Assignment 3: Conceptual Design

Problem Statement:

- Purpose: The purpose of my design is to help utilize the limited space in my small kitchen.
- Requirements: The design my be easy to use by myself and all my roommates, must be compact, made to be durable, relatively inexpensive, and easy to assemble and disassemble.

Assumptions About the Problem:

1) My kitchen has limited space, therefore the design must be compact and purely useful
2) Design will be constantly used, so it must be durable

Decision Matrix:

Relative Weights	Evaluation Criteria	Alternatives					
		Spice Rack		Shelf		Utensil Holder	
		Rating	Score	Rating	Score	Rating	Score
30%	Compact	3	0.90	3	0.60	4	1.20
15%	Easily Manufactured	3	0.45	5	0.75	5	0.75
15%	Inexpensive	4	0.60	4	0.60	4	0.60
20%	Ease of Use	5	1.00	5	1.00	5	1.00
20%	Durability	5	1.00	5	1.00	3	0.60
100%			3.95		4.25		4.15

Based on the decision matrix, the best option fitting my design requirements is the shelf.

FRDPARRC:

FR	DP	A	R	R	C
Rotation	About center axis	P=Tw	https://byjus.com/physics/kinematics-rotational-motion-around-fixed-axis/	Rotation gets jammed	Design tracks to make smooth sliding surface
Translation	Shelf pullouts	P=Tw Shear/Bending of shelves	https://byjus.com/physics/sliding-friction/	Friction	Keeps shelf light, design with coefficient of friction in mind.
Translation	Shelf rollers	P=Tw Shear/Bending of shelves	http://www.animations.physics.unsw.edu.au/jw/rolling.htm	friction	Keeps shelf light, design with coefficient of friction in mind.

Rotation: For the rotational shelf, it will be three tears with a center dowel as an axis point. In order for the shelves to spin around the center dowel, there will be threads made into the dowel for the shelf to spin around.

Translation through shelf pullouts: Will have a track for the shelf to slide in and out of.

Translation through shelf rollers: Will utilize wheels for the shelf to slide in and out of position.

Lessons Learned:

- A decision matrix makes the design process easier to accomplish and will yield a design that better fits the parameters emplaced.
- The physic mechanics of translational sliding and how I must design with friction in mind.

Comments to Advisee:

- Use a FRDPARRC chart to clearly show multiple solutions
- Include more detailed schematics of your design, include possible physics equations that will be used
- Update Gantt chart to fit current Assignment