

Week 1 Scaffold Level 1

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Submitted in partial fulfillment
of the requirements for the degree
Master in Business Administration
School of Business and Leadership

BUS605, Dr. P

Nyack College

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Executive Seven Day Pen

New Product Design

Concept Development

Amongst different concepts, we decided to move forward with the concept of the 'Executive Seven Day Pen Set' which holds the idea that we design seven different pens representing each day of the week. We ensure that the quality of the set is exceptional and that the size of the pen and its weight are comfortable for its usage. Additionally, the added presentation box will add practical and style elements to the product, and it will sum up the overall appeal to our customers. The product is conceptualized as a quality gift which can be professional or personal and targets people who use pens in their daily lives, however, it can also be purchased for own usage.



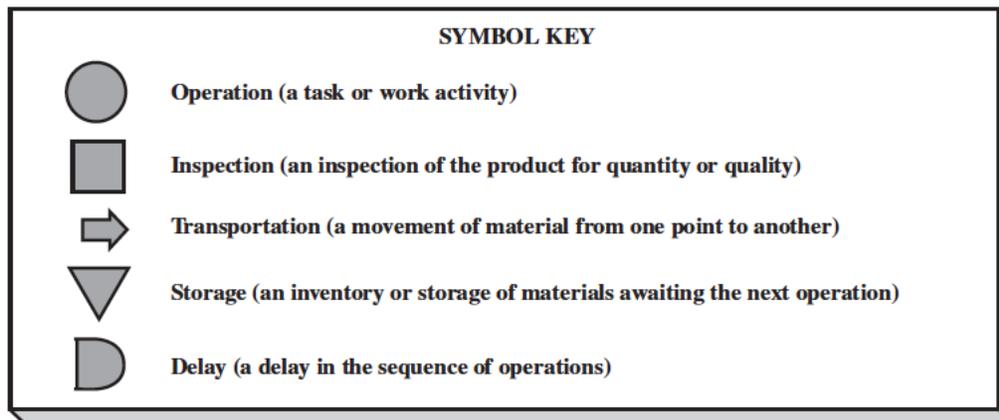
Product Design

The design of the pen set is crucial to all our departments and customers. In order to build our production prototypes, we need to go into detail about this new product with as many specifications as possible. Altogether, this will be a mixture of product cost, quality, and the schedule of the production. The pen set consists of two main parts, the presentation box and the seven different pens. For each of the parts, we are going to require material that needs to be purchased and manufactured to the final product. The pens consist of the clip, the barrel, and the tip from the outside and the twist mechanism, the refill ink, and a spring. Each barrel is made of a different type of hardwood while the tip and clip remain the same in polished chrome. The presentation box from solid maple has a real marquetry inlay as well as glass display window which is bordered by a marquetry wood trim inlay. Lastly, both the pens as well as the box can be personalized by engraving in dark brown.

Process Flow

Subject Charted Pen		<h2 style="margin: 0;">FLOW PROCESS CHART</h2> <div style="border: 1px solid black; padding: 2px; margin-top: 5px;"> Can I Eliminate? Can I Combine? Can I Change Sequence? Can I Simplify? </div>					Summary	Pres.	Prop.	Save
Operation Manufacturing							Operations	4		
Charted by Executive Seven Day Pen Set							Transports	3		
Chart No. 01 Sheet 1 of 1							Inspections	2		
Date May 17, 2021							Delays	0		
		Storages	6							
		Time	16							
		Distance	460							

Dist. in Feet	Time in Min.	Oper.	Tran.	Insp.	Delays	Store	Present <input checked="" type="checkbox"/>	Descriptions	Notes
							Proposed <input type="checkbox"/>		
1	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Spring Supply	
2	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Ink Supply	
3	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Barrel	
4	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Tip	
5	250	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Inventory taken from warehouse to manufacturing	
6	0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Press tip into the lower end of the barrel	
7	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Inspection if tip and barrel connect well	
8	0.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Place the refill ink with spring inside the barrel	
9	120	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Partially completed product transfered to final step	
10	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Twist Mechnaism	
11	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Clip	
12	0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Insert the twist mechanism into the clip	
13	90	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Partially completed product transfered to final step	
14	0.7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Screw Clip on higher end of the barrel	
15	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Inspect functionality of the pen	
16		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
17		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
18		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
19	=	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
20	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Total Time	
21		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			



Production Routing

Defining the process of manufacturing the pen set is going to cover, the number of employees, types of equipment, as well as the capacity and run time. The production requires several steps. Firstly, the manufacturing of the three essential parts, the clip, the barrel, and the tip. Each of these parts has a machine that uses the raw material provided to mold the part into its shape and form. Machine A produces the clip and takes 30 seconds to produce one unit. We have two machines operating at the same time to remain the most efficient. Moving to Machine B which produces the barrel, however, since there are seven different pens and to smaller the bottleneck of that machine, we have seven different machines on site, and they each take 1.5 minutes to produce one barrel with its specific hardwood type. Lastly, Machine C produces the tip in 15 seconds. The bottleneck in our production is Machine A and C with the same capacity of 400 units an hour while the seven Machines B have a capacity of 461 units per hour. The overall run-through time is 2:15 minutes for the manufacturing of the raw materials.

Moving into the various assembly processes to put the pens together. Assembly Process 1 combines the spring, refill ink, together with the barrel and tip. In order to start that process, the inventory needs to be transported to the assembly line which takes a total of five minutes for 250

feet to bring the stock to the different stations through automated systems. Then, the machine presses the tip into the lower end of the barrel within 0.2 minutes. At this point, we have a first inspection to make sure that the connection between the tip and the barrel is stable which has a run time of 2 minutes and is done by one of our warehouse assistants. The next operation task places the refill ink with the spring inside the barrel with the tip in 0.4 minutes apiece and is then transferred to the final station for 3.5 minutes covering a distance of 120 feet.

In Assembly Process 2, which can be processed simultaneously, the twist mechanism is inserted into the clip at 0.2 minutes and transferred to the final step at a distance of 90 feet for three minutes.

In Assembly Process 3, the clip with its mechanism is twisted on the higher end of the barrel in 0.7 minutes, and thereby, the pen is completely functional and ready to be inspected by a warehouse assistant for 2 minutes and ready to be processed to be sent out to customers. The run-through time is 12:48 minutes and adding on the 2:15 of manufacturing inventory for one pen, we have a total of 14.63 minutes to produce one pen. This means we are able to produce 98 pens a day that can fill 14 pen sets of seven pens each. This is a great capacity to start off and once the demand increases, we can expand our operations.

Seven pens are going to be presented in a box that has been manufactured simultaneously with a total manufacturing time of 3:30 minutes with a possible add-on of 75 seconds if the customer seeks to have engraved on both the presentation box and the pens.

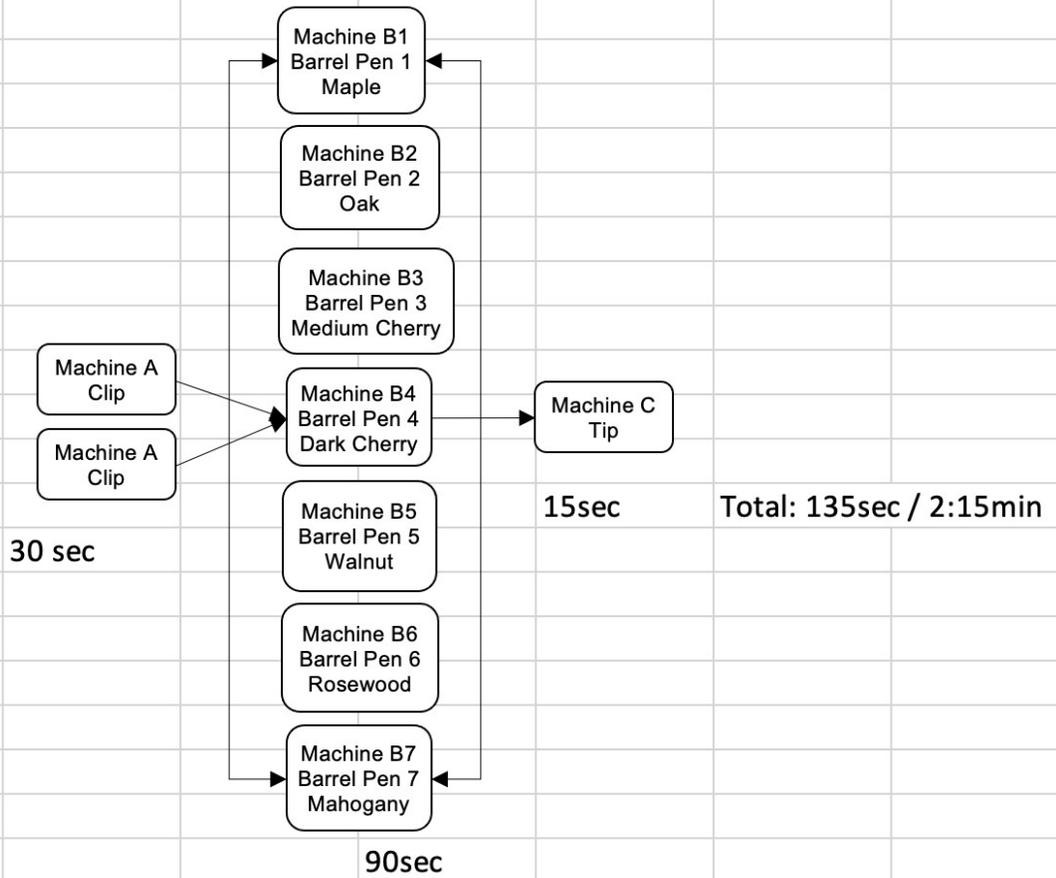
Parts List with Numbering/Units/Costs (also see excel)

	Parts List	Raw Material	Units / 24h	\$ Cost / Unit
	<i>Pen</i>			
1	Spring	Steel	98	0.00011
2	Refill Ink	Metal + Ink	98	0.0046
3	Twist Mechanism	Steel	98	0.00089
4	Tip	Chrome	98	0.0015
5	Barrel	Maple, Oak, Medium Cherry, Dark Cherry, Walnut, Rosewood, Mahogany	98	0.28
6	Clip	Chrome	98	0.0033
			28.42	0.29
	<i>Presentation Box</i>			
1	Box	Maple	98	1.4
2	Inlay	Velvet	98	0.0023
3	Display Window	Glass	98	0.00056
4	Border	Marquetry Wood Trim	98	0.00032
	Engraving	Graver	76	0
				1.406
				Total Cost: 1.698

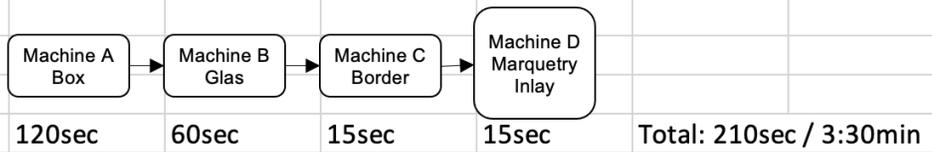
Bills of Material Tree Diagram

Manufacturing Processes

Pens



Presentation Box



Engraving

