

Antoine Rocha
M.O.T 1 HW#5

Homework #5

Schedule:

Review the homework -(5 minutes)

Brainstorm-(5 minutes)

Work on structure problem solving (120 minutes)

Define the problem (5 minutes)

Plan the treatment of the problem(10 minutes)

Execute the plan(30 minutes)

Check your work(10 minutes)

Learn and generalize(20 minutes)

Total time (200 minutes)

1. Specialized Bike Company (SBC)

Define the Problem:

Discover why SBC developed the HOQ.

Support your claim by providing at least three main reasons why they would do so.

Identify one way in which SBC would use the HOQ.

Plan the Treatment:

Fully read the questions to have a clear understanding of what is being asked and what I will be looking for in the text.

Read the chapters in the book

Take notes and highlight important sections

Utilize the notes taken in class and apply them to the problem.

Execute:

- What is Quality Function Deployment: a method to transform user demands into design quality, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and components parts, and ultimately to specific elements of the manufacturing process.
- House of quality: a diagram resembling a house, used for defining the relationship between customer desires and the firm/product capabilities.
- Reasons why SBC developed the HOQ.

Reason:	Example:
To increase the value of the mountain bike market, SBC wanted to produce a front suspension fork. The HOQ enabled the team to work efficiently and become more confident in their work; ultimately, allowing them to gain a substantial share of the suspension fork market.	<ul style="list-style-type: none"> Company addresses the customer needs of a lightweight bicycle The company focuses on every detail to ensure that the customer needs and wants are satisfied
HOQ creates an efficient method in which the company can focus on specific details that the customers want fixed. Overall, this process allows the technicians to adjust process progression after the metrics are accounted for.	<ul style="list-style-type: none"> Competitive benchmarking includes ST Tritrack (\$65), Maniray 2(\$105) and more. SBC follows a series of steps to reach target specifications to create an affordable bike that enthusiasts would enjoy.
HOQ takes subjective customer needs and uses it to create a more precise and effective process to guarantee the overall success of the product.	<p>SBC answers customer needs by using technical metrics. For example.</p> <p>Customer wanted more comfortable handlebars so SBC created a product that had a reduced vibration of 10 Hz after testing</p> <ul style="list-style-type: none"> Created more lightweight bikes

What is one way SBC would use HOQ ?

- Based off the situations in the book, it seems obvious that SBC would use HOQ to identify its customer needs, which will help them set up their target specifications and finalize specifications thus producing high quality products.

Check your work:

- Since my work has been based off the notes taken in class and directly from the book, my assumptions should be represented realistically to the problem

Learn and Generalize:

- QFD/HOQ is effective method of approaching problems in which companies must address customer needs. In addition, technological products have many aspects that are important for companies to create HOQ to ensure that they can address problems in terms of technical metrics.

2. Quality Function Development: The “perfect” humane mousetrap

Define the problem

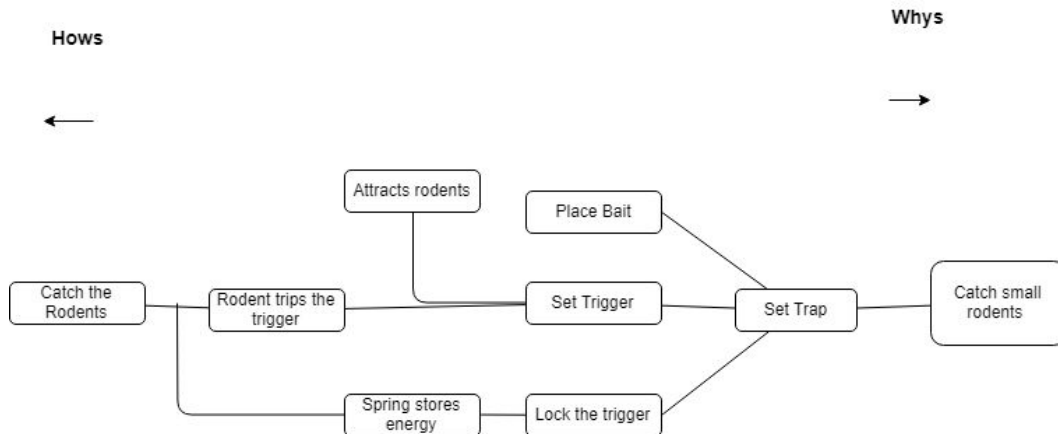
- How does a mousetrap function?
- Develop a HOQ for the mousetrap and how it'll help with development of the “perfect” mousetrap

Plan the Treatment of the Problem

- Find schematics for the mousetrap to determine what qualities define a mousetrap
- Create a FAST diagram to dissect the mouse trap.
- Create a HOQ for the mousetrap
 - How does this help with the development for the perfect mousetrap?

Execute the Plan

Dissect the mousetrap (FAST Diagram)



House of Quality

1. Make a structured and prioritized list of the customer needs for the mousetrap

Primary	Secondary	Tertiary
<ul style="list-style-type: none">• Reliability (ability to catch rodents)	<ul style="list-style-type: none">• Catches rodents efficiently	<ul style="list-style-type: none">• Rodents can't escape
<ul style="list-style-type: none">• Humane	<ul style="list-style-type: none">• Doesn't harm the rodent• Allows for easy release by user• No chemicals	<ul style="list-style-type: none">• Guarantees safety of the user• Edible bait
<ul style="list-style-type: none">• Set up	<ul style="list-style-type: none">• Small & compact• Simple	<ul style="list-style-type: none">• Fits into tight spaces• Quick

Criteria	Importance
Mouse cannot escape	10/10
Bait does not contain chemicals	10/10
There is no pain to the mouse	10/10
Mess free	6/10
No harm to user	9/10

2. Make a list of “technical metrics” and assess the importance of each metric

	Energy to trap (nm)(TM1)	Energy to exert pain (N)(TM2)	Chemical repercussion (TimeTM3)	Peak to set trap up (NM)(TM4)	Surface area (CM)(TM5)
Importance	8/10	7/10	10/10	8/10	7/10

3&4. Determine the correlation between the customers needs and the technical matrix using a convenient scale, the result is a correlation matrix.

	TM1	TM2	TM3	TM4	TM5	TM6
TM1	+					
TM2	+	+				
TM3	X		+			
TM4	X	+	+	+		
TM5	X	+	X	+	+	
TM6	X	X	X	X	X	+

5. Competitive benchmarking

a. Assess the comperring products from the viewpoint of customers

<u>Customer Need</u>	<u>US</u>	<u>Sticky</u>	<u>Clasp</u>
Bait not poisonous	10	10	10
No pain for mouse	9	10	2
Mouse can't escape	8	6	10
Size of the trap	7	7	7
Mess Free	6	9	7
Easy to use	9	9	6
Feasibility of release mouse	7	6	7

- b. Assess these products from a technical standpoint

<u>Customer Need</u>	<u>US</u>	<u>Ipod</u>	<u>cassette</u>
Energy to trap	N/A	0	~0
Energy to pain	N/A	N/A	1NM
Chemicals	N/A	High	Low
Peak to set up trap up	0	0	5
Surface Area	10cm	20cm	25cm

6 Use the HOQ to set targets for the customer needs and targets for the technical specifications to compete the HOQ.

1. Target Customer Specification

<u>Customer Need</u>	<u>Importance</u>
Bait not poisonous	10/10
Painless death for mouse	9/10
Size of Trap	10/10
Mess Free	7/10
Feasibility to release mouse	6/10
Mouse can't escape	10/10

2. Target customer Specification

Customer need	Importance
Energy to trap	9/10
Energy to exert pain	7/10
Chemical repercussion	10/10
Peak to set trap up	9/10
Surface Area	6/10

Check your work

Since the work has been based off the notes taken in class and directly from the book itself. My assumptions should be represented to the problem

Learn and Generalize

After creating an HOQ for the mousetrap industry, it is clear that companies in this industry should focus on the technical metrics that have a positive correlation with other metrics. In conclusion, I noticed that the energy required to trap a mouse should be efficient and trap the mouse. Also I must address the fact that there are negative correlations with the technical metrics of the product.

2. Quality Function Development: The CD Player

Define the Problem:

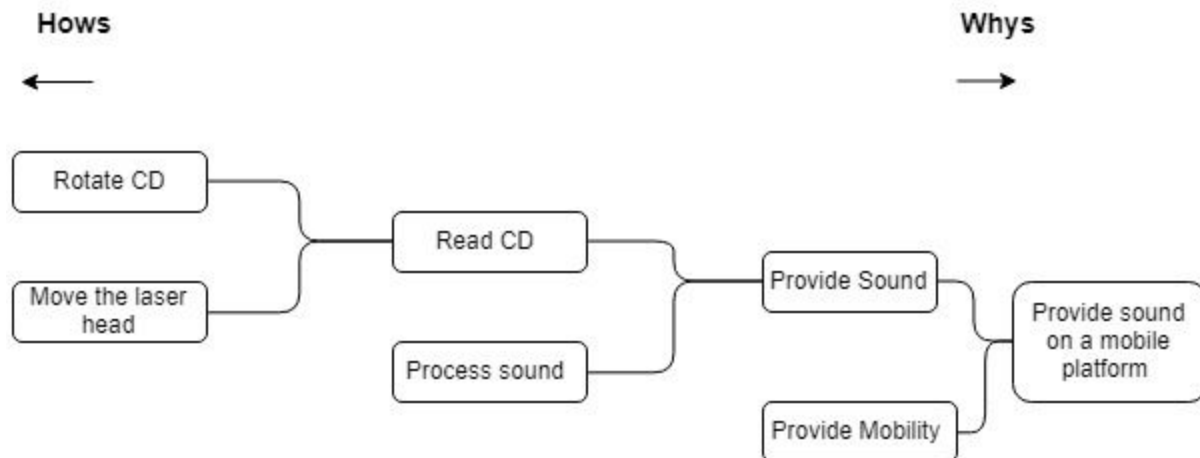
- How does a CD player Function?
- How do I develop a HOQ for the CD player and how will this help with the development of this product ?

Plan the Treatment of the problem

1. Find schematics for the average CD player to determine what qualities define it.
2. Create a FAST diagram to dissect the CD player
3. Create a HOQ for the CD player
 - a. How does this help with the development for the perfect mousetrap?

Execute the Plan

Dissect the CD player (FAST Diagram)



2. House of Quality

1. Make a structured and prioritized list of the customer needs for the CD player

Criteria	Importance
Buttons easy to read and click	10/10

Display screen	8/10
open/close	10/10
Adjust volume	7/10
Protability	7/10
Ease of holding CD player	6/10
Build quality	9/10
Battery life	7/10
Durability	8/10

2. Make a list of “technical metrics” and assess the importance of each metric

	Press the buttons (nm)(TM1)	Peak shock force (N)(TM2)	Power usage (TimeTM3)	Display power (NM)(TM4)	Display Distance (CM)(TM5)
Importance	6/10	9/10	7/10	8/10	7/10

3&4: Determine the correlation between the customers needs and technical matrix using a convenient scale, the result is a correlation matrix.

	TM1	TM2	TM3	TM4	TM5	TM6
TM1	+					
TM2	+	+				
TM3	X		+			
TM4	X	+	+	+		
TM5	X	+	X	+	+	
TM6	X	X	X	X	X	+

5. Competitive benchmark

a. Assess the competing products from the viewpoint of customers

Customer Need	US	Ipod Mini	Cassette
Feasibility to Buttons	7	9	4
Display Screen	6	8	6
Open/Close access	8	9	1
Adjust volume	7	8	5
Portability	9	10	8
Weight	8	8	8
Durability	8	10	7
Battery life	6	5	7
Power durability	10	9	10

B. Assess these products from a technical standpoint

Customer Need	US	Ipod Mini	Cassette
Rotation Speed	1.5 m/s	N/A	N/A
Velocity to Read CD	1.4 m/s	N/A	N/A
Frequency Responce	2Hz	N/A	N/A
Distance away to read the display	20cm	30cm	N/A
Power needed to play	AA batteries	Charge on 120v for 3 hours	AA batteries
Angle at which the display can be read	80	180	0

6. Use the HOQ to set targets for the customer needs and targets for the technical specifications to compete the HOQ

a. Target Customer Specification

Customers Need	Importance
Feasibility to Buttons	10/10
Display Screen	8/10
Open/Close access	10/10
Adjust Volume	7/10
Portability	7/10
Weight	6/10
Durability	9/10
Battery life	7/10
Power Durability	8/10

B. Target customer Specification

Customer Need	Importance
Rotational Speed	10/10
Velocity to read CD	9/10
Frequency Response	10/10
Distance away to read the display	6/10
Power needed to play	9/10
Angle at which the display can be read	6/10

Check your work

Since my work has been based off the notes in class and directly from the book itself, my assumptions should clearly represent a realistic solution to the problem at hand.

Learn and Generalize

After creating an HOQ for the CD player industry, it is clear that companies in this industry should focus on the technical metrics that have positive correlation with other metrics. In conclusion, we noticed that the energy consumed by each CD player should be improved since the product seems to run out of batteries quickly. This HOQ is very helpful because it lists the potential flaws in the product and helps the developers see the important parameters that we should focus on to improve the product.

Problem 3

House of Quality for Your Technology Company's Proposed New Product

Schedule

- Review the homework (5 minutes)
- Brainstorm (5 minutes)
- Work on structure problem solving (120 minutes)
- Define the problem (5 minutes)
- Plan the treatment of the problem (10 minutes)
- Execute the plan (30 minutes)
- Check your work (10 minutes)
- Learn and generalize (20 minutes)
- Total time (250 minutes)

Define the Problem

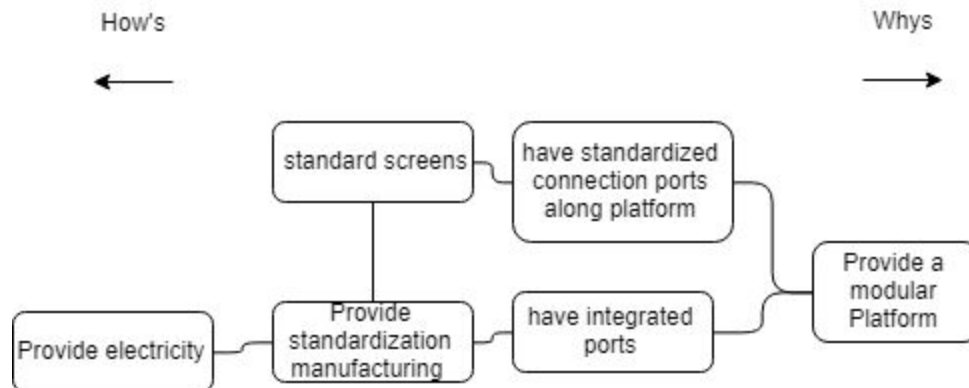
- Generate a House of Quality for modular laptops (ModiFi)

Plan:

- Make a structured and prioritized list of the customer needs for the intended product based on market research. Assess the importance of each need using a convenient scale
- Make a list of the technical metrics, and assess the importance of each metric using a convenient scale
- Correlate customer needs and the technical metrics using a convenient scale. The result is called a correlation matrix.
- Correlate the technical matrix to each other using a convenient scale
- Benchmarking: assess a set of competing products from the viewpoint of the customer, and from a technical viewpoint using a convenient scale for customer benchmarking, and engineering units of measurement for the technical benchmarking.
- Set targets for customer needs and technical metrics for a new product

Execute:

FAST Diagram(Assigned to Antoine Rocha)



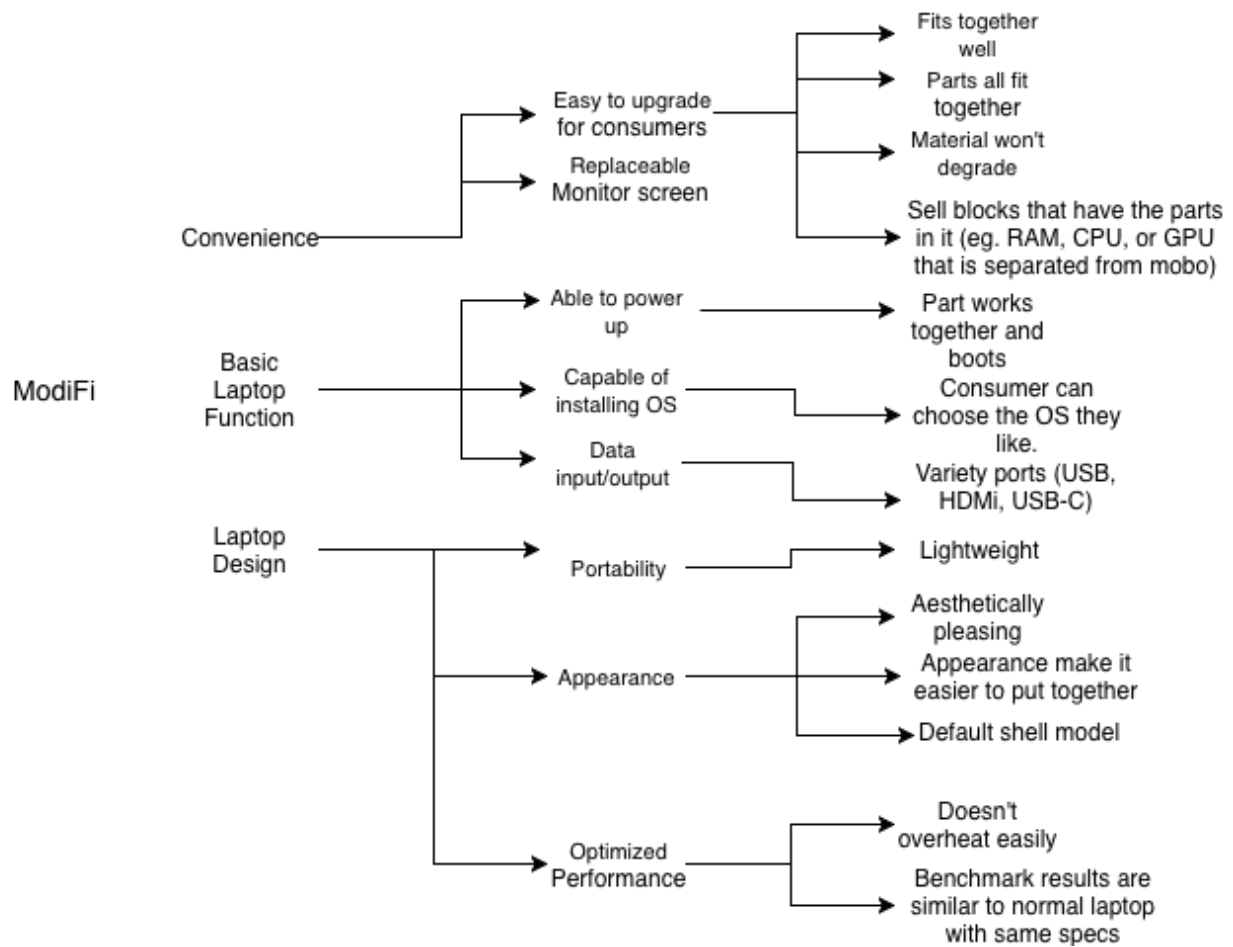
1. Understand how the product works
2. Identify the primary or main function of the product, and place it on the extreme right of the diagram.
3. Systematically ask “why” and “how” questions and organize the answers with:
 - a. “Whys” on the right.
 - b. “Hows” on the left.
4. Stop when we reach the level of subsystems (that are relevant).

House of Quality: HOQ (6 STEPS)

Step 1: Make a structured and prioritized list of the customer needs for the intended product based on market research. Assess the importance of each need using the convenient scale.

Primary	Secondary	Tertiary
Convenience	<ol style="list-style-type: none">1. Easy to upgrade for consumer2. Replaceable monitor screens	<ol style="list-style-type: none">1a. Fits together well1b. Parts all fit together easily1c. Parts are replaceable1d. Sell blocks that have the parts in it (eg. RAM, CPU, or GPU that is separated from mobo)
Retain Basic laptop function	<ol style="list-style-type: none">1. Capable of installing operating system2. Data input and output	<ol style="list-style-type: none">1a. Consumer can choose the OS they like.2a. Variety ports (USB,

	3. Able to power up	HDMI, USB-C, and AUX) 3a. Part works together and boots
Laptop Design	1. Portability 2. Appearance 3. Optimized Performance	1a. Lightweight 2a. Aesthetically pleasing 2b. Appearance makes it easy to put together 2c. Default shell model 3a. Doesn't overheat easily 3b. Benchmark results are similar to normal laptop with same specs

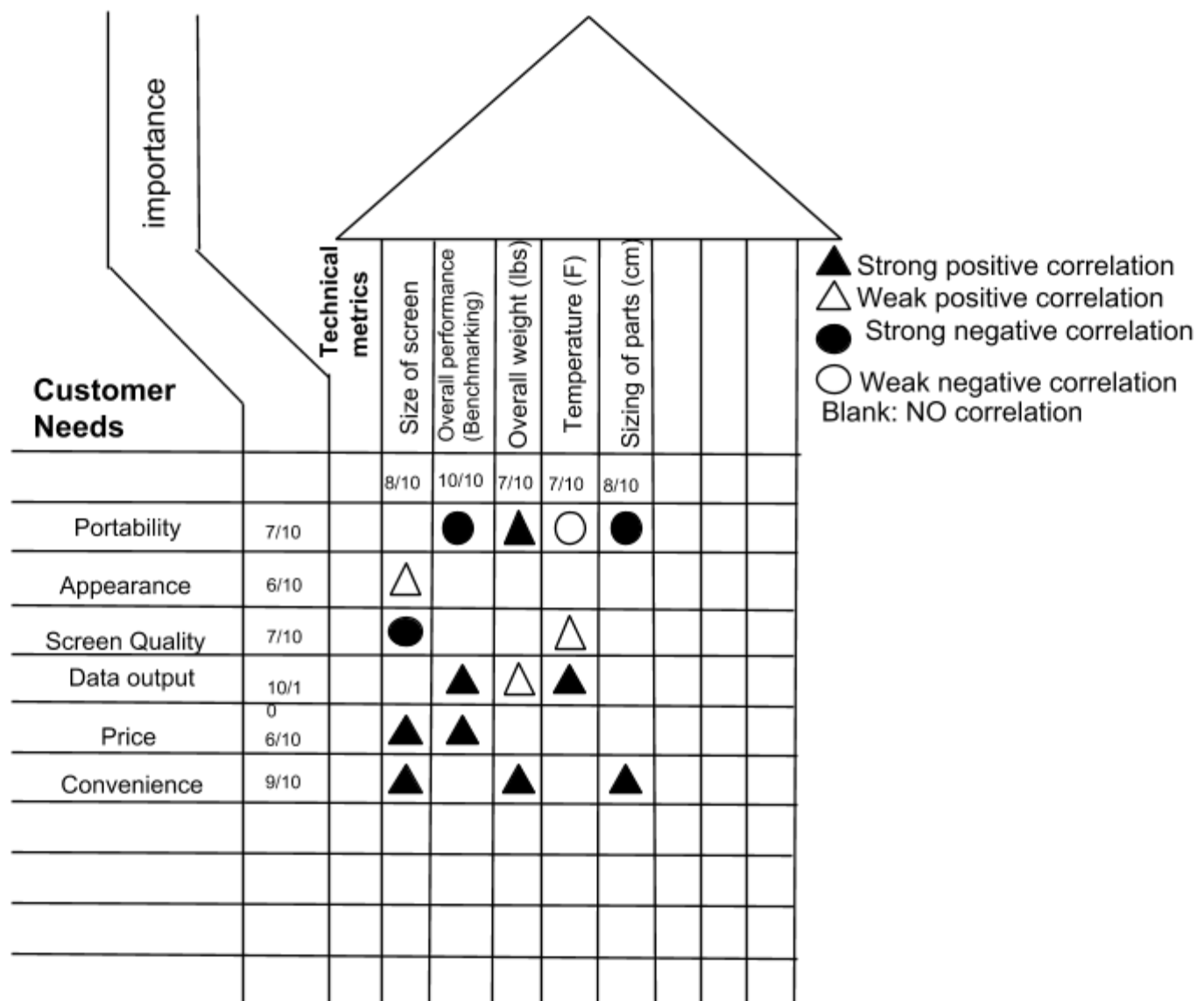


Customer Needs	Importance Scale (1-10)
Portability	7/10
Appearance	6/10
Convenience	10/10
Data Input and Output	10/10
Price	6/10
Screen Quality	7/10

Step 2: Make a list of the technical metrics and assess the importance of each metric using a convenient scale.

Technical Metrics	Importance Scale (1-10)
Sizing of parts (inches)	8/10
Overall Performance (Benchmarking)	10/10
Overall weight (lbs)	7/10
Sizing of the screen (inches)	8/10
Temperature (°F)	7/10

Step 3: Correlate customer needs and the technical metrics (engineering requirements) using a convenient scale. The result is called a correlation matrix.

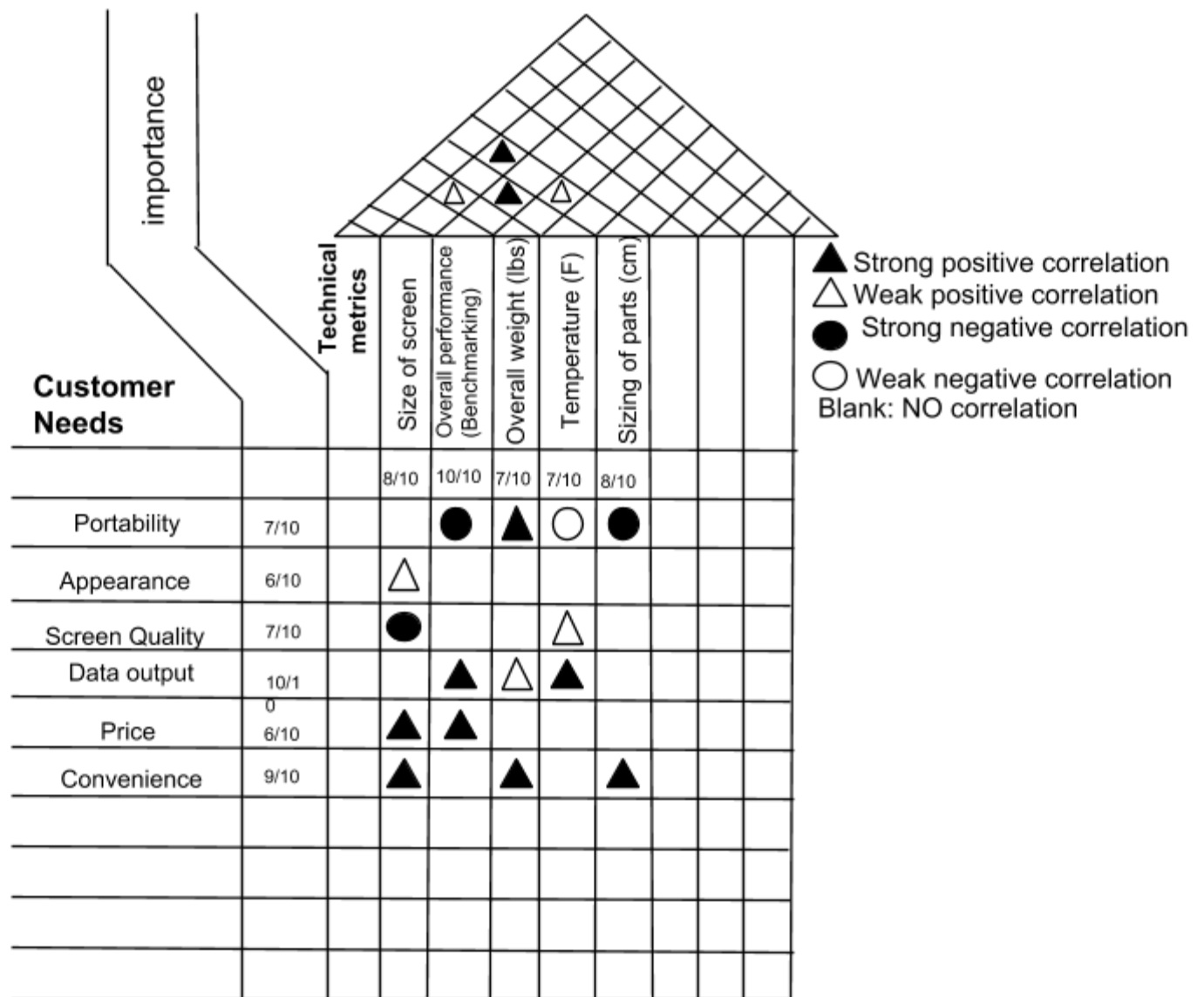


Step 4: There are dependencies between the technical metrics.

4a. Correlate the technical metrics to each other using a convenience scale.

Technical Metric Scale (TM)	Sizing of Parts (inches)	Overall Performance (Benchmarking)	Overall Weight (lbs)	Sizing of the screen (inches)	Temperature
Sizing of Parts (inches)	+		+ -	+	
Overall Performance (Benchmarking)		+			+
Overall Weight (lbs)	+ -		+	+ -	
Sizing of the screen (inches)	+		+ -	+	
Temperature		+			+

+ : Strong Positive Correlation
 + - : Weak Positive Correlation
 - : Strong Negative Correlation
 Blank : No Correlation



4b. Place “Half” of the matrix on top.

Updated HOQ:

Step 5: Benchmarking

Assess a set of competing products from the viewpoint of the customer on the functionality of the laptop(customer benchmarking), and from a technical engineering viewpoint (technical benchmarking) and engineering units of measurement for the technical benchmarking.

Target Customer Needs	Target Technical Metrics
<ul style="list-style-type: none"> ● Portable like a laptop ● Able to run all basic software available to a laptop ● Easy to upgrade parts for consumers ● Sturdy through time <ul style="list-style-type: none"> ○ Still works after 10 years so that it's upgradable 	<ul style="list-style-type: none"> ● Standardization for all parts <ul style="list-style-type: none"> ○ PCIe connections ● Parts are able to work together <ul style="list-style-type: none"> ○ Manufacturer software drivers for all relevant parts ● Benchmarking numbers <ul style="list-style-type: none"> ○ 1080p screen ○ Battery lasts 9 hours ○ File Transfer rate - 1272.40 Mbps ○ Geekbench 4 (16722) ○ Processing power (mm:ss) - 1:00 ○ Display brightness (Nits) - 209 ○ Color gamut 209 ● Weight below 5kg

Check your work:

After working together as a group, we have done each of our respective parts on research on relating companies who might be competitors or substitutes for the modular laptop. Overall our assumptions seem to be correct and reasonable through the data provided. Some information may or may not be accurate since our product has not yet entered the marketplace.

Learn and Generalize:

Our product, the modular laptop, is a modular system that uses connection ports on the screen that clip on to the board. Our goal is to provide safe and easily upgradable laptops that can be replaced either through the screen or laptop body. By working together as a group to create a HOQ for our product, it helped us find different targets of improvement for our product(modular laptop). Instead of only looking at the product as a whole, we made corrections in the scope that have helped structure the modular laptop concept.