Project 1

Summer Internship

NIRMAL P J

176130009

Uravu

- URAVU is a non-government organization working with people, governments and businesses to implement programs for sustainable employment and income generation in rural areas.
- Uravu is a non-profit trust, established in 1996, registered under the Indian Trusts Act.
- Uravu promotes social enterprises based on value addition of local, natural resources, especially bamboo, the "green gold".
- Uravu implements integrated, end-to-end programs in the bamboo sector, which include providing skill training in bamboo processing, establishing micro enterprises, marketing of bamboo handicraft, cultivation of bamboo and promotion of eco-tourism.
- Uravu strives for empowering marginalized social groups, especially the traditional artisans, women and the Indigenous People.
- Uravu is located in Thrikkaipetta village in Wayanad district, Kerala state, South India.

ACTIVITIES OF URAVU

Skill Development

Establishing Micro Enterprises

Resource Enhancement and Eco Restoration: Bamboo Nursery

Kalpetta Bamboo Cluster Program

Marketing rural products

Uravu Eco Links

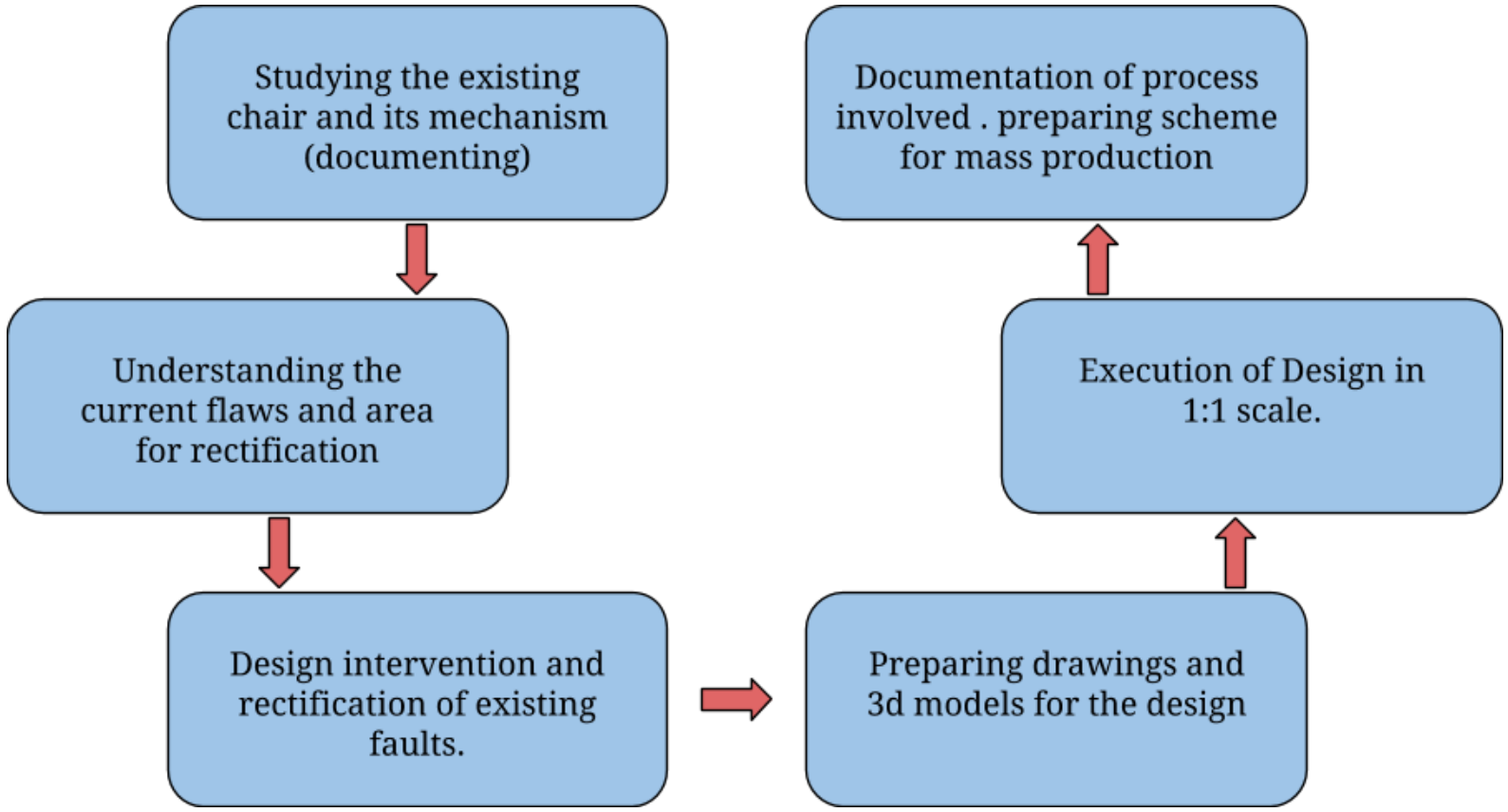
DESIGN BRIEF

The brief was to recreate the existing chair design by analysing the present flaws and rectifying it, creating a detailed documentation of the process and material involved in making of the chair.

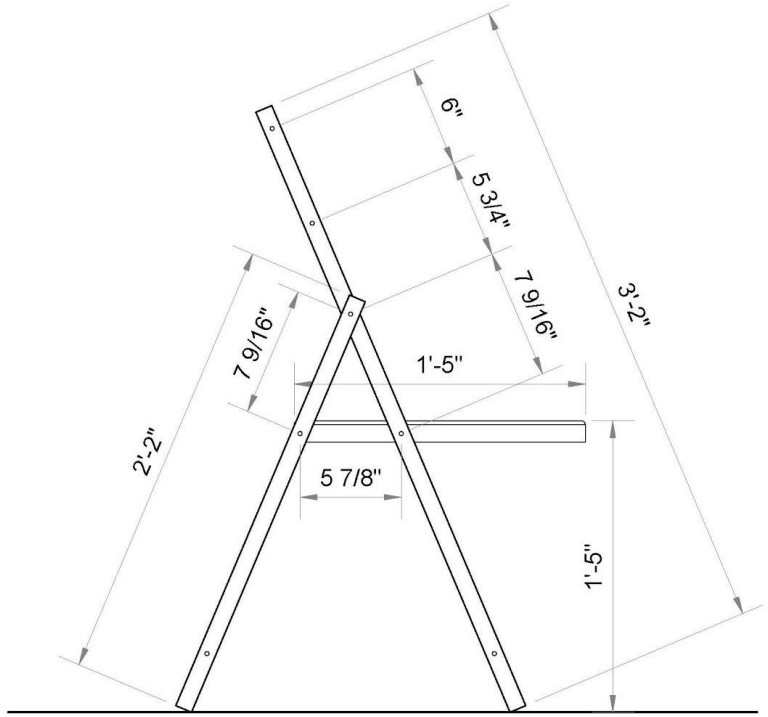
USER REQUIREMENTS

Their requirements was to quantify the material requirements, labour , time and machines required for the manufacturing of the chair and to create a scheme for the production of the chair when it comes to mass manufacturing.

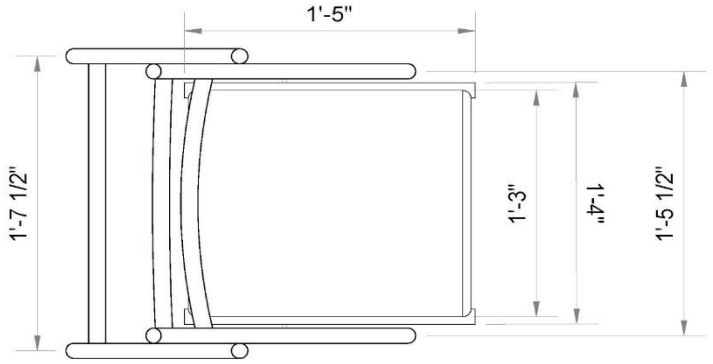
DESIGN METHODOLOGY



EXISTING CHAIR DOCUMENTATION

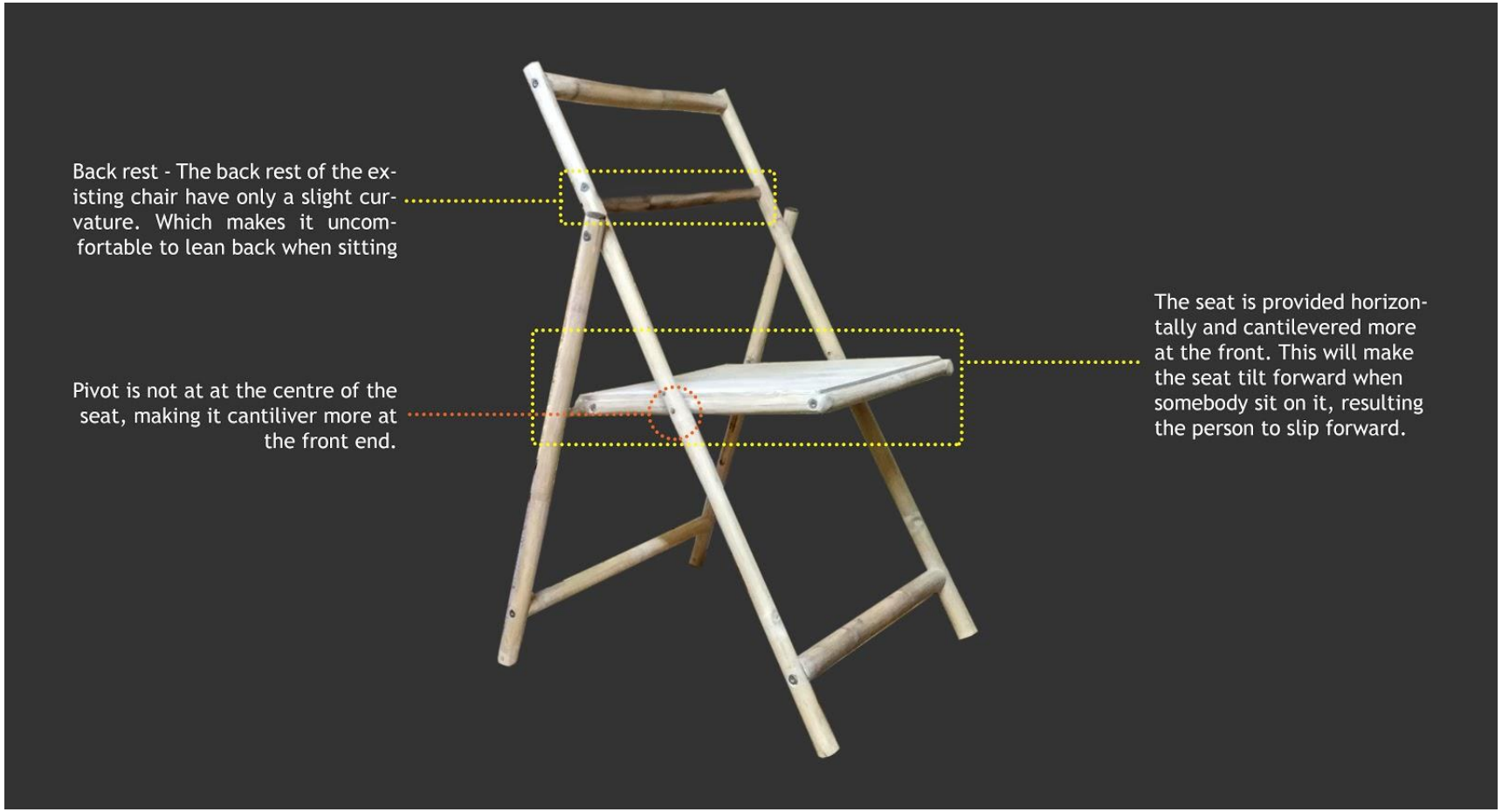


SIDE ELEVATION

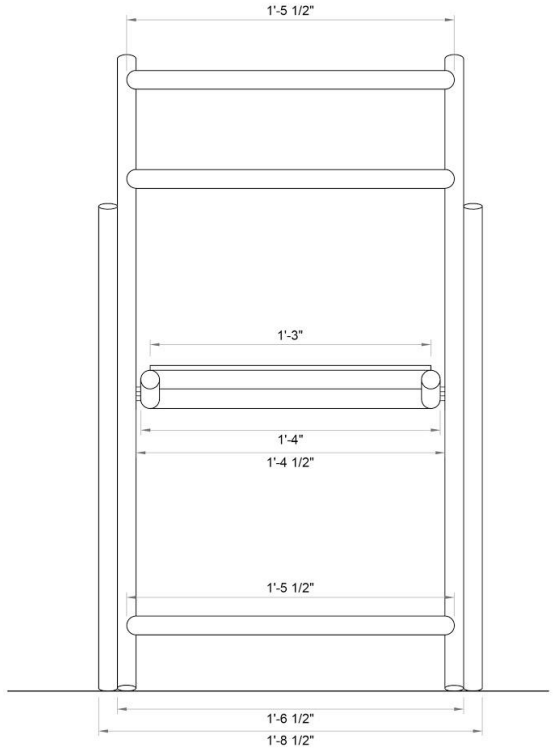


PLAN

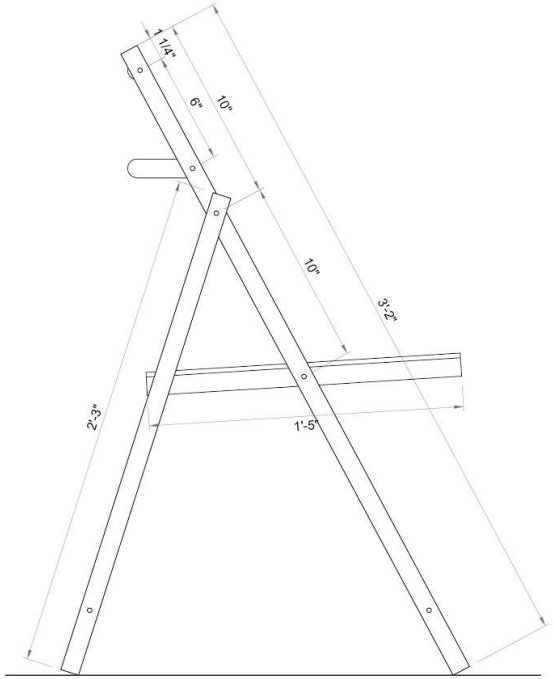
EXISTING CHAIR - PROBLEM IDENTIFICATION



CHAIR DESIGN 1 - CAD DRAWINGS AND 3D VIEWS



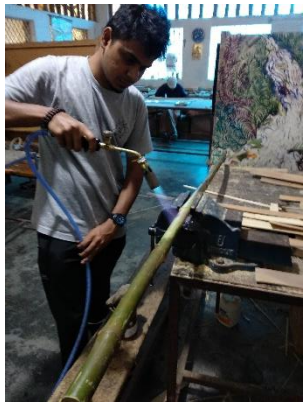
CHAIR **1** - FRONT VIEW



CHAIR **1** - SIDE VIEW

MAKING PROCESS - CHAIR 1

Sticking Gigantus bamboo reapers to make the seat

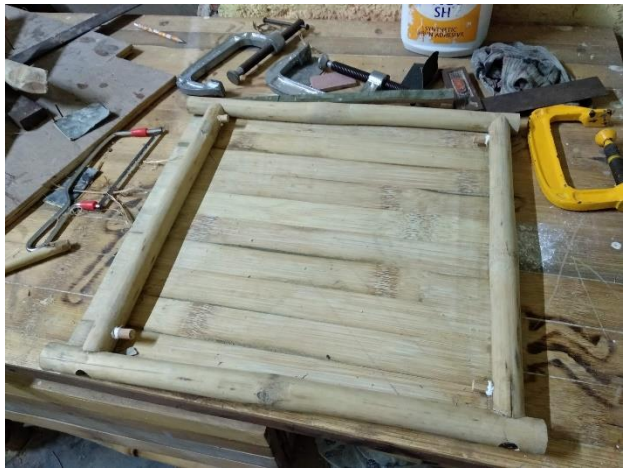


Straightening the strictus pieces using an LPG blow torch

Scraping the surface of the bamboo using a knife

Cleaned up Strictus pieces

Finishing the seat piece using an angle grinder and then using sand paper

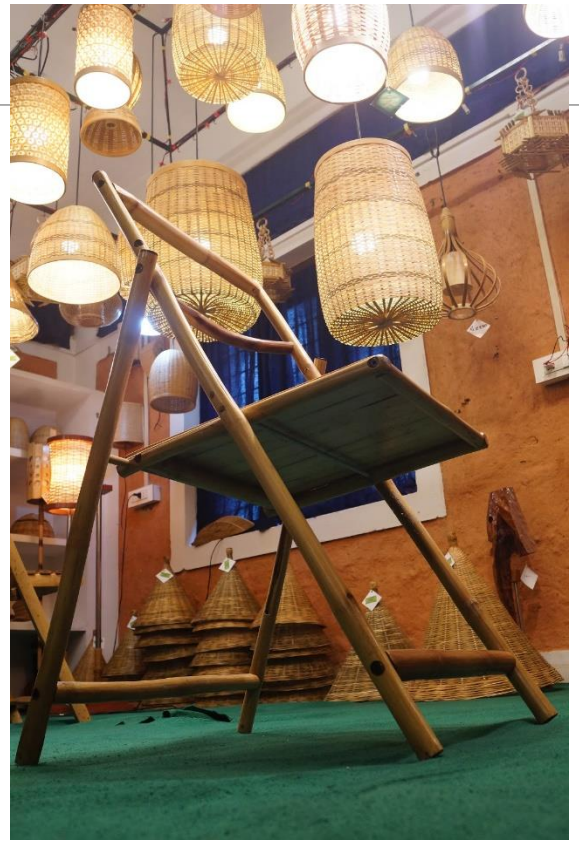


Assembling the seat piece to the strictus frame

Final assembly of the seat and leg pieces

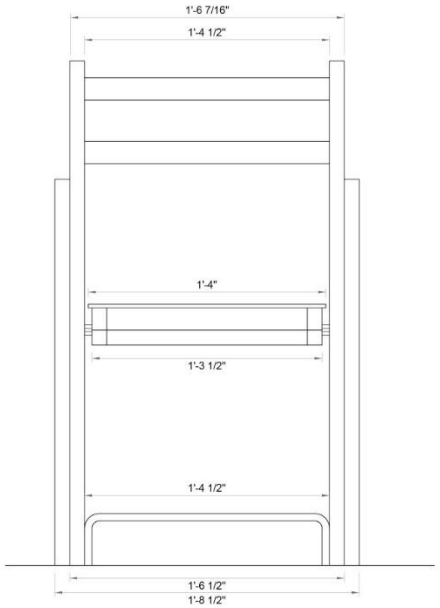
Final sanding and finishing

Photos of finished chair after polishing

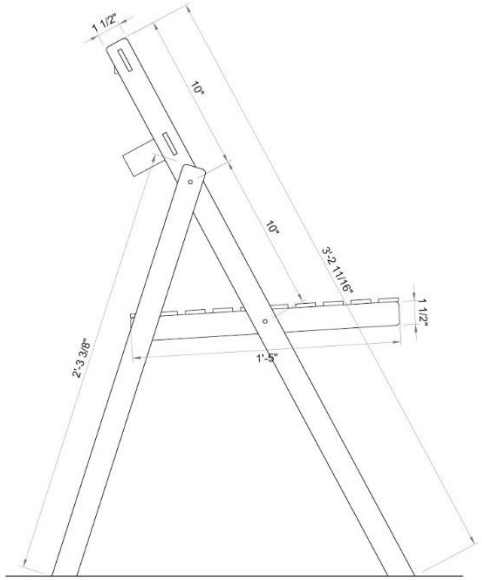


Photos of finished chair after polishing

CHAIR DESIGN 2 - CAD DRAWINGS AND 3D VIEWS



CHAIR 2- FRONT VIEW



CHAIR 2- SIDE VIEW

MAKING PROCESS - CHAIR 2

Scraping the surface of the gigantus bamboo reapers using a knife

Scraped reaper pieces for the seat

Making template to bend backrest

Charring the seat pieces and the backrest pieces using a blowtorch

Sticking and nailing two one-side reapers to make leg pieces

Bending the reapers using hot air gun

Finished pieces before assembly

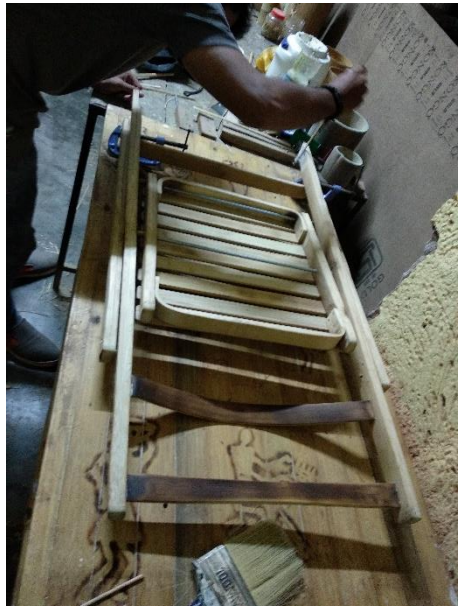
Assembling the seat frame

Finishing the frame using an angle grinder

Trial assembly of chair

Nailing the seat panels to the frame




Various stages of assembly



Photos of finished chair after polishing



Photos of finished chair after polishing

Photos of finished chair after polishing

Design 1			
Item	**Process**	**Time**	**Total time**
Seating			
Day 1			
Making panel	Sanding and plaining	2:00 hours	2:30 hours
	Sticking and clamping	0:30 hours	
	Drying	over night	
Framework	Straightening	0:30 hours	3:35 hours
	Scraping top Surface	0:30 hours	
	Cutting	0:15 hours	
	Marking , carving ends	0:20 hours	
	Drilling and counter sinking	1:00 hours	
	Assembling framework	0:30 hours	
	plaining the top of the frame	0:30 hours	
Day 2			
Making panel	Sanding and plaining	1:00 hours	2:00 hours
	Rounding the ends	0:15 hours	
Full Assembly	Gluing Panelling on to the mainframe	0:30 hours	
Main Members			
Day 1			
Legs, Footrest and Backrest	Straightening	1:30 hours	8:00 hours
	Scraping top surface	1:30 hours	
	Cutting	0:20 hours	
	Topping with Coconut shell	1:00 hours	
	Bending backrest	0:30 hours	
	Carving ends for fitting	1:00 hours	
	Marking, Drilling holes and countersinking	2:00 hours	
Day 2			
Final Assembly	Marking channel with router	0:45 hours	6:45 hours
	Nailing, drilling etc.	4:00 hours	
	Sanding	2:00 hours	
Day 3			
	Polishing and sanding		

Materials	Quantity
1" dia strictus	22' 4 1/2"
1 1/2" wide, 1/4" thick gigantus reaper (two side plained)	13' 9"
Alen head bolt and D-nut	14 nos each
8mm metal road	3'1"

Design 2			
Item	**Process**	**Time**	**Total time**
Seating			
Day 1			
Framework	Straightening	0:30 hours	6:10 hours
	Cutting	0:30 hours	
	Sticking, drilling, nailing and clamping	2:00 hours	
	Drying	over night	
	Bending - Second member	0:40 hours	
	Scraping and cutting	0:30 hours	
Panel	Cutting	0:20 hours	
	Edge rounding	0:20 hours	
	Colouring (burning)	0:30 hours	
Day 2			
Assembly			
Main frame	Sanding, nailing and gluing	2:30 hours	5:00 hours
Panelling	Marking, drilling, Nailing and gluing	2:30 hours	
Main members			
Day 1			
Legs, Footrest and Backrest	Straightening	1:30 hours	7:20 hours
	Cutting	0:30 hours	
	Sizing and Sanding	2:30 hours	
	Sticking and clamping	1:00 hours	
	Drying	over night	
	Bending back rest and leg rest	1:00 hours	
	scraping	0:30 hours	
	Colouring (burning)	0:20 hours	
Day 2			
Legs, Footrest and Backrest	Drilling and Nailing	2:00 hours	8:00 hours
	Cutting and sanding	2:00 hours	
	Cutting angle , edge levelling	2:00 hours	
	Drilling, making channels with router	2:00 hours	
Day 3			
Full Assembly	Bending back rest and leg rest	0:30 hours	8:00 hours
	Drilling holes to fix Backrest	1:00 hours	
	Cutting metal rods	0:30 hours	
	Grinding, drilling, nailing, clamping	6:00 hours	
	Drying	over night	
Day 4			
	Polishing and Sanding		

Materials	Quantity
1 1/2" wide, 1/2" inch thick gigantus reaper (one side plained)	35'2"
1 1/2" wide, 1/4" thick gigantus reaper (one side plained)	3' 2 1/2"
1 1/4" wide, 1/4" thick gigantus reaper (one side plained)	13' 4"
8mm metal rod	3'1"
Alen head bolt and D-nut	2 nos each

Time and Material requirements

CHAIR DESIGN 1 - USING STRICTUS		
PARTS	**Materials:**	**Processes:**
LONG LEGS - 2 Nos		
	1 Inch dia strictus	**1. Straitening :** the bent of the strictus is straightened by heating and bending. **2. Drilling:** cut it into the specific dimensions and mark the positions for the metal rod and bolts and drill holes. Make counter sink holes where the bolts come. **5. scraping and Finishing:** once the holes are drilled, scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.
SHORT LEGS - 2 Nos		
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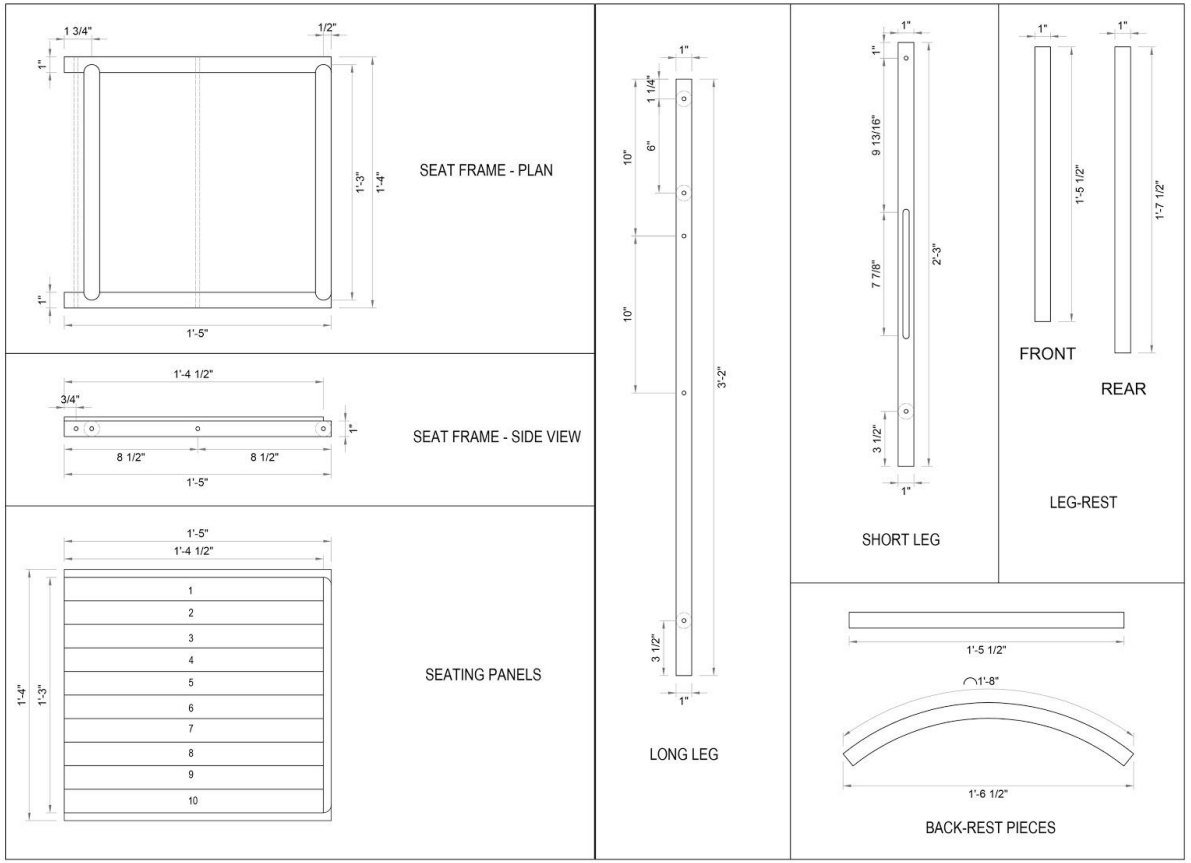
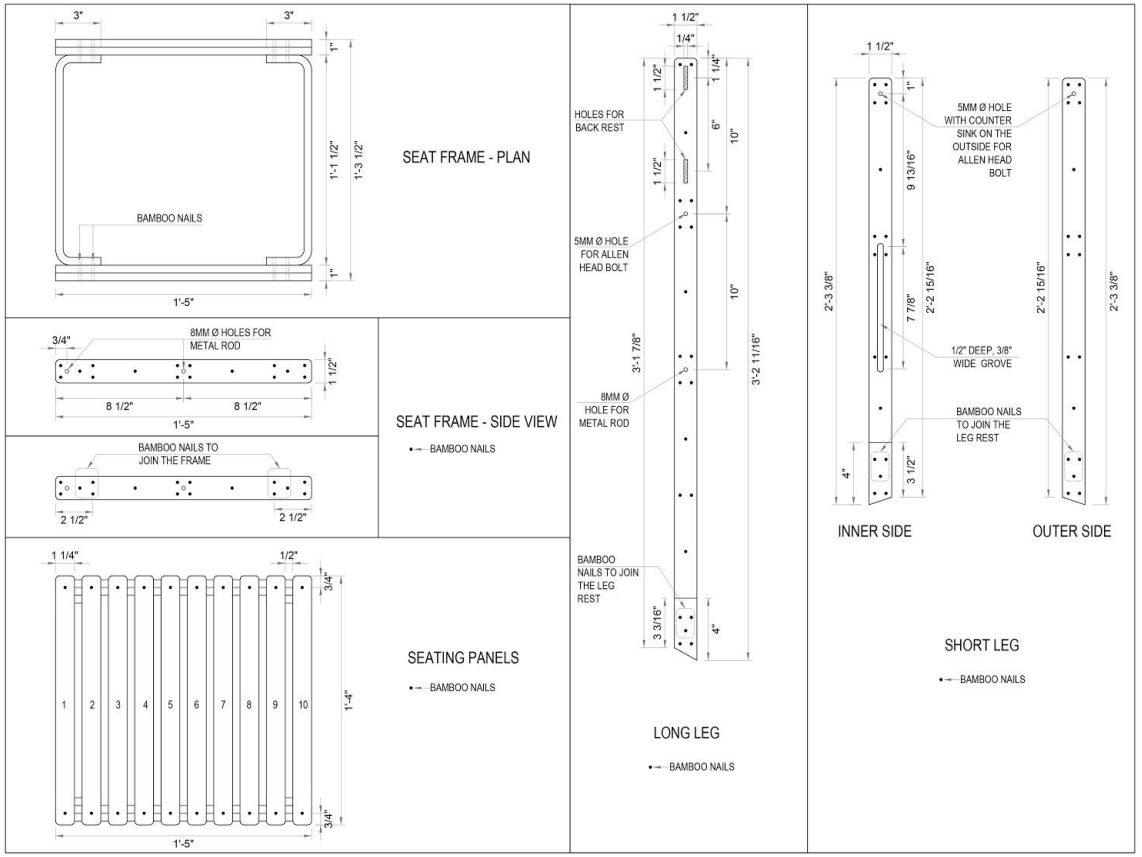
LEG REST - 2 Nos		
	1 Inch dia strictus	**1. Straitening :** the bent of the strictus is straightened by heating and bending. **2. Drilling:** cut it into the specific dimensions and mark the positions for the metal rod and bolts and drill holes. Make counter sink holes where the bolts come. **5. scraping and Finishing:** once the holes are drilled, scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.
BACKREST - 2 Nos		
	1 Inch dia strictus	**1. Straitening and bending :** the bent of the strictus is straightened by heating and bending. the pieces which need bend is further bent by heating process. **2. Drilling:** cut it into the specific dimensions and mark the positions for the metal rod and bolts and drill holes. Make counter sink holes where the bolts come. **5. scraping and Finishing:** once the holes are drilled, scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.

CHAIR DESIGN 2 - USING GIGANTUS		
PARTS	**Materials:**	**Processes:**
LONG LEGS - 2 Nos		
	Gigantus bamboo reaper - One side plained .5 inch thick	**1. Sticking:** Take two pieces of gigantus bamboo reapers slightly larger than than the specified dimensions and stick them together. **2. Clamping and Drying:** Clamp them together at various points to get a good adhesion and let it dry. **3. Nailing:** Once dried, drill holes and nail them together using bamboo nails and glue at the specified points and let it dry. **4. Drilling:** Once the nails dried, cut it into the specific dimensions and mark the positions for the metal rod and bolts and drill holes. Make counter sink holes where the bolts come. **5. scraping and Finishing:** once the holes are drilled, scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.
SHORT LEGS - 2 Nos		
	Gigantus bamboo reaper - One side plained .5 inch thick	**1. Sticking:** Take two pieces of gigantus bamboo reapers slightly larger than than the specified dimensions and stick them together. **2. Clamping and Drying:** Clamp them together at various points to get a good adhesion and let it dry. **3. Nailing:** Once dried, drill holes and nail them together using bamboo nails and glue at the specified points and let it dry. **4. Drilling:** Once the nails dried, cut it into the specific dimensions and mark the positions for the metal rod and bolts and drill holes. Make counter sink holes where the bolts come. **5. scraping and Finishing:** once the holes are drilled, scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.
LEG REST - 2 Nos		
	Gigantus bamboo reaper - One side plained .5 inch thick	**1. Bending:** using heating process, the bamboo reaper is bent to the desired dimension . **2. scraping and Finishing:** scrape and clean the surfaces using a knife and a grinder and then finish it with sand paper.
BACKREST - 2 Nos		
	Gigantus bamboo reaper - One side plained .25 inch thick	**1. Bending:** using heating process, the bamboo reaper is bent to the desired dimension . **2. scraping and Finishing:** scrape and clean the surfaces using a knife and a grinder . **3. Burning(colouring)** : using gas blower the back rest pieces are given a darker shade.

Detailed process report





Chair details

REFFERENCES

http://www.uravu.net/

Thank you