Design Methodology

I'm Inspired

Organized By:

Sponsored By: DASSAULT SYSTEMES SOLIDWORKS Stratasys

Design Methodologies

How can we design a product in methodic way?

Guidelines for successful designers

Product design is not only reserved for creative talented engineers.
By scientific and practical working methods it can be learnt.

Outstanding solutions or inventions requires intuitive ingenuity, imagination and visionary thinking. Without intuition is likely the real success will
fail.

Methodology and intuition are not opposites. Both together will form a fruitful and necessary symbiosis!

Guidelines for successful designers

INVENTIONS ARE

1% INSPIRATION

99% TRANSPIRATION

Guidelines for successful designers

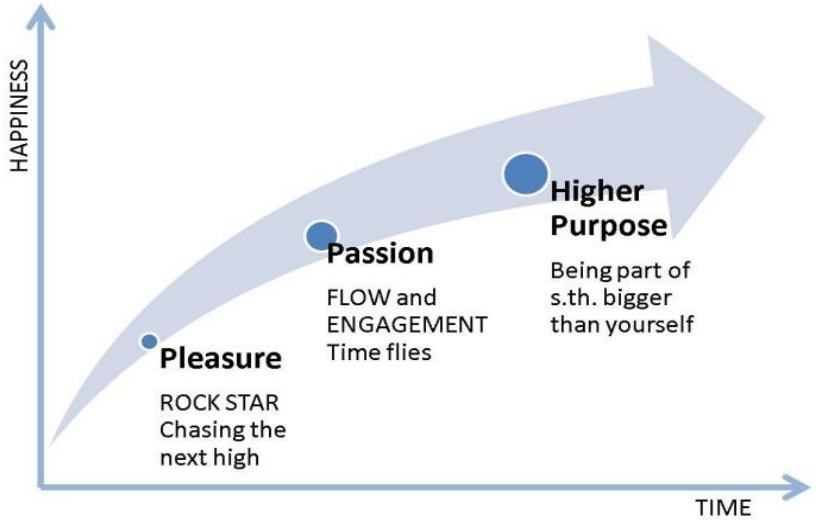
RESOURCES ARE LIMITED. IDEAS NOT.

Guidelines for successful designers

MONEY IS NOT A MOTIVATION FOR R&D

R&D NEED SELF-MOTIVATION

CREATE SOMETHING BIGGER THEN YOU ARE



> It's extremely rewarding to be a part of something bigger than myself.

Guidelines for successful designers

Start simple.

Keep good company.

Keep learning.

Stay Positive.

Stop thinking. Just do.

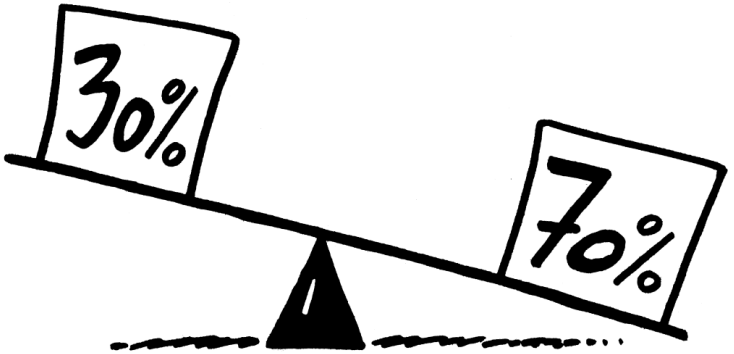
Know yourself.

Track your progress.

Help others.

Guidelines for successful designers

TEAMWORK



Guidelines for successful designers

UNDERSTAND THE PIZZA EFFECT

Guidelines for successful designers

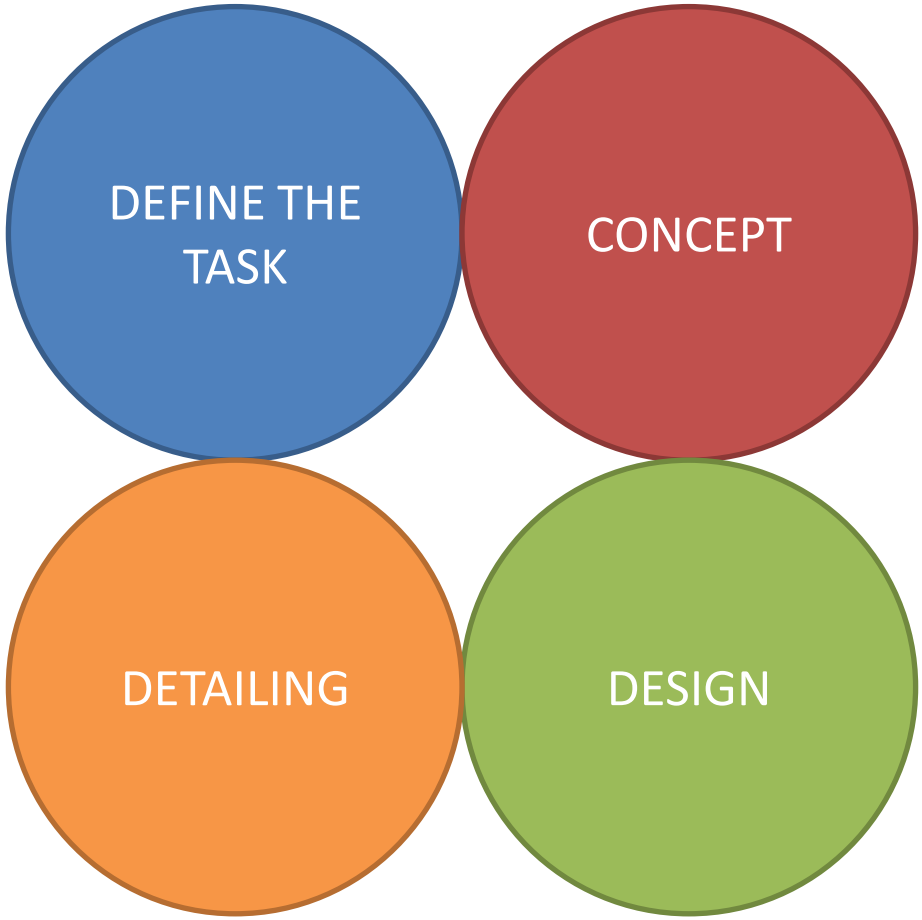
SLICE THE PIZZA SO THAT YOU CAN EAT IT!

Guidelines for successful designers

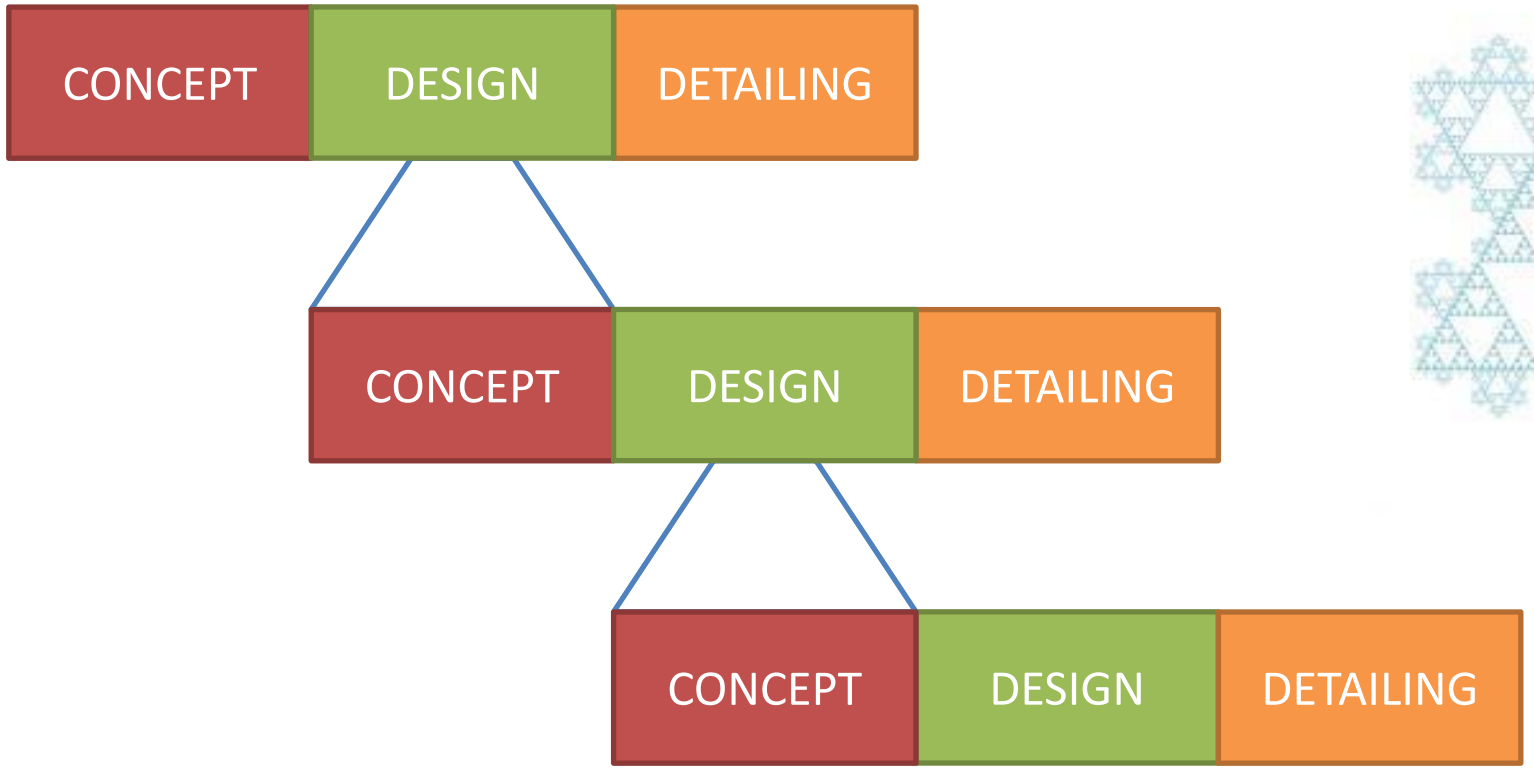
CHARACTERISTICS OF THE IDEAL DESIGNER

- Spatial ability
- Determination and decisiveness
- Economic insight
- Endurance and stamina
- High tolerance for frustration
- Perseverance, immunity to setbacks
- Optimism

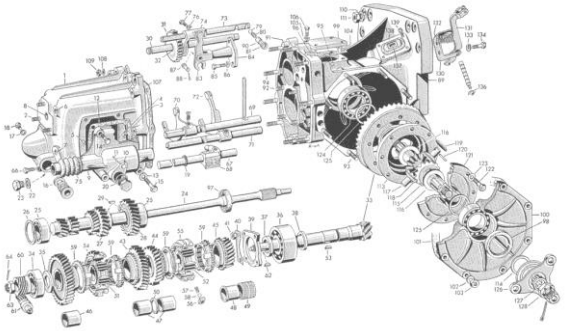
Design Methodologies



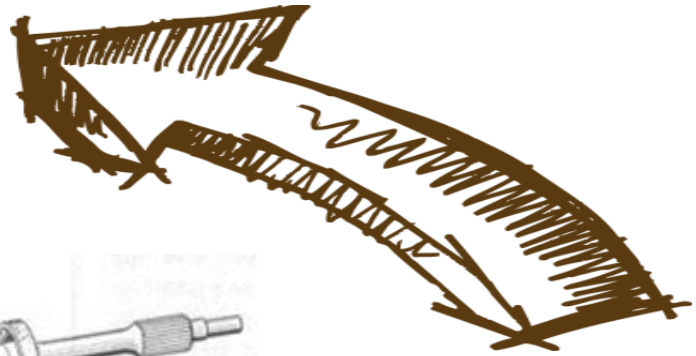
Design Methodologies

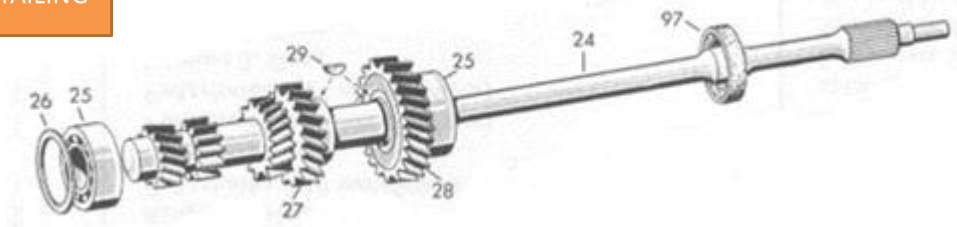


Design Methodologies



CONCEPT | DESIGN | DETAILING





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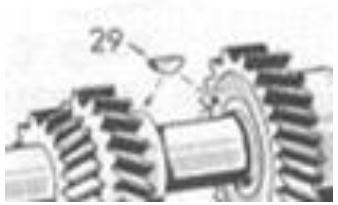


CONCEPT | DESIGN | DETAILING

DEFINE THE TASK

DEFINE THE TASK

We need new products!

We need additional two or three more technological fields!

What can WE create or develop?

Who has an idea?

Where are we in the market?

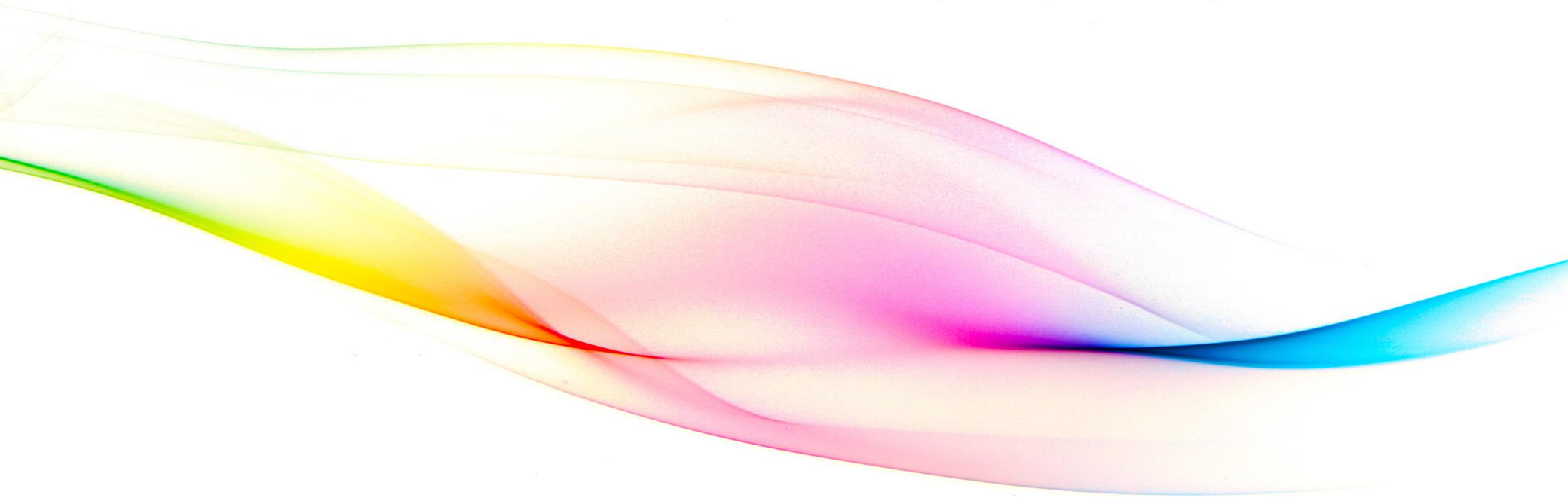
Do we have the right strategy to target additional market segments?

Where are innovational needs?

Needs on product innovation

DEFINE THE TASK

BE AS ABSTRACT AS POSSIBLE AND CONCRET AS NEEDED!

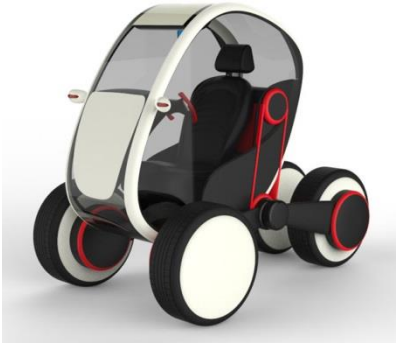


DEFINE THE TASK

Task: Develop a new car

DEFINE THE TASK

Task: Design a transport device



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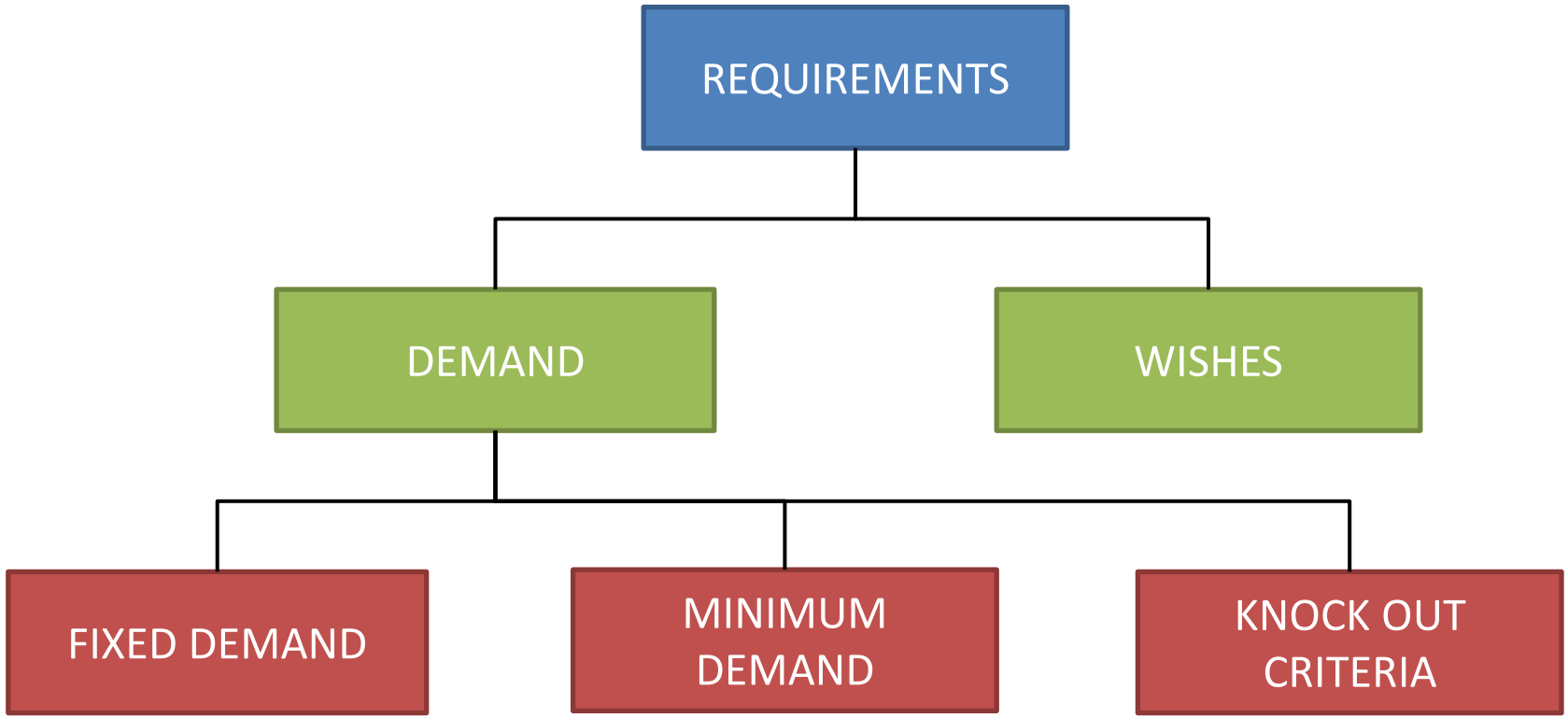


DEFINE THE TASK

LIST OF MAIN DESIGN CRITERIA

Geometry	Production
Kinematic	Quality Control
Force	Assembly
Energy	Transport
Material	Usage
Signal	Maintenance
Safety	Recycling
Ergonomic design	Costs

DEFINE THE TASK

IME GROUP		REQUIREMENT LIST	PAGE 1 OF 3 PAGES
DATE OF DEFINITION	DEMAND	DEFINITION OF DEMAND OR WISH	PIC

DEFINE THE TASK

YOUR SITUATION:

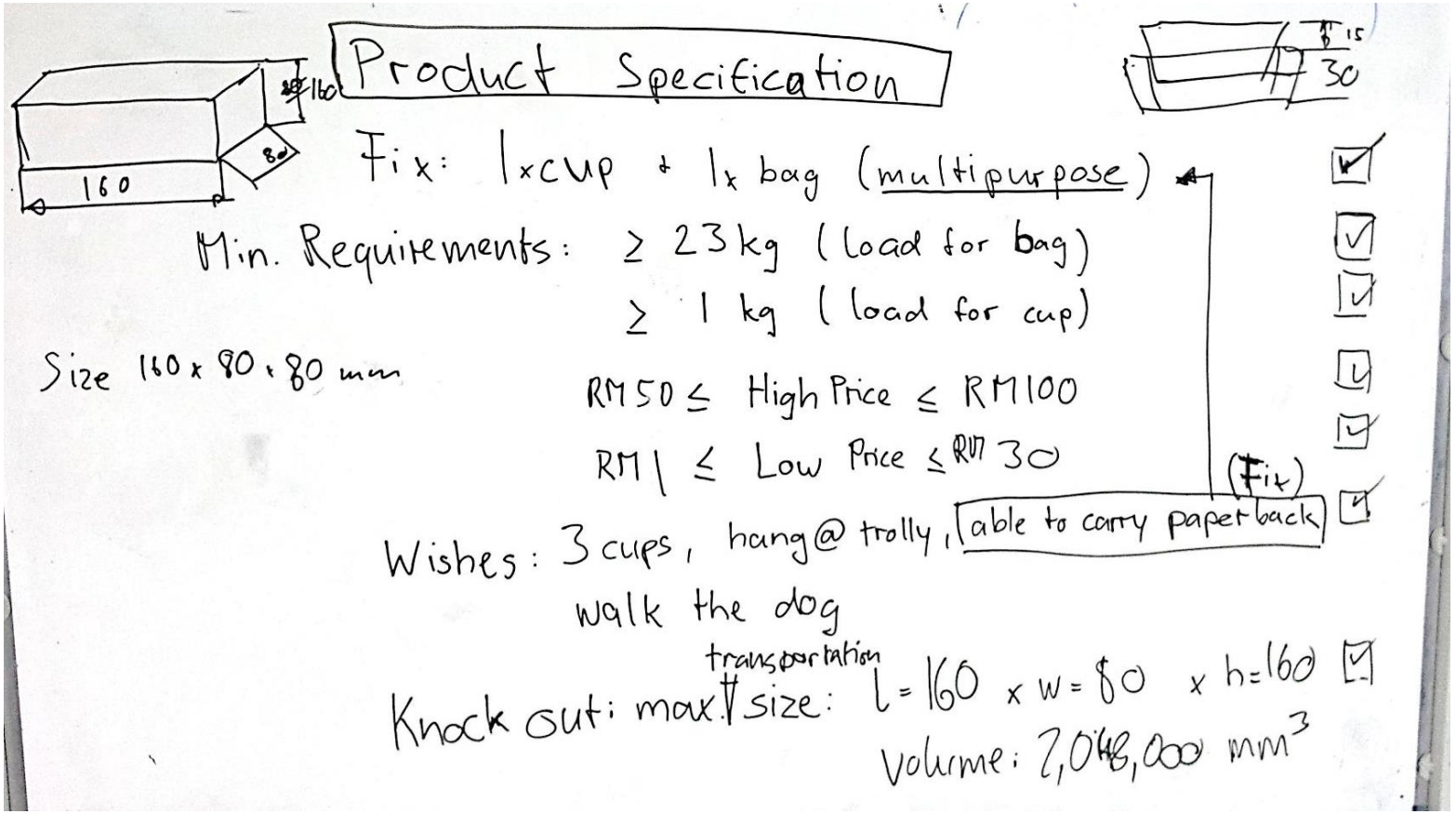
DURING SHOPPING, BAGS, CUPS AND OTHER OBJECTS ARE QUITE DIFFICULT TO HOLD. VERY OFTEN IT IS UNCONVINENT TO USE TROLLEY TO CARRY THE GOODS DUE TO THE CROWD.

YOUR TASK:

DESIGN A DEVICE THAT INCREASE THE COMFORT OF PEOPLE BY CARRYING MORE THEN 2 BAGS WITH ONE HAND.

OUTPUT: REQUIREMENT LIST (NOT ANY DESIGN)

DEFINE THE TASK



DEFINE THE TASK

IME GROUP		REQUIREMENT LIST	PAGE 1 OF 3 PAGES
DATE OF DEFINITION	**DEMAND**	**DEFINITION OF DEMAND OR WISH**	**PIC**
29.04.2015	FD	1x bag and 1 cup	Martin
29.04.2015	MD	> 23 kg for bag and > 1 kg for cup	Martin
29.04.2015	MD	High price segment RM 50 to RM 100 Low price segment RM 1 to RM 30	Martin
29.04.2015	W	> 3 cups; hang at trolley; able to carry paper bag, walk the dog	Martin
29.04.2015	KO	>160 x 80 x80 mm	Martin

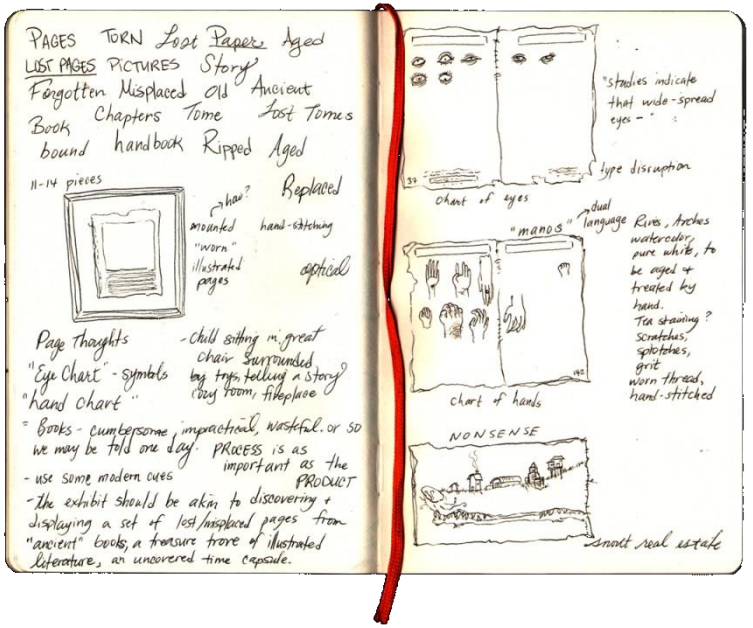
CONCEPT

CONCEPT

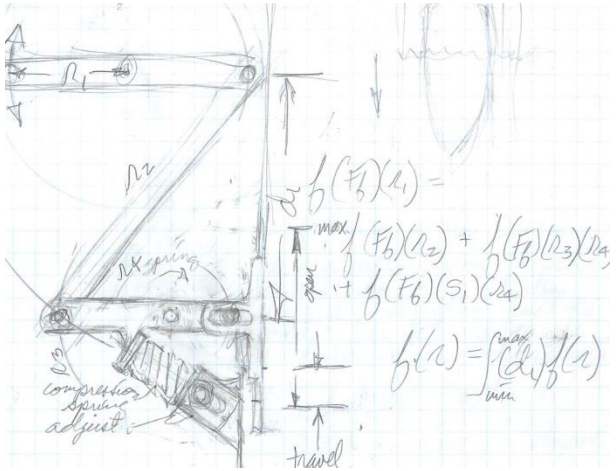
The hand sketch is the most important tool during the concept phase.

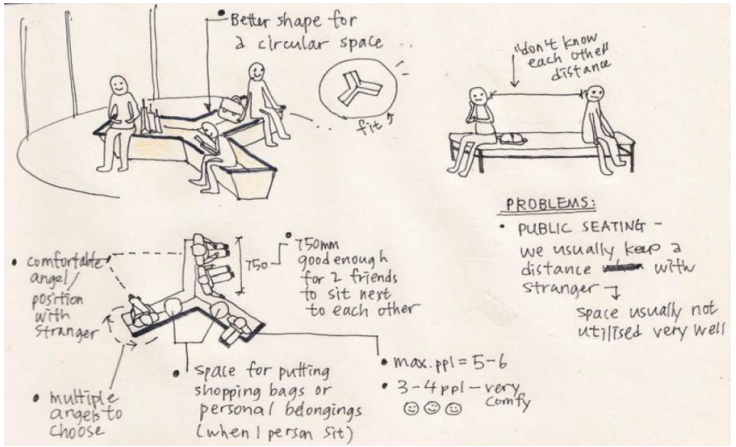
Reason:

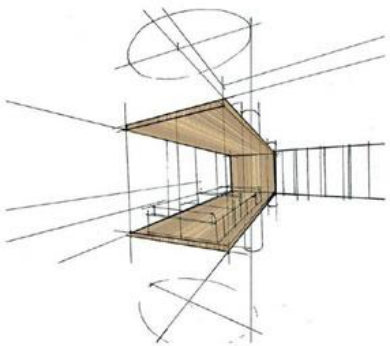
- Direct idea generation
- Only paper and pen
- Monitoring of the idea development
- Any time and anywhere

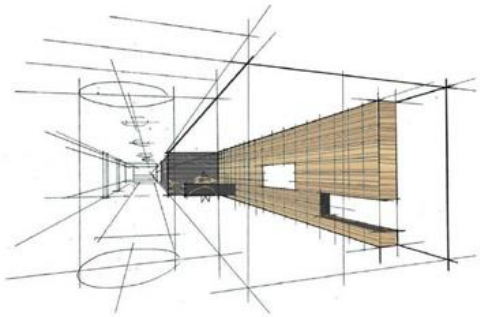


CONCEPT


travel


Better shape for a circular space
fits
don't know each other's distance
PROBLEMS:
• PUBLIC SEATING - we usually keep a distance with stranger
space usually not utilised very well
• comfortable angel/ position with stranger
750
750mm good enough for 2 friends to sit next to each other
• multiple angels to choose
• space for putting shopping bags or personal belongings (when 1 person sit)
• max. ppl = 5-6
• 3-4 ppl - very comfy





CONCEPT

Brainstorm

Expose yourself to new experiences

Meet new people

Welcome all ideas even bad ideas

Challenge established ideas

Reword the problem

Get someone else’s perspective

Try working from a new location

Go for a long walk, take a bath, go on holiday, sleep on it etc.

Alter your routine

CONCEPT

Follow industry experts on blogs and twitter

Revisit rejected ideas

Have a genuine interest in the area you are focusing on

Listen to different types of music – creating different moods and states

Meditate

Draw pictures instead of writing words

Put yourself in someone else's shoes and thinking space

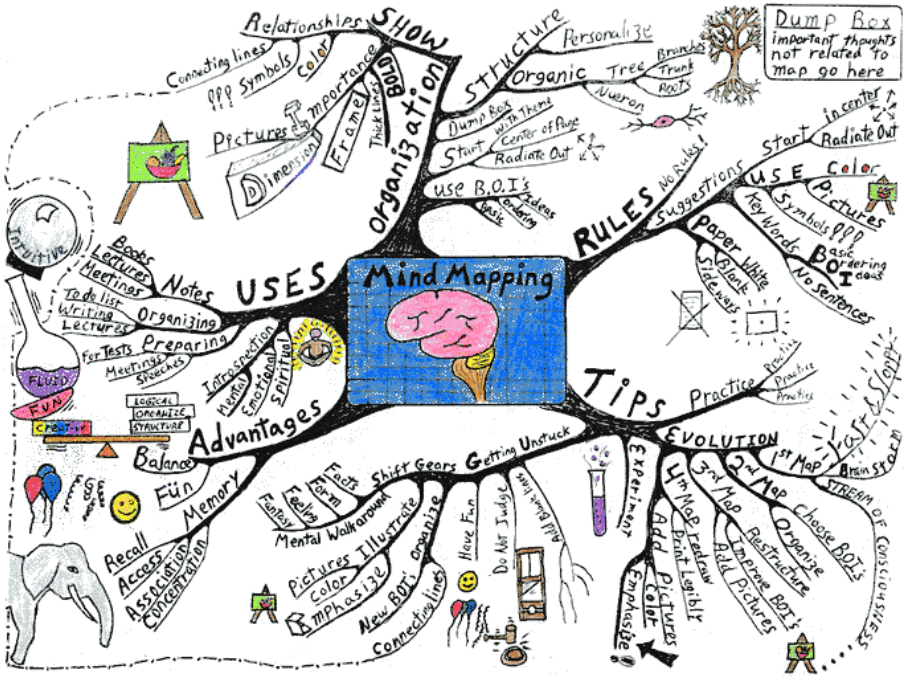
Hang out with people who are passionate about what they do

Ask a child

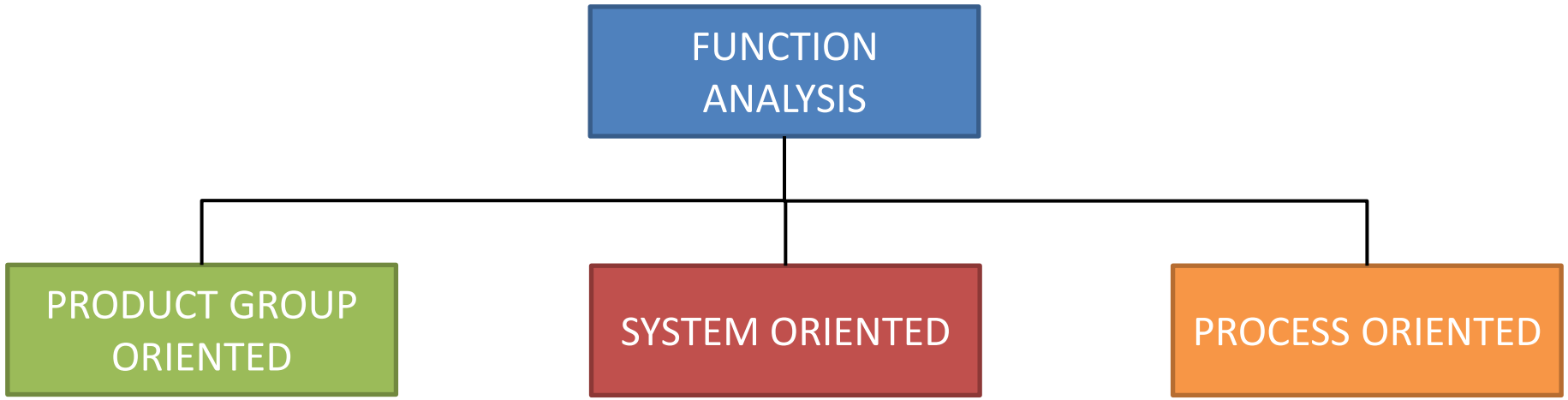
Buy a magic whiteboard

CONCEPT

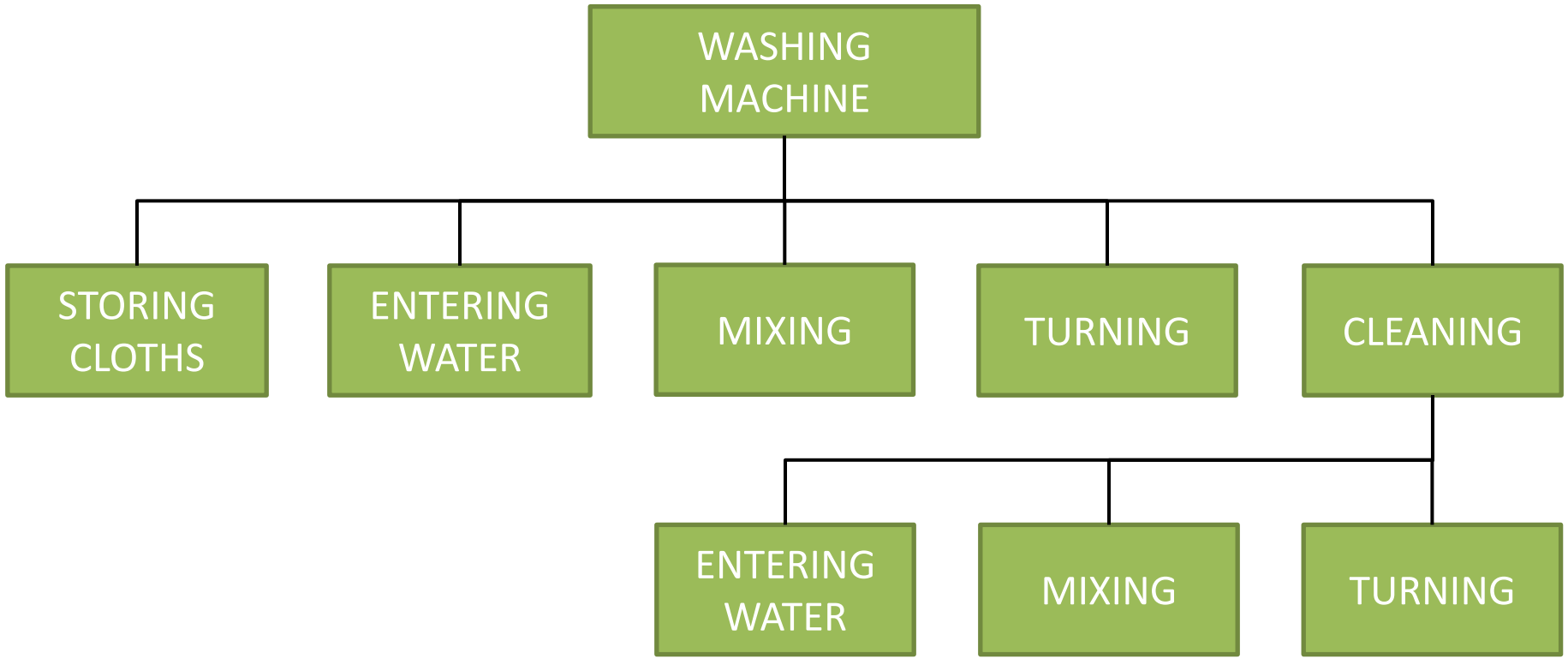
MIND MAPPING



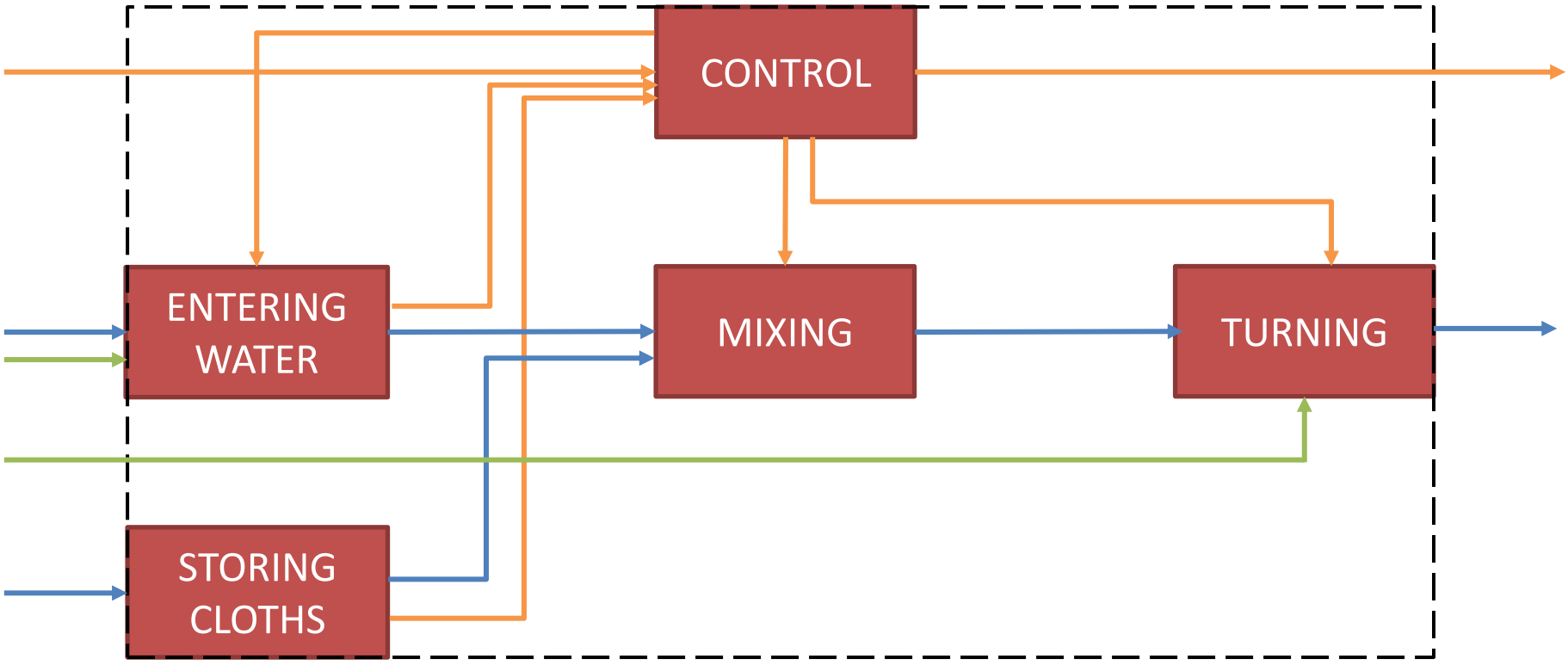
CONCEPT


FUNCTION ANALYSIS
PRODUCT GROUP ORIENTED
SYSTEM ORIENTED
PROCESS ORIENTED

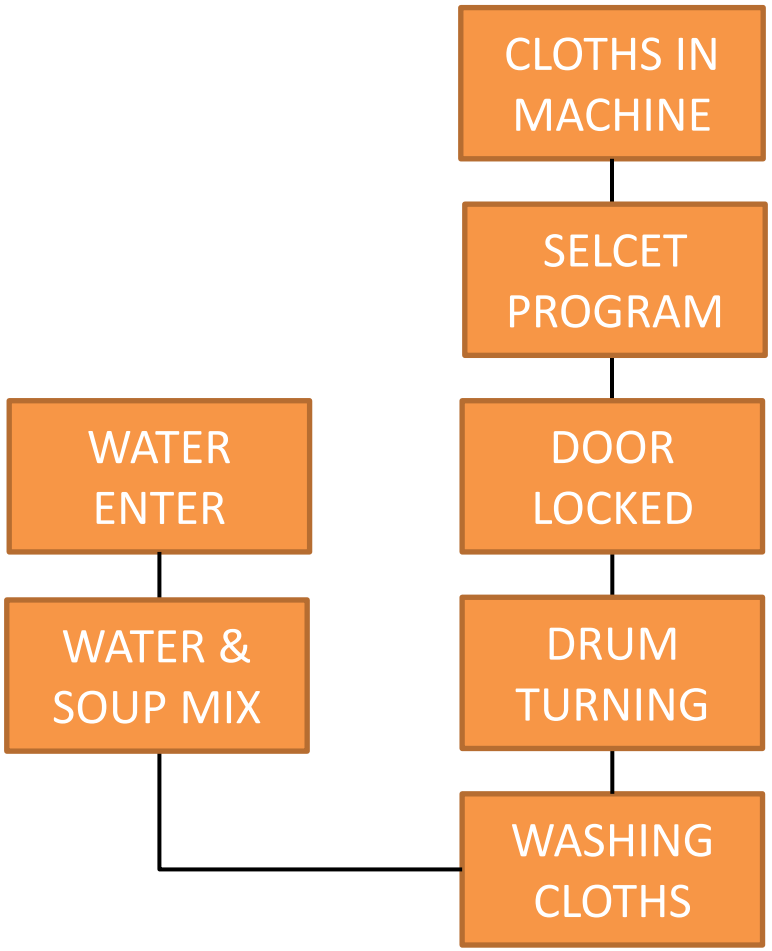
CONCEPT


WASHING MACHINE
STORING CLOTHS
ENTERING WATER
MIXING
TURNING
CLEANING
ENTERING WATER
MIXING
TURNING

CONCEPT



CONCEPT

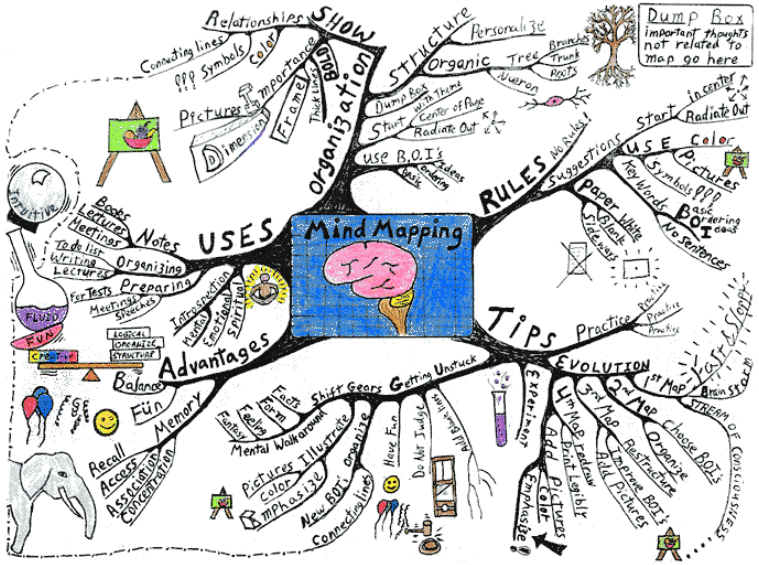

CLOTHS IN MACHINE
SELCET PROGRAM
DOOR LOCKED
DRUM TURNING
WASHING CLOTHS
WATER & SOUP MIX
WATER ENTER

CONCEPT

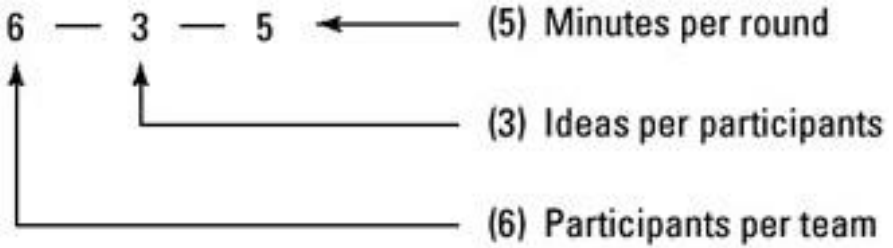
MORPHOLOGICAL BOX				
	WORKING PRINCIPLE 1	WORKING PRINCIPLE 2	WORKING PRINCIPLE 3	WORKING PRINCIPLE N
FUNCTION 1				
FUNCTION 2				
FUNCTION 3				
FUNCTION N				

CONCEPT

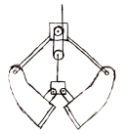
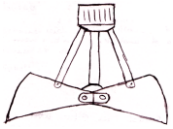
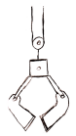
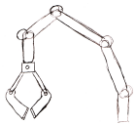
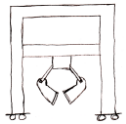
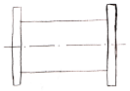
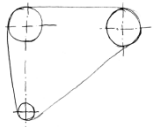
MIND MAPPING



6-3-5 METHOD



CONCEPT

MORPHOLOGICAL BOX				
	WORKING PRINCIPLE 1	WORKING PRINCIPLE 2	WORKING PRINCIPLE 3	WORKING PRINCIPLE N
OPEN/ CLOSE				
UP/ DOWN				
DRUM				
TRANS.				

CONCEPT

MORPHOLOGICAL BOX				
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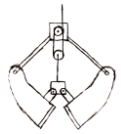
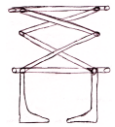
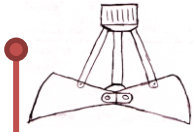
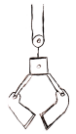
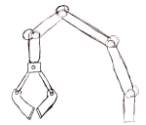
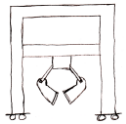
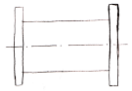
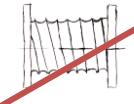
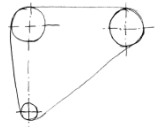
OPEN/ CLOSE				
UP/ DOWN				
DRUM				
TRANS.				

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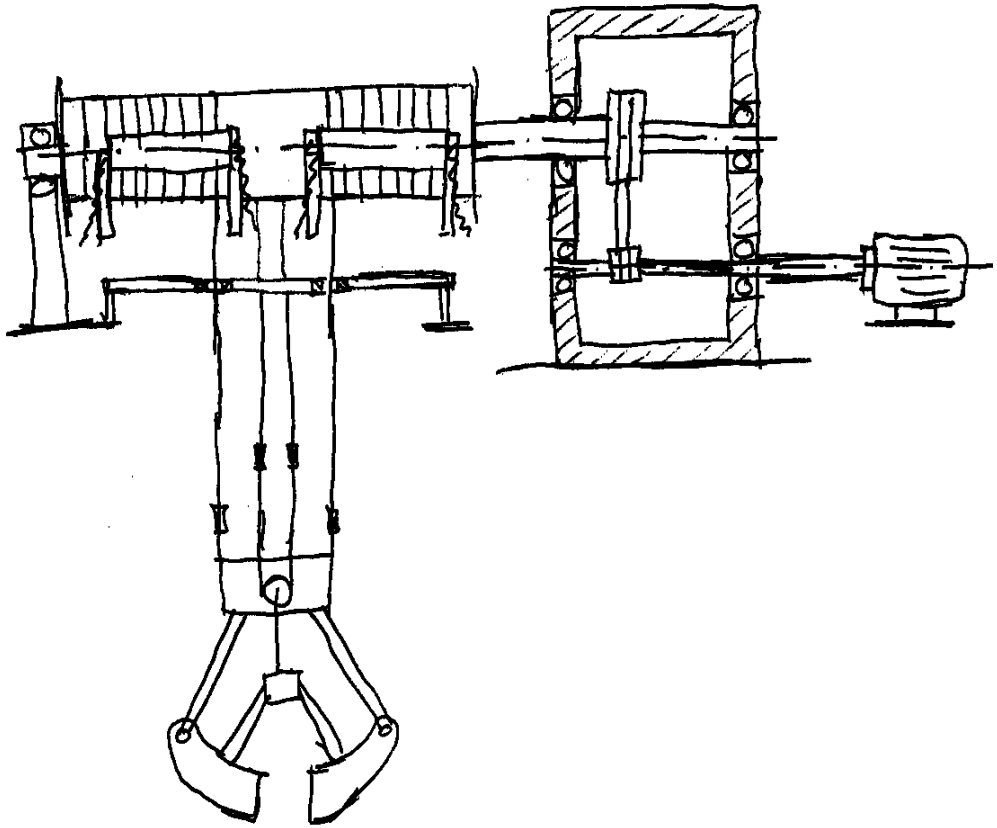

CONCEPT

YOUR TASK:

CREATE A MORPHOLOGICAL BOX BASED ON YOUR DESIGN REQUIREMENTS THAT FULLFIL ALL THE NEEDS OF IT.

STRATEGY:

USE MIND MAPING AND 6-3-5 METHOD TO CREATE FUNCUTIONAL STRUCTURES AND SOLUTION FOR EACH FUNCTION THAT YOUR PRODUCT NEED.

CONCEPT

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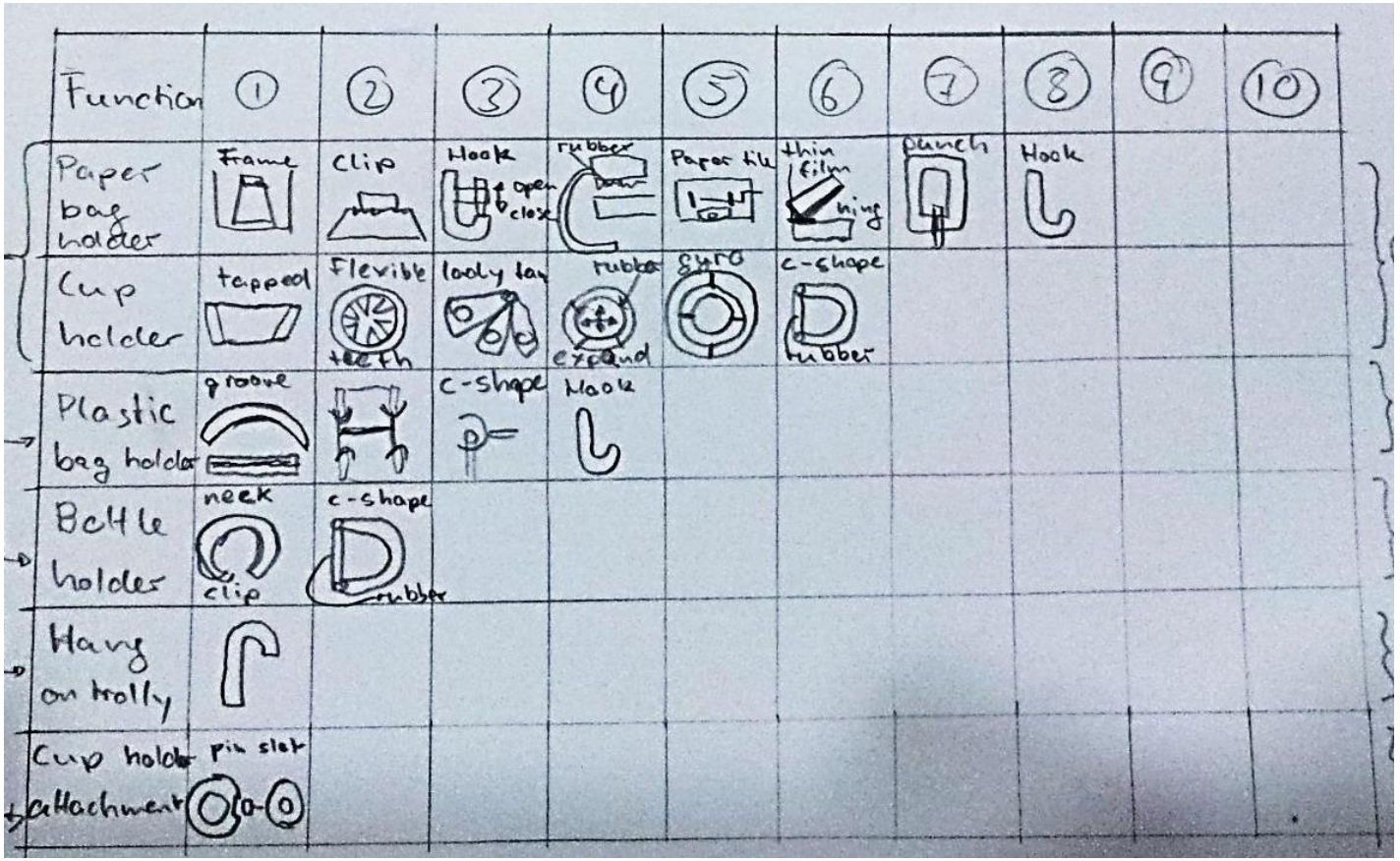
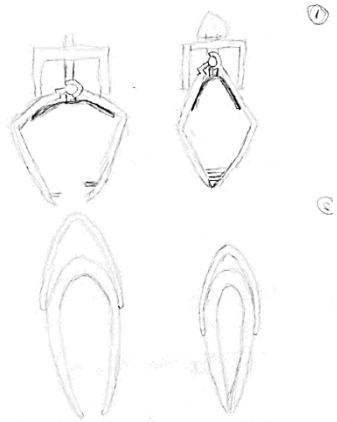
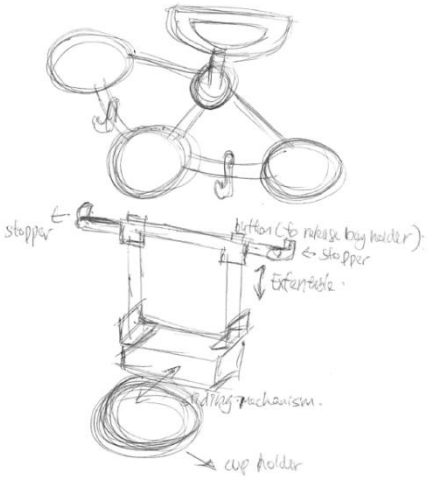
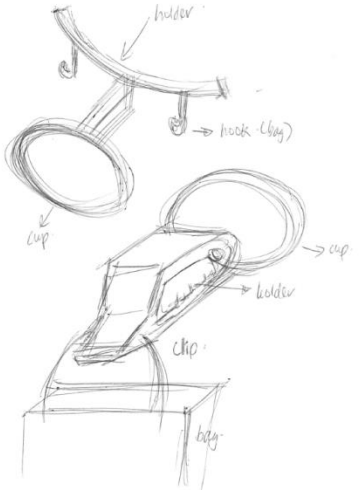
CONCEPT

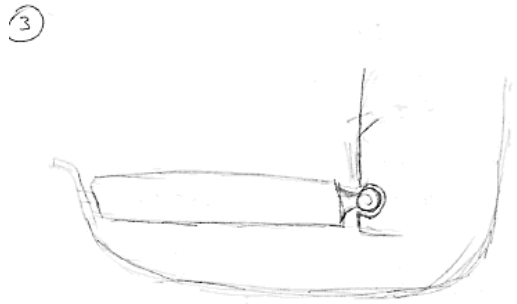

Function
1
2
3
4
5
6
7
8
9
10
Paper bag holder
Frame
Clip
Hook
rubber
Paper file
thin film
plunch
Hook
Cup holder
tapped
Flexible
teeth
rubber
expand
Hard
c-shape
rubber
Plastic bag holder
groove
c-shape
Hook
Bottle holder
neck
clip
c-shape
rubber
Hang on trolly
Cup holder attachment
pin slot

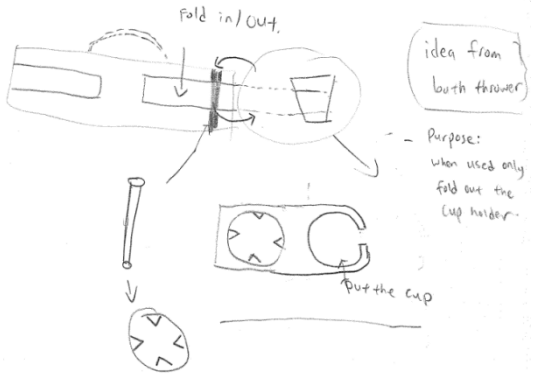
CONCEPT




stopper
button (to release bag holder)
stopper
extendable
cup holder

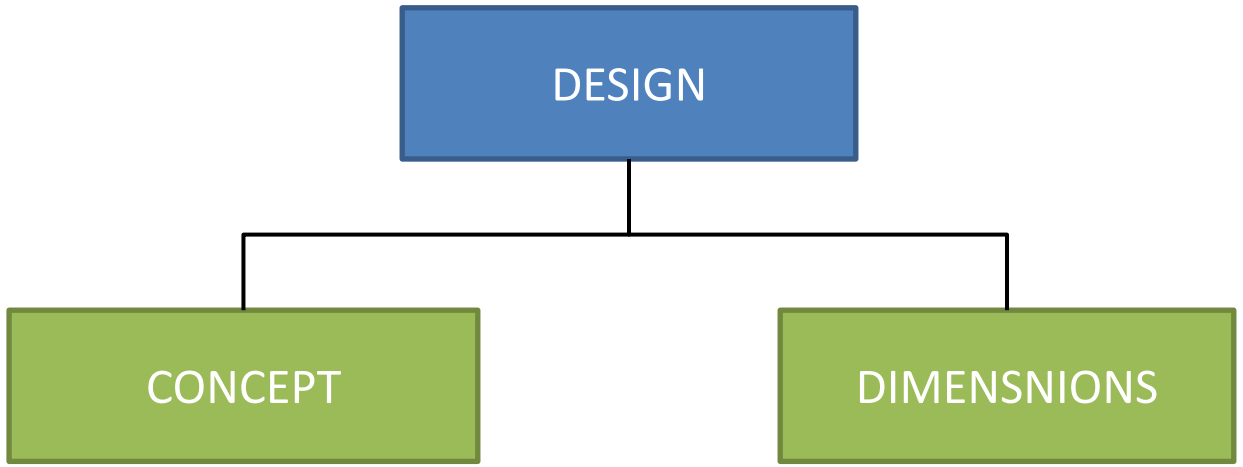

holder
hook (bag)
cup
cup
holder
chip
bag


3


fold in/out
idea from
bath thrower
- Purpose:
when used only
fold out the
cup holder.
put the cup

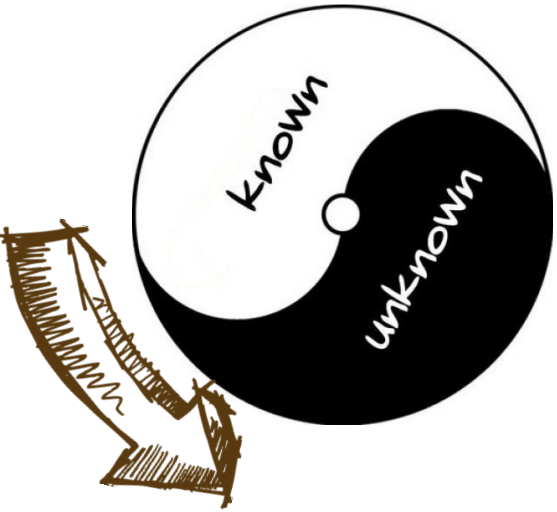
DESIGN

DESIGN

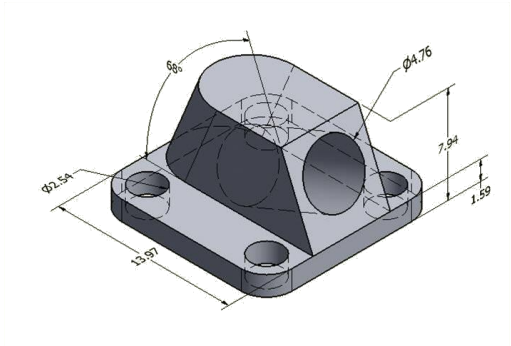


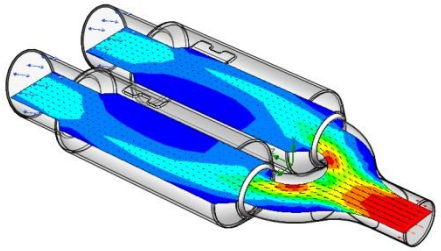
DESIGN

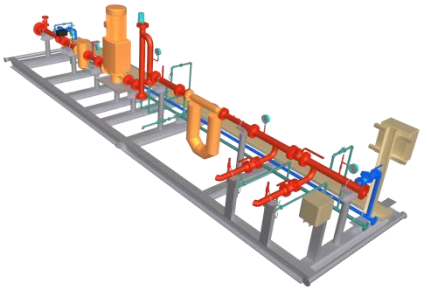
METHODIC OF DESIGN

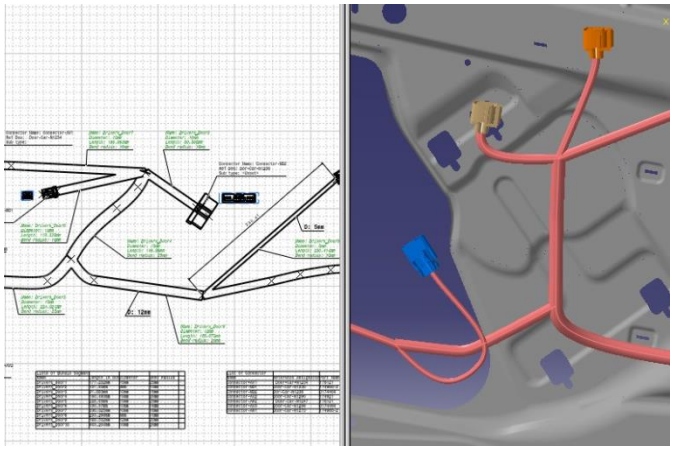


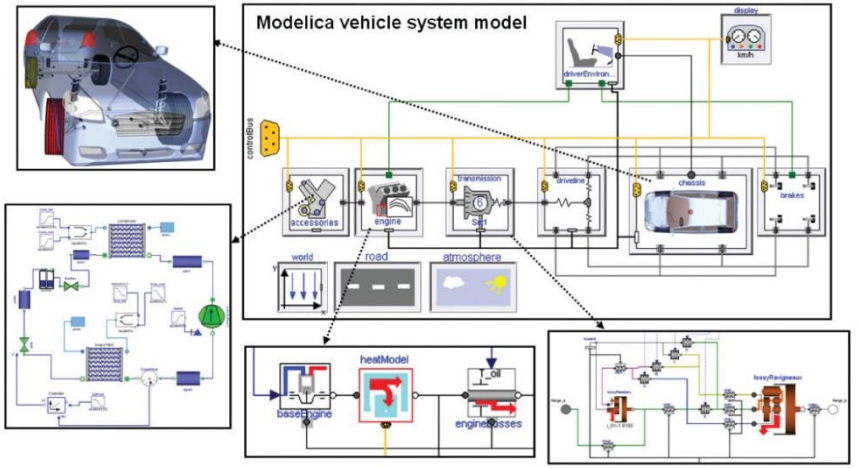
DESIGN


68°
Ø4.76
7.94
Ø2.54
13.97
1.59

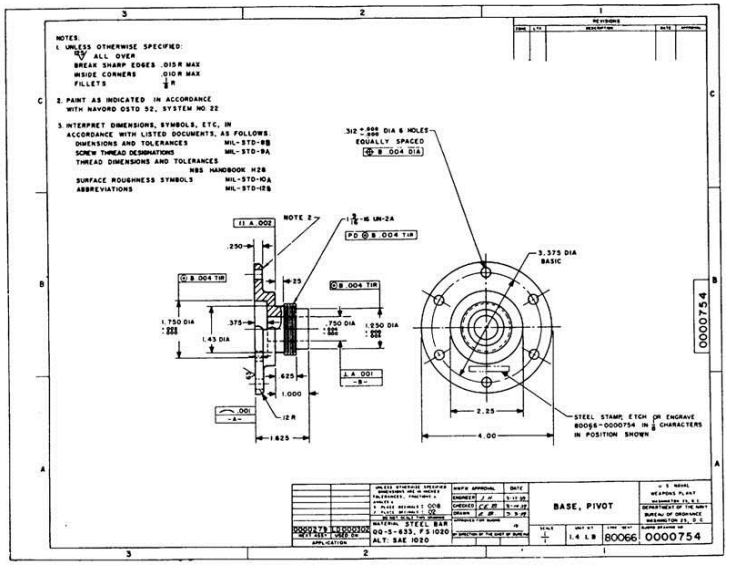







Modelica vehicle system model
accessories
engine
transmission
driveline
chassis
brakes
world
road
atmosphere
heatModel
baseEngine
engineLosses

DETAILING



BILL OF MATERIAL

ITEM NO.	DESCRIPTION	UNIT	ASSEMBLY OR FSN NO.	QUANTITIES	
				TROP	NORTH
1 – 1	[illegible]	EA.	[illegible]	1	1
1 – 2	[illegible]	EA.	[illegible]	1	1
1 – 3	[illegible]	EA	[illegible]	1	1
1 – 4	[illegible]	EA	[illegible]	2	2
1 – 5	[illegible]	EA	[illegible]	1	1
1 – 6	[illegible]	EA	[illegible]	1	1
1 – 7	[illegible]	EA	[illegible]	1	1
1 – 8	[illegible]	EA	[illegible]	1	1
1 – 9	[illegible]	EA	[illegible]	1	1
1 – 10	[illegible]	LB	[illegible]	1	1
1 – 11	[illegible]	EA	[illegible]	1	1
1 – 12	[illegible]	EA	[illegible]	1	1
1 – 13	[illegible]	EA	[illegible]	1	1
2 – 14	[illegible]	EA	[illegible]	1	1
2 – 15	[illegible]	EA	[illegible]	1	1
	[illegible]	EA	[illegible]	1	1

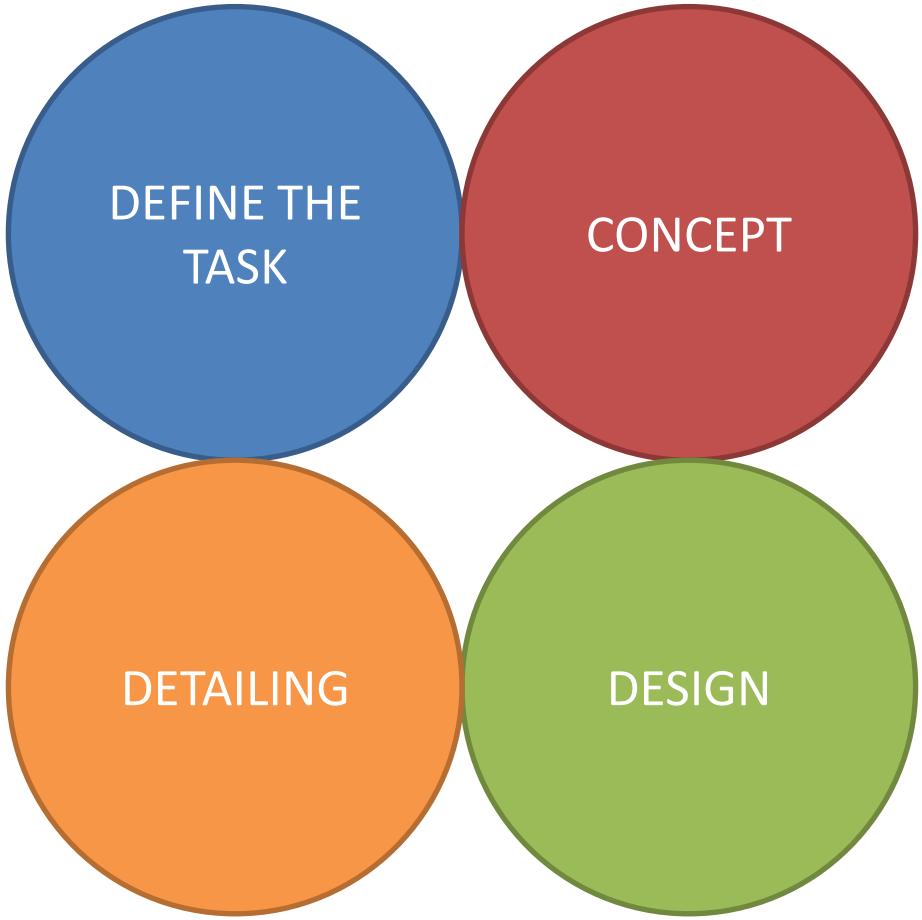
DMV2Ch01f41

DETAILING

Likelihood	Negligible	Minor	Marginal	Critical	Catastrophic
Near Certain	Low	Medium	High	High	High
Highly Likely	Low	Medium	Medium	High	High
Likely	Low	Low	Medium	Medium	High
Unlikely	Low	Low	Low	Medium	Medium
Remote	Low	Low	Low	Low	Low

Consequence

Design Methodologies



Thank You For Participating!

I'm Inspired