4



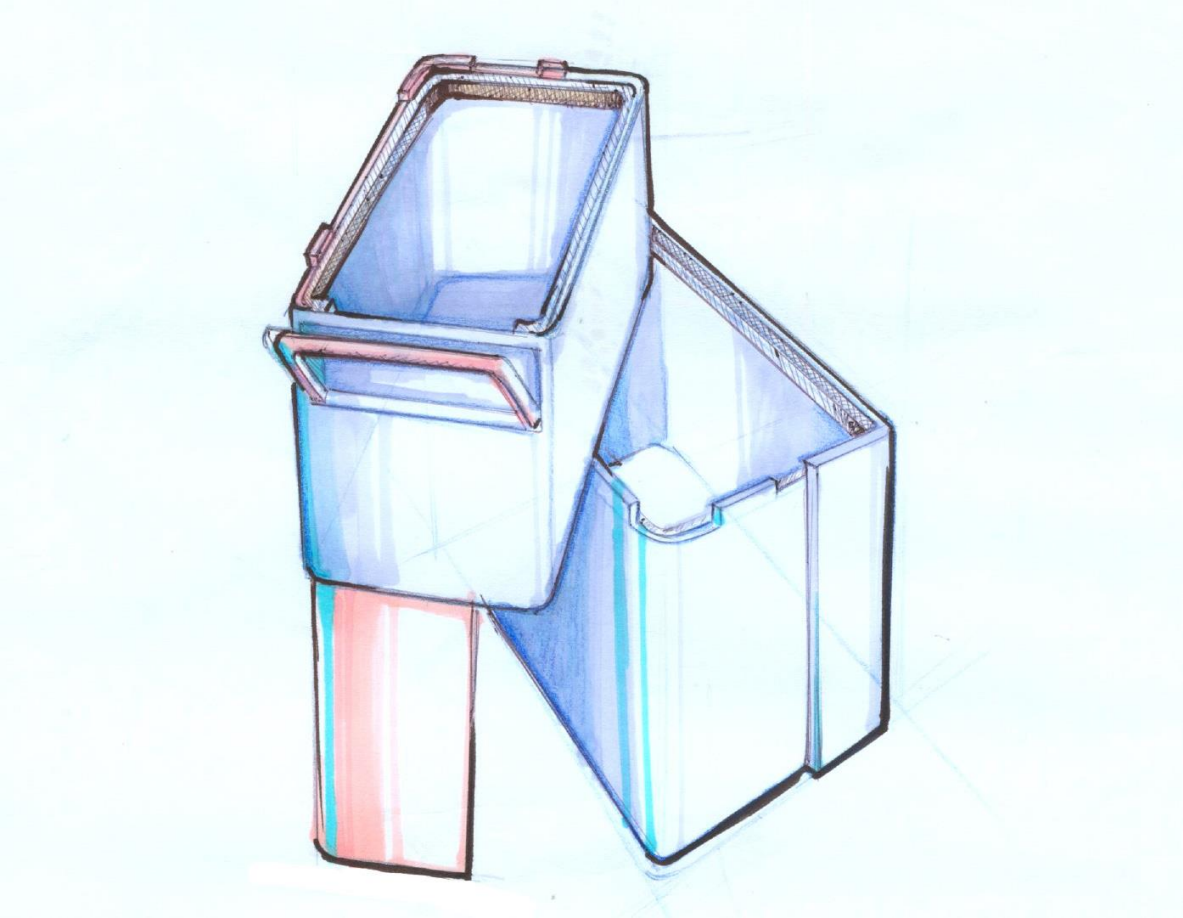

GUIDE LINE FOR ROTATION
HANDLE-4
HANDLE-3
90% PERSON INDIA ARE RIGHT HANDED
STOPER
PIVOT POINT
FOOT USED
HANDLE-1
HANDLE-2


Long Handle
Small Handle
Child seat
Extra support

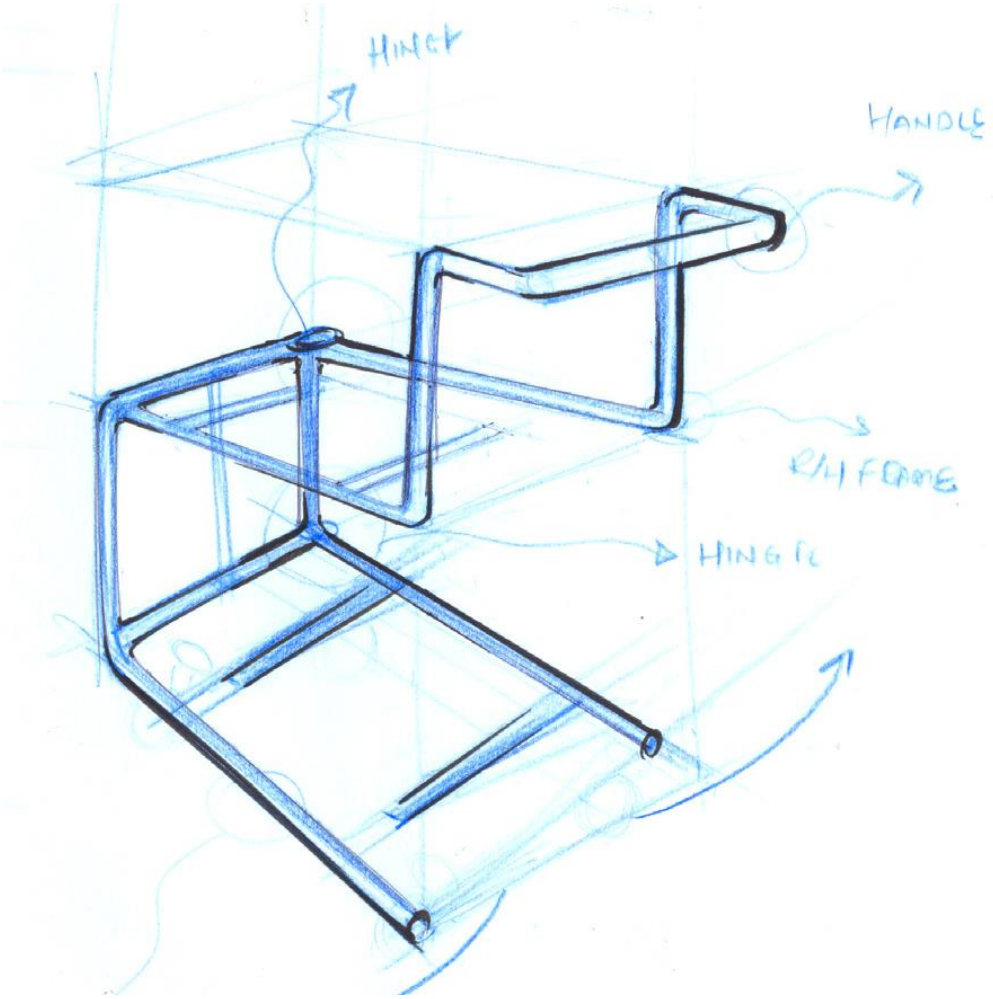




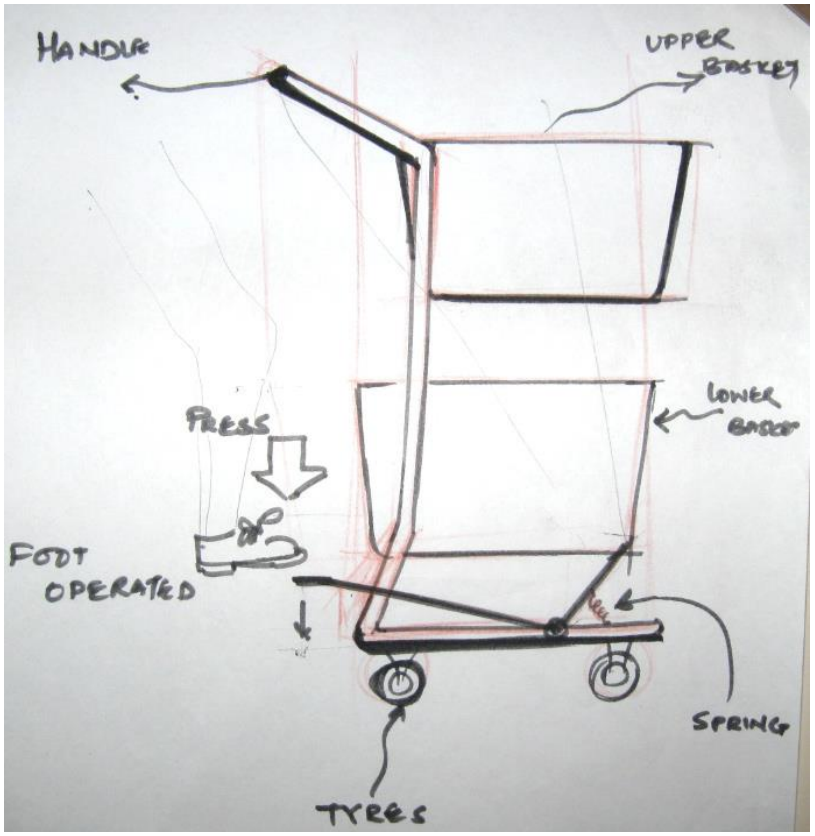
# Concept 4



# Concept 5



# Concept 6


HANDLE
UPPER BASKET
LOWER BASKET
PRESS
FOOT OPERATED
SPRING
TYRES

# Evaluation

Comfort ability (60% weightage )
1-Accessibility
2- Footprint
3- Handling at the billing counter

Loading and unloading (30% weight age)
Child seat (10% weightage)

Stack ability (60% weightage)
1-Goods
2- trolley

•Footprint in Inches

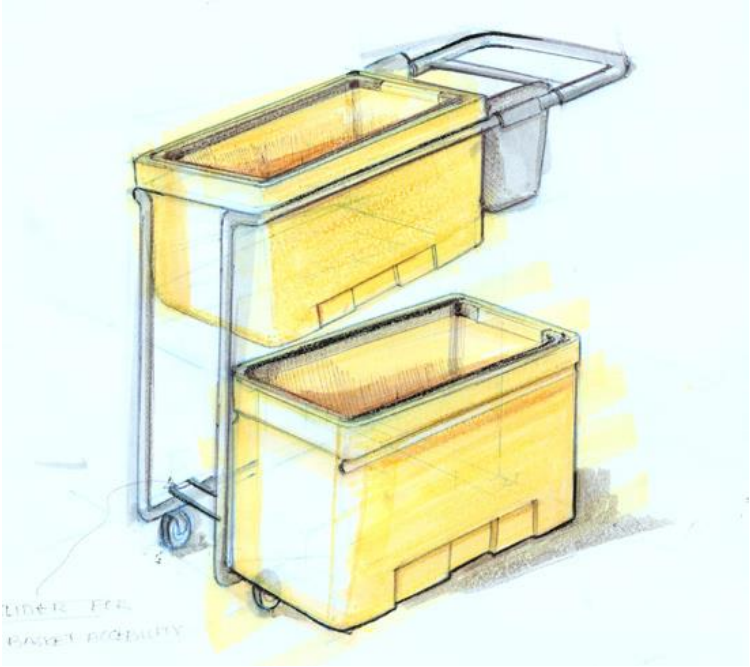
| | basket | | | trolley | | |
|---|---|---|---|---|---|---|
| | height | length | width | height | length | width |
| current trolley size | | | | 37.5 | 30 | 24 |
| concept-1 | 15 | 24 | 15 | 22 | 24 | 15 |
| concept-2 | 15 | 20 | 15 | 27 | 20 | 15 |
| concept-3 | 13 | 24 | 13 | 37 | 24 | 20 |
| concept-4 | 13 | 24 | 15 | 37 | 27 | 29 |
| concept-5 | 13 | 24 | 15 | 37 | 27 | 29 |
| concept-6 | 13 | 24 | 15 | 37 | 30 | 17 |

# Evaluation

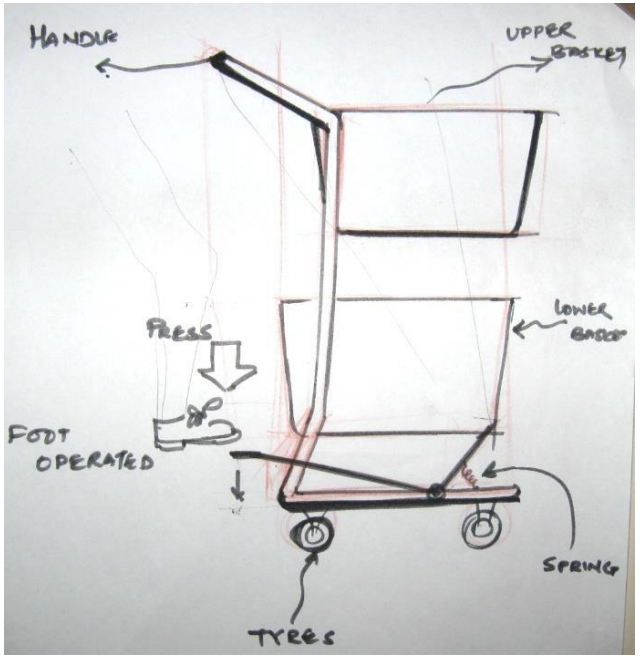
- Calculation

| | Accessibility | Foot Print | Handling at Bill Counter | Stack ability for Goods | Stack ability for trolley | Loading -Unloading | Child Seat | Total |
|---|---|---|---|---|---|---|---|---|
| concept-1 | 27 | 34.2 | 16.2 | 33 | 23.4 | 10.2 | 2.2 | 146.2 |
| concept-2 | 28.8 | 31.8 | 16.2 | 34.2 | 29.4 | 12 | 3.6 | 156 |
| concept-3 | 38.4 | 31.8 | 28.2 | 36 | 29.4 | 15.9 | 4.8 | 184.5 |
| concept-4 | 27.6 | 9 | 11.4 | 23.4 | 23.4 | 9.9 | 1.5 | 106.2 |
| concept-5 | 27.6 | 9 | 11.4 | 23.4 | 23.4 | 9.9 | 1.5 | 106.2 |
| concept-6 | 37.8 | 30.6 | 30 | 35.4 | 28.8 | 15.6 | 0.2 | 178.4 |

# Evaluation



Concept 3




Concept 6

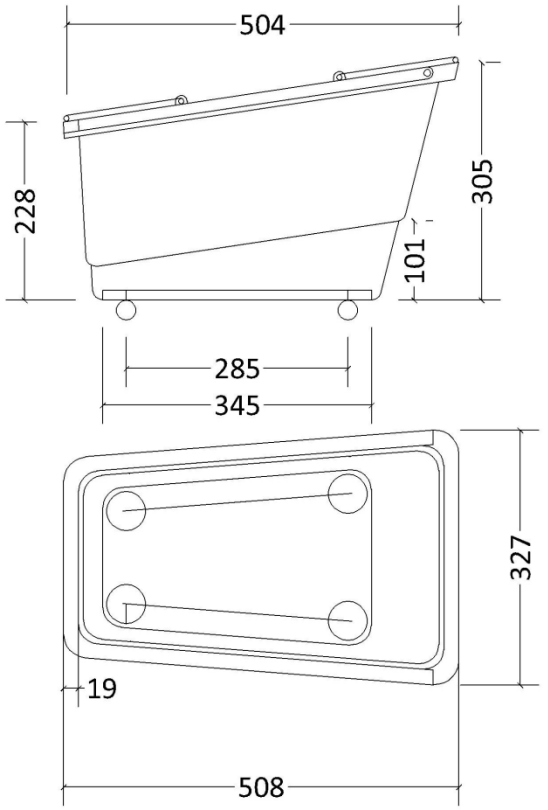
# Simulation

Problem identify in simulation

- Basket size (24 x 13 x 13”)
- Upper basket Angle:
- Accessibility of lower basket
- Extra handle

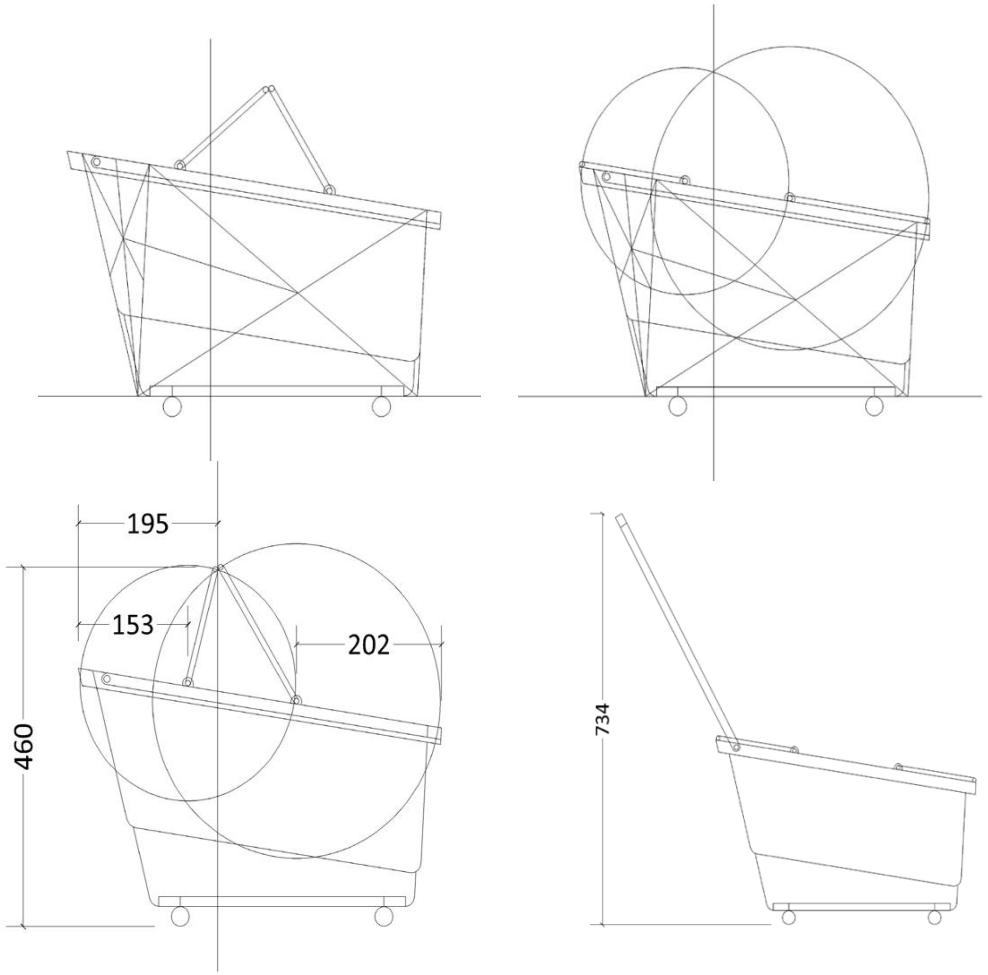
# Dimension

- Final basket size



# Dimension

- Basket handle dimension



# Dimension

•**Stack ability**

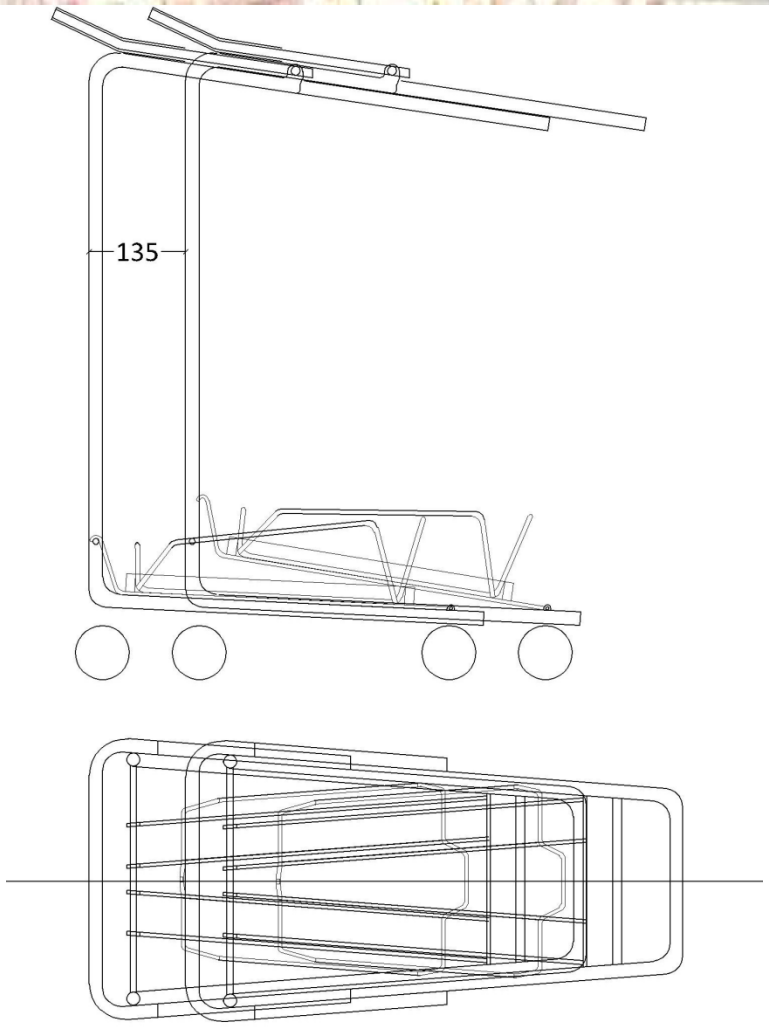
Current trolley carrying 150 mm
And propose trolley carrying 135 mm

•**Calculation:** (when 50 trolley stack)

50 x 150 = **7500 mm** space consumed

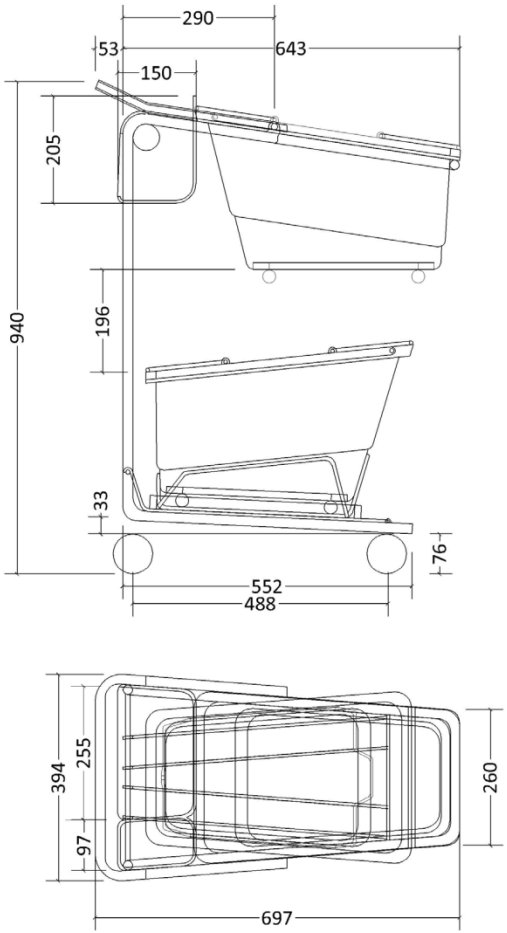
when, purpose trolley
50 x 135 = **6750 mm**

7500-6750= **750 mm** (appr. 2.5 feet saving)



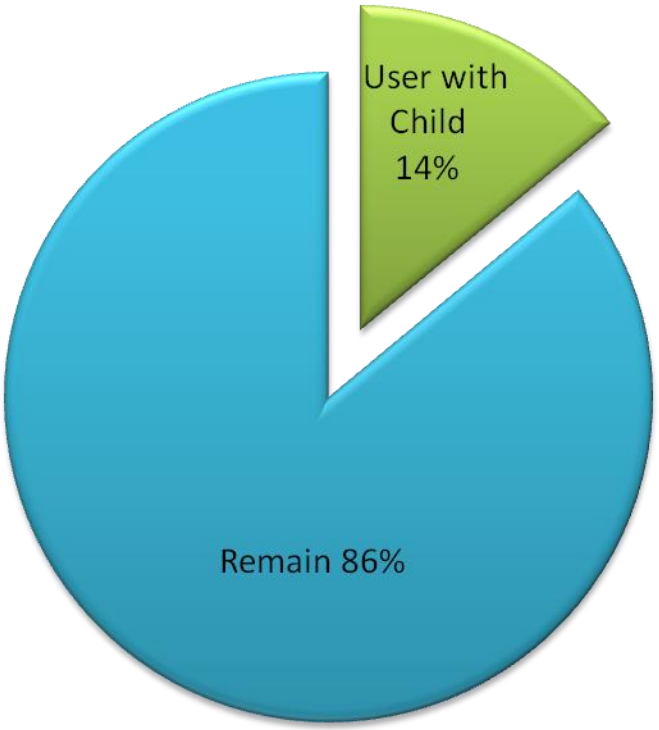
# Dimension

- Dimension of trolley

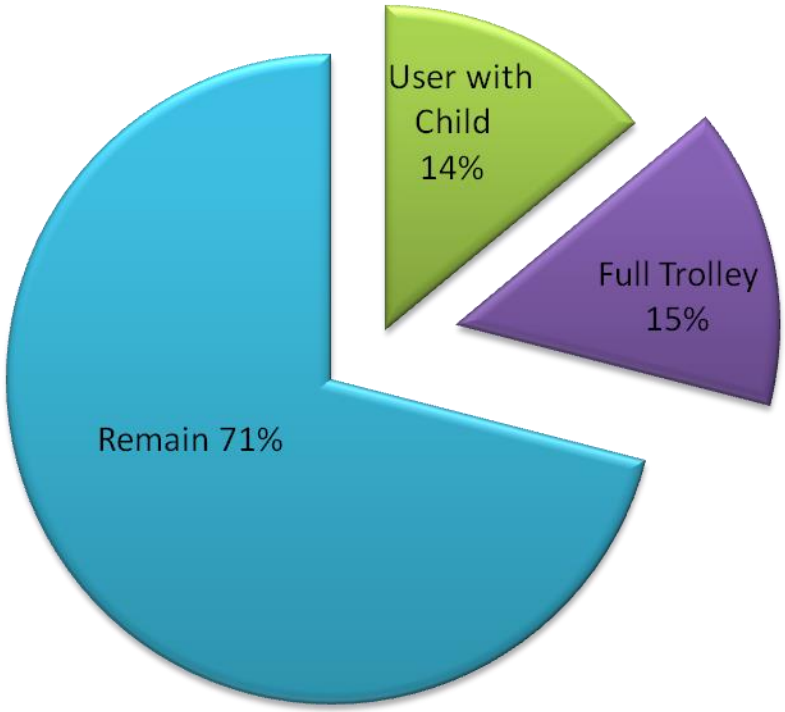


# Final rendering

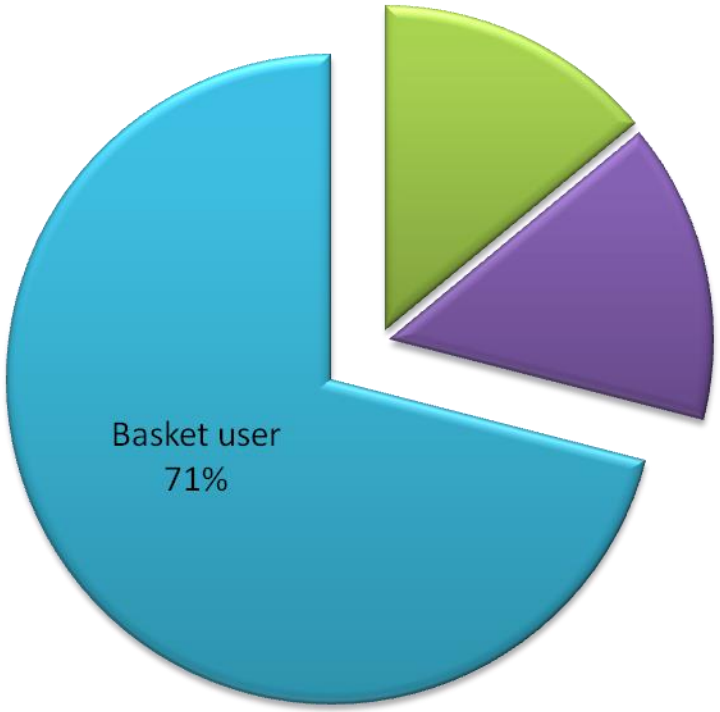
# User with child



# Full trolley shopping



# Basket user



# Thank you