From: Dennis McVay, *PMP, CLSSBB, CSM*
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The Cube Project

Question: Did you ever have an unfinished Cube Project? Don't panic! I would like to invite you to dust off your old Cube (or acquire a new one), give me 15 minutes, and learn how to finally solve a Cube Project, while using some of our modern-day Project Management Professional (PMP), Certified Lean Six Sigma Black Belt (CLSSBB) and Certified Scrum Master (CSM) training methodologies, skills and select tools.

Did you know in 1974 a six-sided Cube was invented by Ernő Rubik as a training tool to help teach us 3-dimensional problem solving using our brain? Twenty years after (mid 1990's) we find the Cube has dust on it and we are fidgeting with Catherine Hettinger's 1-dimesional spinning devices that require no brain exercises. Why?

Let's jump right in with a simple "Root Cause Analysis" tool, where we ask the Five Whys to help solve a problem:

1**.) Why** does your unsolved cube have dust on it?
　　Answer: Could not figure it out.

2**.) Why** could you not figure it out?
　　Answer: It did not come with instructions?

3.) **Why** were there no instructions?
　　Answer: The Cube's inventor challenged us to use our brain's cognitive mapping skills to solve the Cube without instructions.

4.) **Why** - We found the "Root Cause". Fourth **Why** was not required.
5.) **Why -** In this example the fifth **Why** was also not required.

<u>ROOT CAUSE:</u> After asking only three of the Five Whys, the answer was obvious... No Instructions were provided.

<u>SOLUTION:</u> Instructions are now provided and listed below.

<u>FUN FACT:</u> The original Cube was created in 1974, 9 years before we had a searchable internet that launched in 1983. Also, the Cube has approximately 43 quintillion possible configurations, so it is no surprise that customers eventually gave up on the 3D problem-solving exercise, mechanically took the Cube apart to reassemble as solved, or had suspiciously crooked / peeled stickers.

Solving the Cube is a rewarding mental exercise that comes with a positive sense of accomplishment. Take time to understand all the twists and turns to find the definition of done. Please ignore all the high speed Cube masters that practice daily and enjoy your own journey to Cube completion. Through continuous improvement, you will become faster, and with practice, the student will become the teacher.

Remember, we live in a world full of wonderful 3D Computer Aided Design, 3D Simulators, 3D Printers and 3D every-thing. So I would like to challenge you to set your 1D fidget spinner to the side, start thinking 3D again, pick up your favorite 3D puzzle Cube and follow along with this unique introduction to PMP, CLSSBB, CSM methodologies.

Now, let's kick off this project and have some fun!

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Project Overview: This Cube project was designed to help you learn some project solving methodologies, while having fun working with your hands solving a Cube. Remember, life is full of twists and turns just like the tiles on this Cube. The logic introduced within this project matters to be successful now and in the future projects you may encounter. With this Cube project you will be challenged to follow instructions, stay organized, know your orientations, face positions, rotations like clockwise and counterclockwise, thinking, remembering , planning, observing, learning, adapting and improving to achieve customer satisfaction. Every scrambled Cube will look different in the beginning, just like projects in the real world, but as you solve this Cube project over and over, look for continuous improvements, inspire to teach others or learn more methodologies through online research, certifications and classes to become the best problem / resolution coach you can be.

As a Certified Project Management Professional (PMP), we must first avoid setting ourselves up for failure by doing a project feasibility study. Never overpromise, which almost always leads to under-delivery and disappointments. Secondly, before starting any project carefully evaluate if the project is worth doing or if it is destined to be a never-ending task. Remember, a project is a <u>temporary endeavor </u>(which has an ending), this project is taken to create a unique product, service or result that delivers value. Having said this, "The Cube Project" will be good service project, since it has a definite start, end, and delivers value.

In this example, it will be assumed the Project Sponsor(s) approved the project charter and all the business case and details were completed using the PMBOK's® 7 four process groups of INITIATING, PLANNING, EXECUTING, MONITORING & CONTROLLING within the eight performance domains labeled TEAM, STAKEHOLDERS, PLANNING, PROJECT WORK, DEVELOPMENT APPROACH & LIFE CYCLE, DELIVERY, MEASUREMENT, UNCERTAINTY to deliver the best value to the organization and its stakeholders through professional project delivery. *NOTE: PMBOK's® Guides Versions 6 & 7 are a combined body of knowledge that is recognized as good practices that a PMP can tailor to fit any project.*

There are many planning tools a PMP will consider and use to make sure all the required outputs or deliverables can be achieved. For this Cube Project, let's use this tool "**I**nput, **T**ools and **T**echniques, **O**utput or known as an **I.T.T.O.** Table."

An **I.T.T.O.** Table will help you understand what is needed to successfully achieve your **OUTPUT or Deliverable**.
To better understand how a simple table can save you valuable time and resources, let's review the example below. Look at all the items under the **Tools and Techniques** column, if we didn't have a **"Desk"** or **"Chair"** (although, not ergonomically friendly) we could still use expert judgement to achieve our **OUTPUT or Deliverable** of a **"Solved Cube."** However, if we are missing the **"Instructions to Unscramble Cube"** or missing the **"Scrambled Cube"** within the **INPUT** column, then we would FAIL to obtain the **OUTPUT** of a **"Solved Cube"** before we even got a chance to start. Again, this critical strategic planning that will save a lot of time and money. Remember: Why start a project that cannot be finished as planned. Work Smarter, Not Harder using **I.T.T.O.** Tables.

ITTO TABLE		
INPUT	**TOOLS & TECHNIQUES**	**OUTPUTS**
Scrambled Cube	Instructions to Unscramble Cube	Solved Cube
	Chair	
	Desk	
	Timer	
	Expert Judgement	

NOTE: On larger more complex projects you will have several **I.T.T.O.** Tables, where the **OUTPUT** from one **I.T.T.O.** Table, becomes the **INPUT** for the next repeating over an over, until you plan a successful project from beginning to end.

The Cube Project

As a Certified Lean Six Sigma Black Belt (CLSSBB), we benefit from using a data-driven quality tool such as **D.M.A.I.C. or Define, Measure, Analyze, Improve, Control** (*Pronounced: Duh-May-Ick*) These five phases of **D.M.A.I.C.** will help with defining the problem, improving the activities, identifying opportunities for improvements, setting goals, and meeting both internal and external customer needs.

Starting with the **DEFINE** (AKA: Discovery phase), we must specifically determine what is important to the customer or discover an opportunity, problem or process to fix. This will help us move forward with a well defined plan. Inside this Cube project, we will receive a shipment of scrambled Cubes with a goal to resolve matching colors on each of the 6 sides, per customer's requested deliverable Takt Time to make delivery.

In the 1980's, during the Total Quality Management (TQM) movement, Six Sigma experts used a **Supplier, Inputs, Process, Output, and Customer or S.I.P.O.C. Table** (which is similar to using the PMP I.T.T.O. table shown previously) to make sure we know what we are doing to deliver services or products that meet our customers Critical to Quality (CTQ) expectations.

SIPOC TABLE				
SUPPLIER	**INPUT**	**PROCESS**	**OUTPUT**	**CUSTOMER**
Scambled Cube Factory	Scambled Cube	Instructions to Unscramble Cube	Solved Cube	Packaging Factory
		Chair		
		Desk		
		Timer		
		Expert Judgement		

S.I.P.O.C. Tables visually help us understand what is required from start to finish to prevent wasting time and effort on things that simply do not matter to the customer. FYI: Some pronounce this acronym backwards as C.O.P.I.S. Tables.

Second phase we **MEASURE** the process and map the customer requirements, measurement systems, defect tracking, baseline and use Key Performance Indicators (KPIs). Data is the essence of Six Sigma projects, so accurate data and sufficient measurements are required. Other tools include: Control Charts, Pareto Charts, Process Mapping, etc.

Third phase we **ANALYZE** the data collected to see what the data is telling us, using various value stream mapping charts and diagrams to identify potential root causes to validate findings and understand the effects on quality and performance. Other tools include: Root Cause Analysis, FMEA, Validation, Cost of Poor Quality, SPC, KPI, etc.

Fourth we **IMPROVE** the process by understanding the quantitative data collected from the root cause analysis and developing an implementation plan to verify improvements and control risks. Other tools include: Brainstorming, Control Charts, D.O.E., Sampling, Change Management, Confirming, Process Capability, Data Collection, etc.

The Fifth **CONTROL** phase is the hardest of the phases to prevent old procedures from coming back after you hand over the final project during the close process. Communication is key to sustain and successfully pass the finished Cube to the satisfied customer. Other tools include: Control Plan, Standard Work Instructions, Process Maps, etc.

The benefits of using **D.M.A.I.C.** to improve a process is that it will help you define a clear path to reach your goals.

NOTE: **Define, Measure, Analyze, Design, Verify or D.M.A.D.V.** is another quality tool that is primarily used when the existing process no longer works and / or needs completely redesigned.

The Cube Project

As a well informed PMP, it is important to note that PMBOK's® 7 guide did not replace the PMBOK's® 6 guide. The PMBOK's® 7 guide builds on top of the PMBOK's® 6 guide, but now includes the Agile methodology and Hybrid approaches for managing complex projects. *(__PRO TIP:__ I highly recommend __learning__ both guides.)*

__FUN FACT:__ Scrum is a fun word that typically catches friends off guard. The word Scrum came from describing a group of Rugby players scrummaging during a game. Scrum came into existence during the mid 1980's approximately 8 years before the Agile manifesto / methodology was developed. Scrum typically uses 2-week sprints to deliver quick incremental results that was built on previous completed work. Using Scrum results in providing high-quality products faster. Scrum and Agile are different but share the same framework, where Agile is more flexible with the Product Backlog and Scrum is more rigid to produce quicker results. There is much benefit in failing fast to learn and adapt. Scrum has three main roles: Scrum Master, Product Owner and the Product Team (AKA: Developers)

__As a Certified Scrum Master (CSM),__ the purpose is to be a facilitator, coach or guide using the best practices of Agile and Scrum methodologies through the course of a project to keep the team on track, while teaching the value of using Scrum and Agile methodologies.

The Product Owner, will own the Product Backlog. The Product Backlog lists User Stories, Defects, Epics, Etc. of "what" and in "what order" to achieve the customer's deliverable time frame and stakeholder needs. The Product Owner interacts with the Product Team / Developers to prioritize the manage the Product Backlog.

PRODUCT BACKLOG													
Epic	Sprint / Priority	User Story Role	User Story Name	Story Details	Acceptance Test Criteria	How to Demo	Tasks	Analyst / Prep work (TIME)	Development Estimate (TIME)	QA (TIME)	Total User Story (TIME)	Time Remaining
New University Project	1	University Owner	U001 - Cube	Scrambled Cubes will arrive in order from the factory and must be solved within 15 Minutes.	DONE = When the CUBE has six colored sides with equally matching orange, yellow, blue, green, red and white faces.	Visually	1.) Read Instructions to Unscramble Cube 2.) Apply Instructions to Unscramble Cube	4 Minutes	10 Minutes	1 Minute	15 Minutes	0 Minutes

USER STORY						
TITLE: CUBE		**PRIORITY:** 1		**ESTIMATE:** 15 minutes	**ID #** U001	
AS A: Customer						
I WANT: Solved Cubes						
SO THAT: I can teach 3-Dimensional learning						
ACCEPTANCE CRITERIA						
Done = When the CUBE has six colored sides with equally matching orange, yellow, blue, green, red and white faces.						

The Product Team / Developers, are a cross-functional, self-organizing team of creators that build the actual products to meet the sprint goals within each 2-week iteration and work closely with the Product Owner to groom the Backlog.

NOTE: Larger projects in Scrum are called EPICS and contain individual "User Story" documents that are broken down further into "Tasks" that will be posted on the "Scrum Board" as introduced below.

The Cube Project

The Scrum Master will use "The Scrum Board" to track and visualize progress. This board has three visible categories for each User Story Number "To Do", "Doing" and "Done" that gets updated by the Product Team in an event called Sprint Planning. Note: Another visual tool used within LEAN and Agile frameworks is called a Kanban and is used as a minimal visibility tool, versus "The Scrum Board" which has more focus on the processes.

The Scrum Board

USER STORY #	TO DO	DOING	DONE
U001 "CUBE"	UNSCRAMBLE THE CUBE	READING INSTRUCTIONS	
U002 "PACKAGING"	SHRINK WRAP		

Again, the Product Owner owns the "Product Backlog", which is a living document, meaning that it changes often. The Product Backlog lists everything in the priority that needs to be completed in the order of importance. Sometimes things happen and the Product Team meets with the Product Owner for a Backlog Refinement. When this happens, we must be cautious of scope creep, and make sure new items being added have a clear definition of done.

The Product Team (Specifically the person doing the work for the Task) decides how much time or effort it will take to complete that Task before transferring those items from the Product Owner's Product Backlog to the Product Team's "Sprint Backlog."

Plan for reality, not fantasy! It is better to fail fast to learn and adapt. Benefits include higher quality, risk mitigation, lower costs and better speed to market. Sprints should only last 1 to 2 weeks in case something goes wrong, which helps save lost time and money for rework. Sprints are fixed time boxes that are like a basketball game, when the time runs out the game/Sprint is over. WIN or LOSE you cannot ask for more time, all incomplete items are re-estimated and put back into the backlog. This doesn't mean the Sprint failed, it shows some items may have required more effort.

Every day the Product Team and the Scrum Master meets for a strictly timed 15-minute huddle called the Daily Scrum where the Product Team shares: What was done yesterday? What they are doing today? Are there any obstacles / blockers in the way of the achieving the Sprint goal? The Scrum Master is like the coach of a sport's team and helps the team build speed or velocity to go faster by eliminating any obstacles or waste that is slowing them down.

The Product Owner is still responsible for turning the Product Team's velocity into value by using the project's vision of what you need to accomplish for the customer goals.

At the end of the Sprint week there is a Sprint Review where the Project Team shows what they have accomplished *(NOTE: They should only demo what meets the agreed Sprint's definition of done,)* to anyone who wants to attend the meeting including the customer.

The most important last step is performing the Sprint Retrospective, where a lesson learned analysis is completed to improve future Sprints and ensure teams are working together and customers are satisfied.

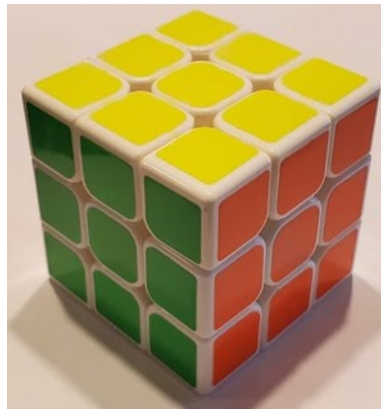## *The Cube Project*

Project Kickoff: Using these methodologies, let's have some fun solving this "Cube Project." Remember life is full of twists and turns just like the tiles on this Cube. The details within this Cube Project matter to be successful here and in future projects you may encounter. With this Cube project you will be challenged to follow instructions, become organized with 3D orientations, face positions, rotations like clockwise and counterclockwise and much more. Again, with every project you must think, plan, observe, learn, adapt and improve to achieve customer satisfaction. Remember every scrambled Cube project will look different in the beginning, just like projects in the real world.

INITIATING: This is where we identify Stakeholders and develop a Project Charter. A Project Charter is a crucial document that includes key activities that define a system for delivering value, such as the "Definition of Done" and "Takt Time" which is the time / rate at which you need to complete a product to meet customer demand.

The "Definition of Done" for the Cube Project = A working high quality Cube with matching colors on all 6 sides.

The "Takt Time" <= 15 minutes

INPUT = (Scrambled Cube) Provided by customer. (Note: Tile colors, locations and positions will vary.)

The Cube Project

PLANNING: This is where we ask Why? What? When? Who? How? to develop a Project Management Plan, Plan Scope Management, Collect Requirements, Define Scope, Create Work Breakdown Structure (Remember to use I.T.T.O or S.I.P.O.C. Tables), Plan Schedule Management, Define Activities, Sequence Activities, Estimate Durations, Develop Schedule, Plan Cost Management, Estimate Costs, Determine Budget, Plan Quality Management, Plan Resource Management, Estimate Activity Resources, Plan Communications Management, Plan Risk Management, Identify Risks, Qualitative Risk Analysis, Quantitative Risk Analysis, Plan Risk Responses, Plan Procurement Management and Plan Stakeholder Engagement.

Planning information:

- The Cube has six colored sides / faces (Flat layout shown below) YELLOW, RED, GREEN, BLUE, WHITE, ORANGE.

- The 3x3x3 Cube's center ★ tiles, one per face color are static and cannot be moved from their origin.
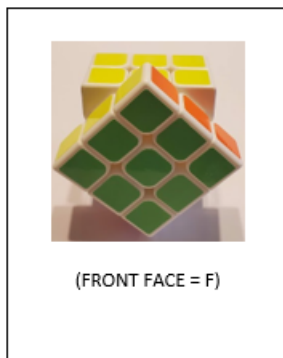

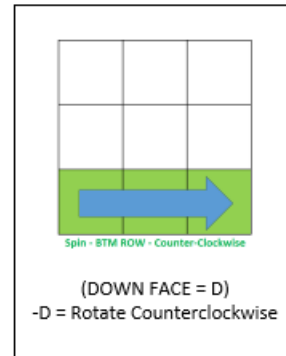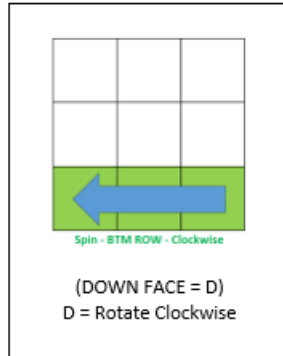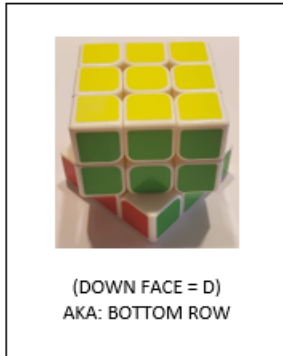(3D Cube illustrated as a flat layout)
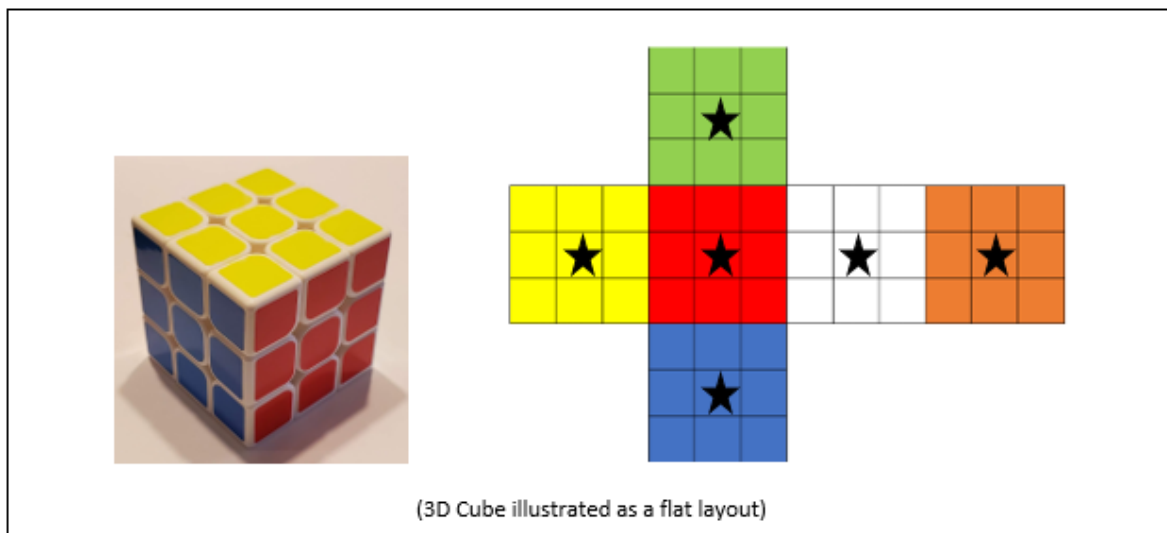
- For RISK Planning the 3x3x3 Cube creates 43 quintillion possible scrambled configurations.

- Orientations: The Front Face, no matter which color, is the face of the Cube directly in front of you, with related positions of Left, Right, Top, Upper and Bottom as you would expect to keep things simple.

- Mechanical Movements: Will be a single twist rotation either Clockwise or a Counter-Clockwise direction as shown below.

(UPPER FACE = U)
AKA: Top Row

Spin -TOP ROW - Clockwise
(UPPER FACE = U)
U = Rotate Clockwise

Spin -TOP ROW - Counter-Clockwise
(UPPER FACE = U)
-U = Rotate Counterclockwise
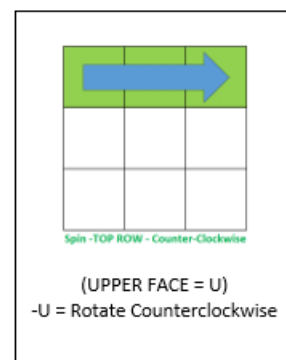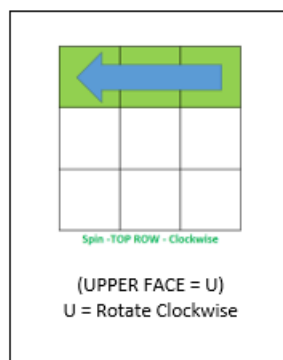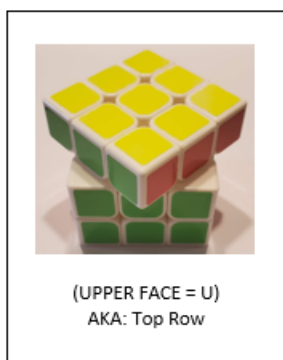
The Cube Project

<CONTINUED>

- Mechanical Movements: Practice single rotations either Clockwise or a Counter-Clockwise direction as shown below.

(DOWN FACE = D) AKA: BOTTOM ROW	Spin - BTM ROW - Clockwise (DOWN FACE = D) D = Rotate Clockwise	Spin - BTM ROW - Counter-Clockwise (DOWN FACE = D) -D = Rotate Counterclockwise
(FRONT FACE = F)	Spin - FRONT - Clockwise (FRONT FACE = F) F = Rotate Clockwise	Spin - FRONT - Counter-Clockwise (FRONT FACE = F) -F = Rotate Counterclockwise
(LEFT FACE = L)	Spin - LEFT - Clockwise (LEFT FACE = L) L = Rotate Clockwise	Spin - LEFT - Counter-Clockwise (LEFT FACE = L) -L = Rotate Counterclockwise
(RIGHT FACE = R)	Spin - RIGHT - Clockwise (RIGHT FACE = R) R = Rotate Clockwise	Spin - RIGHT - Counter-Clockwise (RIGHT FACE = R) -R = Rotate Counterclockwise

The Cube Project

EXECUTING: This is where we actually do the work we defined in the project scope, I.T.T.O, WBS or S.I.P.O.C. and solve the Cube. This Involves Direct and Manage the Project Execution, Perform Quality Assurance, Acquire Resources, Manage Project Knowledge, Develop Team, Manage Team, Manage Communications, Implement Risk Responses, Conduct Procurements, Manage Stakeholder Engagement.

1.) **SOLVE the WHITE BOTTOM**: Rotate and turn various faces to solve the WHITE face of the Cube as shown below. There are various formulas we will use later, but for now **I want you to learn the Cube.** Remember to use Expert Judgement to complete this task. Relax, have fun with this exercise, think the motions through (for every action, there is a reaction) while familiarizing yourself with the Cube. **In the real world, you will most likely have to figure a few things out on your own, so this is good practice.**

2.) **Flip the Cube upside down**, so the white face is now on the bottom. ***NOTE: KEEP THE WHITE FACE ON THE BOTTOM.***
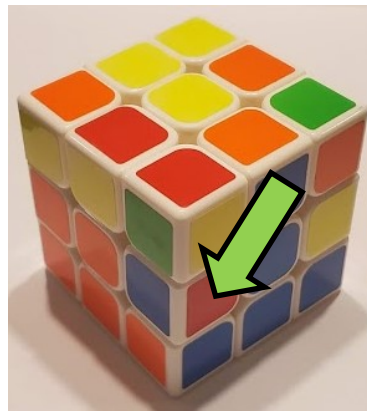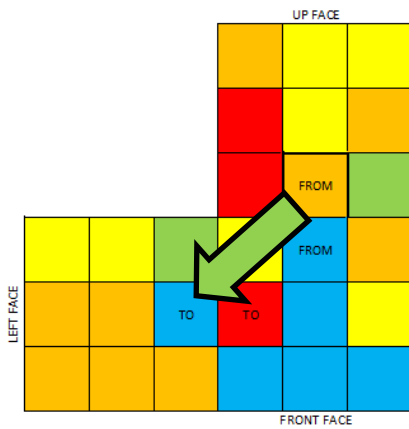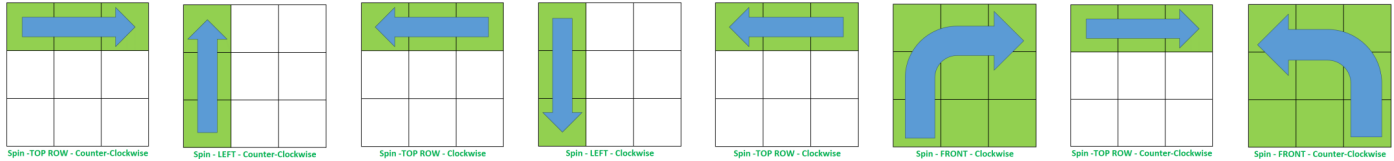
3.) **Rotate MIDDLE to Match Centers**: Rotate the middle / center row of the CUBE to align the matching center colors on the BOTTOM White face you just solved. (Example shown is matching vertical Orange to Orange and Blue to Blue)
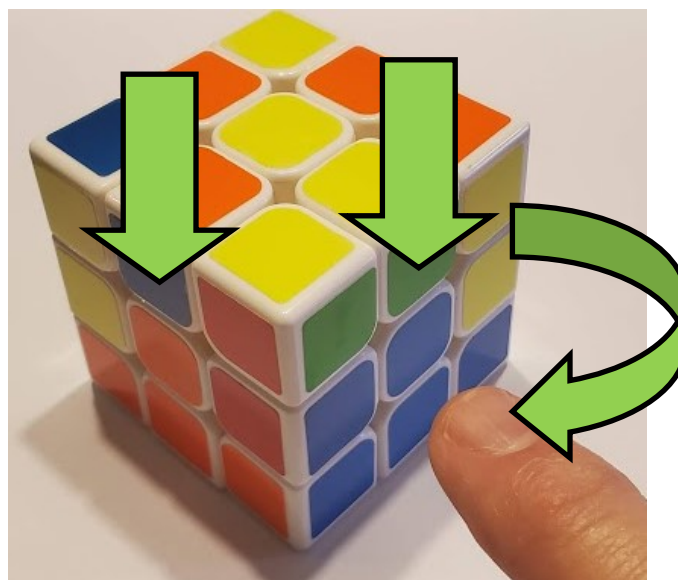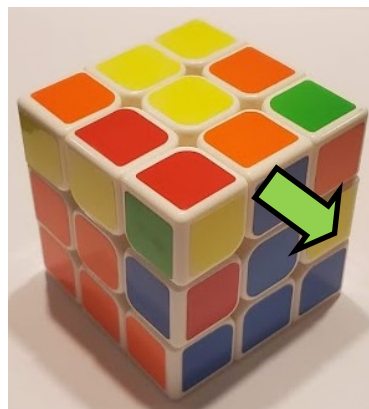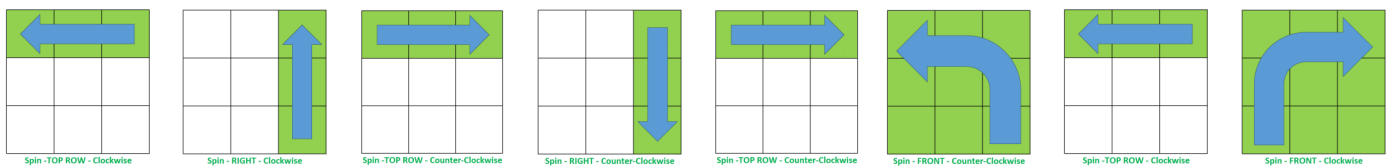
The Cube Project

4.) **SOLVING MIDDLE ROW**: To do this, use one of the two algorithms shown below to easily move a Cube piece diagonally **FROM** one center location **TO** another, in order to match colors required at desired location, going from upper center to downward left.

LEFT SWAP ALGORITHM:

Spin -TOP ROW - Counter-Clockwise	Spin - LEFT - Counter-Clockwise	Spin -TOP ROW - Clockwise	Spin - LEFT - Clockwise	Spin -TOP ROW - Clockwise	Spin - FRONT - Clockwise	Spin -TOP ROW - Counter-Clockwise	Spin - FRONT - Counter-Clockwise

or MOVING from upper center downward right. **(NOTE: Twist the top row, repeat algorithms, to find pieces to move & match.)**

RIGHT SWAP ALGORITHM:

|						
Spin -TOP ROW - Clockwise	Spin - RIGHT - Clockwise	Spin -TOP ROW - Counter-Clockwise	Spin - RIGHT - Counter-Clockwise	Spin -TOP ROW - Counter-Clockwise	Spin - FRONT - Counter-Clockwise	Spin -TOP ROW - Clockwise	Spin - FRONT - Clockwise

The Cube Project

FUN FACT: Within Agile, at the end of every 1 or 2-week iteration, a Sprint Demo occurs to allow presentation of your current progress to the Business Owners, Stakeholders and Customer for feedback and to measure your overall progress. Within this Cube Project, you are now 67% finished, having the first two rows matching (See Cube photo below). ELSE: Restart and carefully review the previous steps.
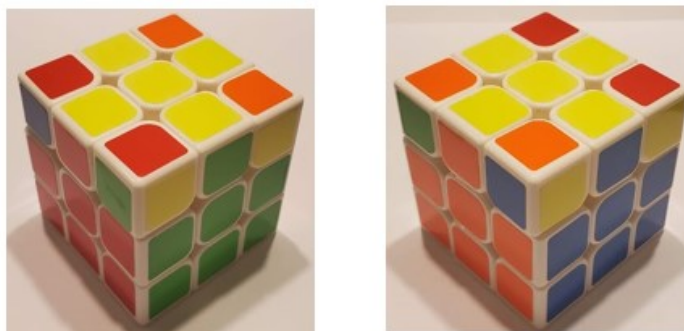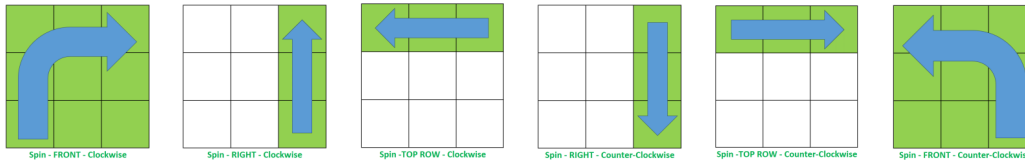

ORIENTATION MATTERS: See illustrations below and be mindful to keep your YELLOW Face in one of these orientations before doing the algorithm below. Learn and adapt, you might need to rotate the Cube's "TOP FACE" to match colors or position in one of the orientations below and repeat the algorithm to locate the YELLOW Cross.
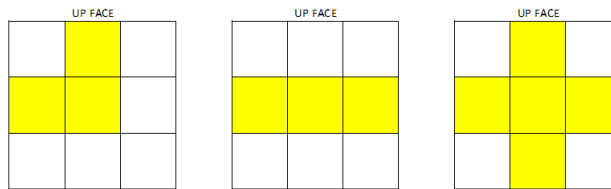
GOAL: FIND THE YELLOW CROSS, WHERE ALL CENTERS MATCH THE SIDE COLORS, ON ALL SIDES AS SHOWN BELOW.

5.) **Solve the Top Row YELLOW Cross Algorithm**: To do this, adjust orientation shown above, and use the following algorithm below a few times. **NOTE: If you find a perfect cross during this algorithm SKIP to STEP #8.**


| Spin - FRONT - Clockwise | Spin - RIGHT - Clockwise | Spin -TOP ROW - Clockwise | Spin - RIGHT - Counter-Clockwise | Spin -TOP ROW - Counter-Clockwise | Spin - FRONT - Counter-Clockwise |

(SAME CUBE VIEW 1 and VIEW 2 WITH THE YELLOW CROSS AND MATCHING CENTERS)

NOTE: The odds are pretty good your YELLOW Cross will only match two of the four YELLOW Cross sides. No worries, there is an algorithm to swap those two center tiles, please jump to Step #6. If you got lucky and found the perfect YELLOW Cross, please jump to Step #8.
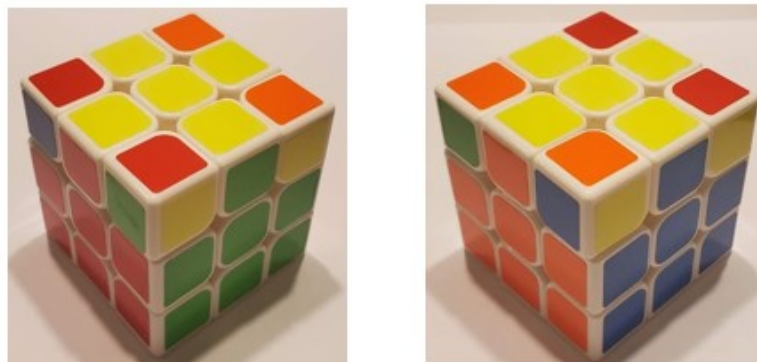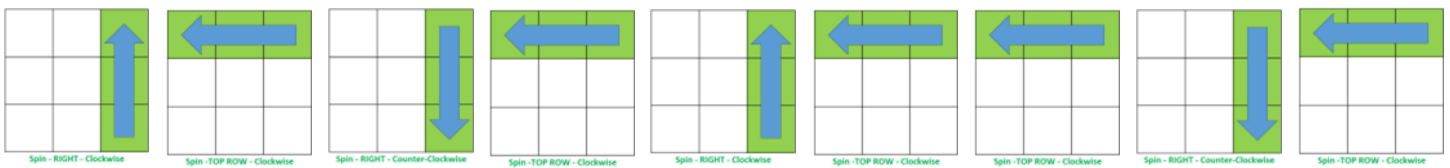
The Cube Project

6.) Look for the two matching Verticals, make sure you twist into place and then rotate the entire CUBE's orientation so these vertically matching tiles are on the right side and back away from the FRONT face.
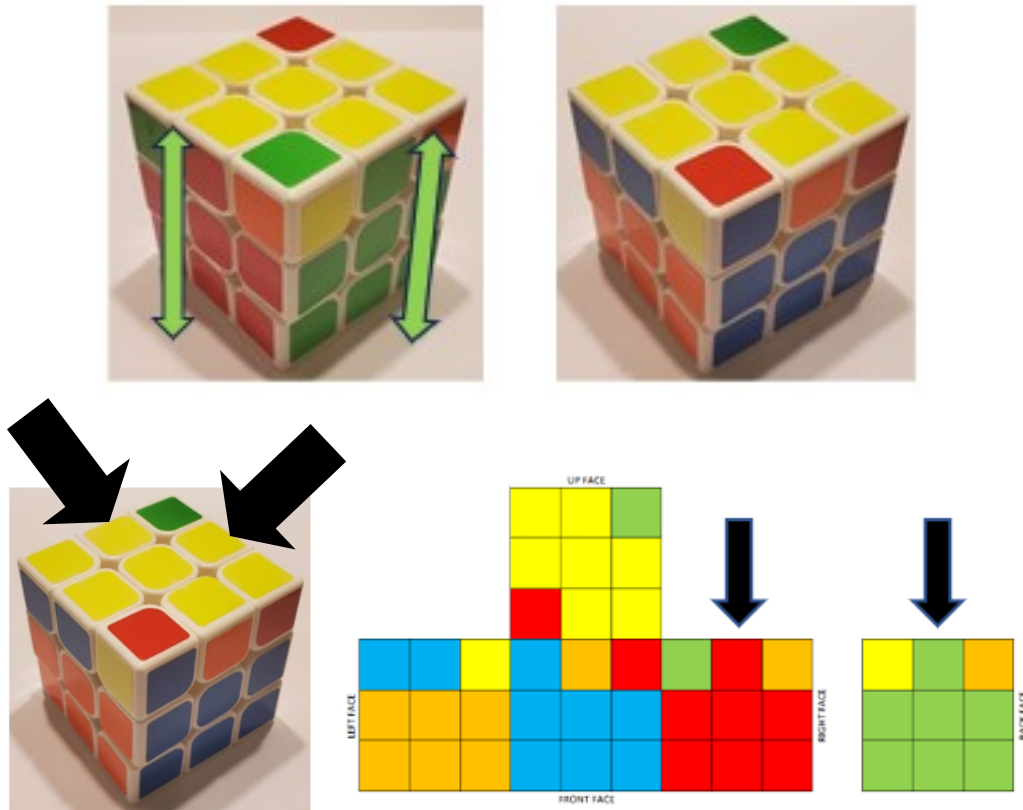
7.) With matching Verticals rotated to the right and back faces. (See illustration above)   Do this algorithm **one time** to fix the other two verticals and solve the YELLOW CROSS. (**Pro TIP**: If things go wrong, keep orientation, reverse the algorithm, and try again.)

Double Center Fix - One time use ALGORITHM:

(SAME CUBE VIEW 1 and VIEW 2 WITH THE YELLOW CROSS AND MATCHING CENTERS)

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CUBE ORIENTATION MATTERS:
- CAUTION: DO NOT TWIST THE "UPPER FACE" YOU MUST KEEP MATCHING CENTER COLUMNS IN ALIGNMENT.
- ROTATE THE ORIENTATION OF THE ENTIRE CUBE, BEFORE DOING THE NEXT ALGORITHMS TO MOVE TILES AROUND.

(**PRO TIP:** If one corner tile matches or colors are near the right areas, orient Cube's "UPPER FACE" bottom right corner as shown below, which is the top view looking down) to keep the good one secure, so it "DOES NOT MOVE" while you move the others around to find a match.)
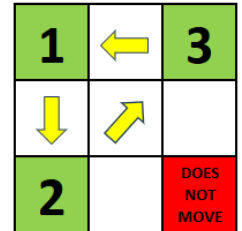
- WITHIN CORNER ALGORITHM #2, THE BOTTOM RIGHT TILE DOES NOT MOVE. REPEAT ALGORITHM #2 TO RELOCATE CORNERS TILES FROM POSITIONS **#1** to **#2** to **#3** TO FIND THE BEST COLOR FIT.

8.) **Fixing the Corner Colors:** Corners have 3 tile colors with two important algorithms to fix correct color placement.

IDEAL: If you are lucky the first time to match the **"IDEAL"** photo below, where ALL 4 corners have ALL the right adjacent colors, but not in the right places, then you can use the **CORNER OPTION #1** algorithm to flip each color tile around and solve the Cube Project.

CRITICAL Work Instruction Note: *IF* your Cube corners are **NOT** in this **IDEAL** scenario, you must skip to **CORNER OPTION #2** algorithm *ELSE* you will have a freshly scrambled Cube in a start over condition. NOTE: Project mistakes can easily happen when you see the finish line and start celebrating too early.
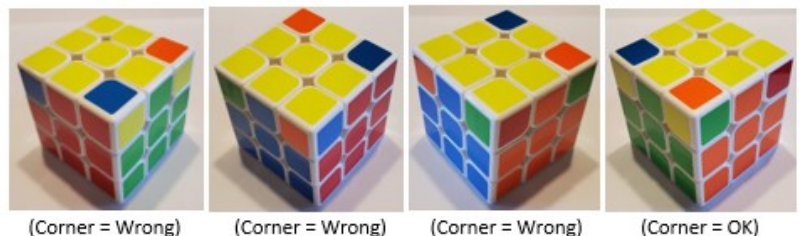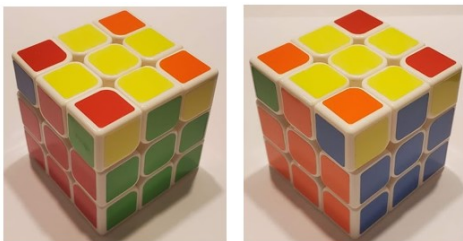
IDEAL   TYPICAL

IDEAL: CORNER OPTION #1 ALGORITHM: (THIS SIMPLE ALGORITHM HAS THE MOST RISK - ONLY USE AFTER THE FINAL CORNERS COLORS ARE IN THE PROXIMTY OF FLIPPING TO DONE.)
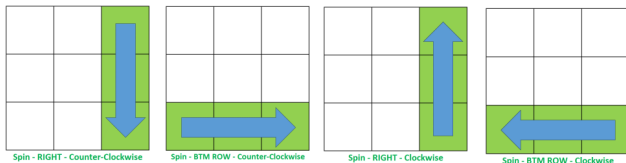
CAREFULLY REPEAT ALGORTHIM #1 UNTIL _ONE "UPPER FACE" CORNER TILE IS SOLVED BEFORE ROTATION-_ (NOTE: The Cube at this point will look scrambled, this is ok as shown in photos below, KEEP ORIENTATION, ROTATE THE NEXT "UPPER FACE" TILE INTO THE SAME CORNER LOCATION TO BE SOLVED, REPEAT ALGORITHM. Repeating this process will solve Cube.
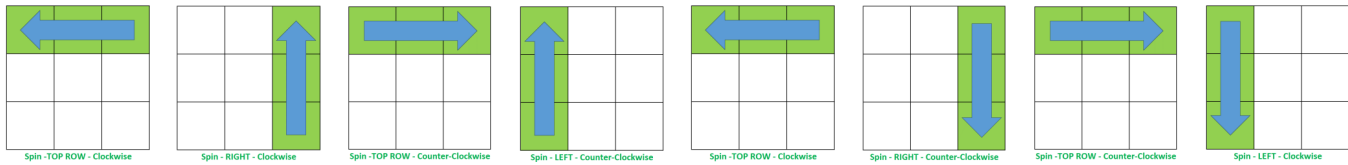

IDEAL CORNERS — **ONE CORNER SOLVED APPEARS SCRAMBLED** — **KEEP SAME "FRONT FACE" ROTATE "UPPER FACE"** — **REPEAT ALGORITHM #1**

The Cube Project

CORNER OPTION #2:

Rotate Cube's orientation as mentioned previously and repeat this algorithm until all corners have matching adjacent colors.

Once, you have all the corner colors in the "IDEAL" scenario positions, go back and perform the CORNER OPTION #1 ALGORITHM until the cube is solved.

MONITORING & CONTROLLING: This is where you monitor and control the performance and progress of your project through Monitor and Control Project Work, Perform Integrated Change Control, Validate Scope, Control Scope, Control Schedule, Control Costs, Control Quality, Control Resources, Monitor Communications, Monitor Risks, Control Procurements and Control Stakeholder Engagement. This will include Identifying positive or negative changes and your attempt to control, provide feedback, validation and performance.

For this Cube example, this is where you will monitor and learn from twisting the Cube in the wrong direction, then control by learning from your mistake. Remember, every project will have ups and downs, so failure is not an option and you got this!

PRO TIP: Some Cubes are tight or hard to twist, so set yourself up for success and purchase a loose easy to spin Cube for more fun!

CLOSING: All projects will eventually end. Make sure you formally close the Project to legally agree that everything is done and the customer agrees the project is officially completed and the bill gets paid.

- Customer and / or Sponsor accepts the deliverables (ie: Solved Cube) and pays the bill
- Provide final reports and wrap up loose ends
- Update your Lessons Learned Register and your roadmap for improvements
- Celebrate!

THE END.
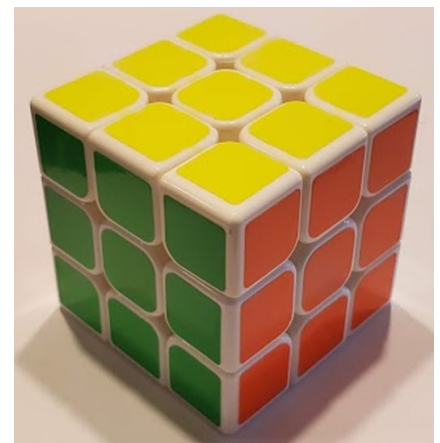
From: Dennis McVay, *PMP, CLSSBB, CSM*
Revision Date: 9/19/2023
Document Number: 360-20

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- Agile Manifesto: https://agilemanifesto.org/

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- ASQ® is a registered trademark of American Society for Quality and their website is https://asq.org/ for more information.

- Total Quality Management (TQM): https://asq.org/quality-resources/total-quality-management

- Quality Council of Indiana is a good source for quality training materials and their website is https://www.qualitycouncil.com/

- Ernő Rubik invented the Rubik's Cube in 1974: https://www.rubiks.com/

- Cube shown in photos is Duncan® Quick Cube™: https://www.duncantoys.com/Quick-Cubes/Quick-Cube-3-x-3-3901QC

- Catherine Hettinger invented the Fidget Spinner in 1993.

- Photos and Graphics from JustRethink, LLC: https://www.justrethink.com/

- Dennis McVay *PMP, CLSSBB, CSM* is online https://www.dennismcvay.com for feedback, comments or suggestions.

NOTE: This is a free educational document that was created to be shared and used as a fun training tool.

Thank You and Enjoy!