ME537 - PRODUCT REALIZATION			
PROJECT NAME	3D Tic Tac Toe		
TEAM MEMBERS	Sung Won, Namrah Tim, Mikey Jon	SUPERVISOR	Anna Thornton
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DOCUMENT TRACKING			
VERSION	EDITS COMPLETED BY	DATE	DESCRIPTION OF EDIT
1.0	Tim	02/09/2020	Initial risks for Assignment 2
1.1	TIm	02/24/2020	Adding risks and tabling things after concept prototype
2.0	Tim	03/24/2020	Re-evaluating post corona
3.0	Namrah	04/12/2020	Risks associated with Mass Production

OPEN / ACTIVE Items								
Number	Item short name	Description (long)	Date added	Date due	Responsible	Risk level	Status	Comments
1	Pieces post-processing	With the large amount of pieces we need to create through casting, each piece will need to be post-processed. This could potentially be extermly time consuming if pieces are not manufacuted well.	2/5/2020	4/8/2020	Quality Team	Medium	Open	Cast the pieces in such a way to reduce the post processing needed minimal
2	Box strength	If box is carried by handle, need to ensure that the box is strong enough at the bottom and wear the handle attaches.	2/5/2020	3/23/2020	Manufacturing Team	Low	Tabled	Use a strong plywood secured with finger joints and wood glue will have plenty of strength to hold all the pieces and its own weight.
3	Budgeting	Product most cost under $10. This may be an issue with all the the part/ pieces we have.	2/5/2020	2/26/2020	Finance Team	High	Tabled	Research for vendors who can supply appropriate quality materials at a lower cost. Decrease part counts where possible.
4	Production uniformity of the pieces	If the pieces are not uniform, all the columns will not be levelled. In a 3D scenario, this might make it hard for players to visualize the placement and make decisions; they all might not fit in the box	2/5/2020	4/8/2020	Manufacturing Team	Low	Open	Make large batches at once for all the pieces. Or make batches for each box set so that within a set all the pieces are uniform
5	Fits of the pieces	The pieces are stacked on top of each other. If the fits are not properly manufactured, the pieces will not stay together.	2/5/2020	3/23/2020	Design Team, Quality Team	High	Open	Choose the best casting material that holds dimensional tollerences the best
6	Long production time for pieces	Each game will have 26-28 pieces which means almost 300 pieces for all the games. This may take a lot of time to make depending on how many molds and how fast our	2/5/2020	4/27/2020	Manufacturing Team	Medium	Open	Choose a fast setting liquid plastic as well as making ice cube like tray molds will allow us to make many pieces at once in a relativley short timeframe.
7	Cost/Complexity of piece mold	Since there is a high number of pieces that need to be manufactured, either many molds or one mold with many parts can be created. Doing this will require more material to make the bigger or high quantity mold.	2/5/2020	4/27/2020	Manufacturing Team		Open	Find material that is cheap enough per peice that the cost doesnt run up to much and make the set more than 10 dollars
8	Fitting everthing in box	Will all of the pieces fit in the box? Potentially need to leave extra room for extra peices.	2/5/2020	3/23/2020	Design Team	Low	Completed	Make box tall enough to fit pieces. Have pieces that fit together to make the most of the space in the box.
9	Joining of the box	The box is made out of finger joints whose proper fit and tolerance is essential.	2/5/2020	3/23/2020	Design Team, Manufacturing Team	High	In Progress	Use a finger joint jig should ensure correct tolerencing and make sure that joining the box is a painless process. Oversizing the spacing may be needed to make sure that the teeth do not fit too tightly and impose a challenge to glueing.
10	Quality of rope	The rope must be strong enough to carry the box filled with 27+ pieces, and good enough quality in which the individual strands would not untangle	2/5/2020	3/23/2020	Quality Team	Low	Open	Good research and on site visits to Blick and REI to test/see rope in person to determine quiality
11	Laser cutting on acrylic	High temperature heat from laser cutting may melt the acrylic and cause deformity.	2/6/2020	3/23/3030	Manufacturing Team	Low	In Progress	Use proper speed and power setting should reduce this issue. Possibly experimenting with lower serrings with more passes.
12	Fitting of the board	Need to ensure that the game board slides with ease into the box	2/6/2020	3/23/2020	Design Team, Manufacturing Team	High	In Progress	Make a test prototype of the box with plywood and test sliding fit of the acrylic board. Possibly tollerance slightly larger to ensure the part fits
13	Assembly of box	All boxes must be able to be assembled with consistency and ease	2/6/2020	4/8/2020	Manufacturing Team	Medium	Open	Create a fixture to attach all the box sides in a consistent manner.
14	Angle of laser cuts	Lasercutting the materials for the box will produce a slight angle on the sides. This may or may not pose a risk.	2/9/2020	4/8/2020	Design Team	Medium	Tabled	No longer planning to laser cut box pieces
15	Color uniformity in pieces	When we cast the pieces using the liquid plastic we will be adding color. To get a consistent color for each set of pieces we will have to pay close attention to mixing enough material. Could ruin the aesthetic if we do a poor job	2/9/2020	4/8/2020	Manufacturing Team	Low	Open	Add the coloring to enough for a single batch of all the pieces needed for a set. Use a procedure to add exactly the same amount of color to the smoothcast material.
16	Choosing a parting line for the piece molds	We need to make the pieces with a two part mold. Finding a parting line location that does interfere with parts that are dimensionally integral and does not require to much post processing to remove.	2/20/2020	3/23/2020	Design Team	High	Open	Possibly put the pariting line near the top and drill the top hole out after.

17	Acrylic cracking	Acrylic board appeared to be cracking at the edges a few days after it had been cut.	2/24/2020	3/23/2020	Manufacturing Team	Low	Completed	Might have been due to interation with the SLA test print. Will possibly need to test laser cutting with different settings of power and speed.
18	Alignment of slots	The slots at the top and bottom of the box panels need to be aligned so that the acrylic board and the bottom board fits right, without stretching the size of the box.	2/24/2020	3/23/2020	Manufacturing Team	Low	In Progress	Cut the slots first before cutting the plywood sheet into smaller squares.
19	Securing the game board	Need to make sure that the game board does not fall out of its slots.	2/24/2020	3/23/2020	Design Team, Manufacturing Team	Low	Open	Test to see if the rope is sufficient to secure the lid in place. Or possibly add a hinge that can be turned up or down.
20	Tearing of wood	The plywood can be torn while it is being cut.	2/24/2020	3/23/2020	Manufacturing Team	Low	In Progress	Cut the plywood along the grain.
21	Twisted piece molding	Find a way to mold the twisted piece in a injection molding process	3/24/2020	5/6/2020	Design Team	High	In Progress	May need to redesign piece with less of a twist to ensure no overhangs. Research into the capabilities of injection molding and what level of overhang it can with do.
22	Jig of finger joint manufacture	What kind of setup is needed for mass manufacture of finger joints with wood.	3/24/2020	5/6/2020	Manufacture Team	Medium	Completed	Stamping technique or rolling cutter that creates the joints through multiple sheets at once.
23	Controlling piece peg size	Measuring and controlling in large quantites if the peices are modling correctly and the pegs are the correct size	3/24/2020	5/6/2020	Quality Team	High	In Progress	Go no go gauges for the pegs. Have a jig with the proper size holes that the pegs should fit in and check a certain amount of samples from a batch
24	Controlling the piece hole size	Measuring and controlling in large quantites if the peices are modling correctly and the holes are the correct size	3/24/2020	5/6/2020	Quality Team	High	In Progress	Go/no-go gauges for the holes. Have a jig with the proper size pegs that the holes should fit around and check a certain amount of samples from a batch
25	Clamping box method	What will be the most cost effective method to clamp the joints while the glue cures	4/2/2020	5/6/2020	Manufacturing Team	Medium	In Progress	There are multiple methods to clamping the box, though for our purposes rubber bands may do.
26	Post-processing of wood	Box must have a smooth surface to prevent splinters and other aesthetic defects.	4/13/2020	5/6/2020	Manufacturing Team	Medium	In Progress	Box will be sanded down and polished with Shellac.
27	Securing the rope	The rope will be secured to the box by threading through the holes and tying knots.	4/13/2020	5/6/2020	Quality Team	Medium	In Progress	Add a quality test to ensure that the knots are properly secured.
28	Rope Ripping	Rope will be rubbing against hole in wood which could lead to ripping	4/29/2020	5/6/2020	Design team	Medium	In Progress	Add a process for smoothing out hole opening. Make sure rope sourced is coating in protection
29	Squaring pieces for finger joint machine	Making sure pieces are square with blade before cutting is needed to prevent poor cuts.	4/29/2020	5/6/2020	Quality Team	High	In Progress	Create a squaring jig for the finger joint machine. Update SOP to include check for part squarness.
30	Wood Post processing	Natural finish on wood is more likely to splinter	4/29/2020	5/6/2020	Manufacturing Team	High	In Progress	Sanding the outsides of the finished assembled box.
31	Twisted Piece placstic issues	aPriori showed plastic issues with the twisted piece design	4/29/2020	5/6/2020	Manufacturing Team	Medium	In Progress	Piece redesign using aPriori as a guide to find a easy to manufacture design.
32	Table saw cutting	Using table saw to cut wood pieces. Need for skilled labor with high risk of injury.	4/29/2020	5/6/2020	Manufacturing Team	Low	In Progress	Design a jig for individual pieces need that make process of cutting safer for operator.