Official Rules of the

SVMA

2027 High School
Tic Tac Toe Manufacturing Challenge

In partnership with the SME Sacramento Valley Chapter

At a Glance

EVENT DATE	Saturday, April 24, 2027
LOCATION	Citrus Heights Event Center, 6300 Fountain Square Dr, Citrus Heights, CA 95621
REGISTRATION	Open through the day of the event
ELIGIBILITY	Individual high school students throughout the region

Contents

1. Eligibility and Participation
2. Project Requirements & Deliverables
3. Technical Specifications
4. Scoring
5. Mentoring
6. Deadlines and Event Logistics
7. Scholarships & Awards

A. Scoring Rubric

> **About these rules.** The official rules for the 2027 High School Tic Tac Toe Manufacturing Challenge are organized into four parts: Eligibility and Participation, Project Requirements & Deliverables, Technical Specifications, and Scoring. All participants are responsible for reading these rules in full before registering.

1 Eligibility and Participation

- **Student Status.** Only high school students from schools throughout the region are eligible to participate. Students must register at https://sacvalleymfg.org/2027-high-school-manufacturing-challenge/.
- **Team Structure.** There are no teams. Each project must be individual, with one project per student allowed.
- **Work Authenticity.** All design, programming, and fabrication must be conducted solely by the student. Industry mentors are permitted to assist only with equipment setup and validation.
- **SME Membership.** Optional but highly encouraged. Students should register as a member of the Society of Manufacturing Engineers (SME), which is free for high school students: https://www.sme.org/sme-membership/sme-membership-levels.

2 Project Requirements & Deliverables

To be considered for judging, participants must submit the following.

- **A Complete Set.** One board and 10 pieces — two different designs with 5 pieces each — totaling 11 pieces.
- **Technical Documentation.** Detailed drawings and a bill of materials.
- **Simple Report.** A written report of one to two pages.
- **Presentation.** On the day of the event, students must present their technical summary and finished parts to the judges. A student who cannot attend may ask another registered participant to present on their behalf, provided the judges are told at the table.

COMPETITION DIVISIONS

Contestants identify one of the following three competition divisions at registration, or a combination of the processes below. A contestant may change division on the day of the event, or ask to be judged in a second division, and the judges may recommend a change during judging.

DIVISION	REPRESENTATIVE PROCESSES
Metals Fabrication	Welding, soldering, brazing, mechanical fasteners, laser, plasma cutter, and similar processes
Machining	CNC or manual machining
Hybrid	3D printing, electronics, wood routers and lathes, and similar processes

3 Technical Specifications

- **Size Limits.** The primary project must fit within a 6.5-inch (16.5 cm) cube in the X, Y, and Z dimensions.
  - External accessories are permitted — including laptops, launchers, and similar items — to illustrate the operation of the project. External accessories should not detract from the primary project.
  - The total tabletop project may not exceed 4 square feet of tabletop presentation area, and the project display must not exceed 24 inches in height.
- **Materials.** Metal, wood, plastic, paper, or fabric may be used, and mixed media is allowed. Projects will be judged within one of the three competition divisions identified in Section 2.
- **Required Processes.** At least one subtractive process must be incorporated — for example a grinder, dremel, file, laser, plasma, mill, lathe, saw, drill, punch, or scissors.
- **Other Processes.** Any other methods, such as 3D printing or casting, are allowable.

- **Hardware and Electronics.** Any hardware — magnets, bearings, screws, and the like — may be used. Electronics are not required, but they are permitted.
- **Reports and Technical Drawings.** Required only if a contestant is entering the Best Technical Documentation award category.

4 Scoring

> Scoring criteria are set out in **Attachment A** at the end of this document.

5 Mentoring

In partnership with the SME Sacramento Valley Chapter, SVMA provides dedicated mentoring and support throughout this process.

- Students seeking guidance or technical assistance may book a 15-minute virtual consultation via Google Meet at calendly.com/sme-sacramento-valley/15min.
- SVMA will send a follow-up email to all high school instructors when the SME Calendly calendar opens for scheduling.

6 Deadlines and Event Logistics

REGISTRATION	Open until the close of the event on April 24, 2027. There is no registration deadline.
EARLY REGISTRATION BONUS	Five (5) points added for registration completed on or before January 1, 2027. The bonus is awarded to the candidate and applies in every award category the candidate enters.
DAY-OF REGISTRATION PENALTY	Five (5) points deducted for registration completed on or after 12:00 a.m. (midnight) on April 24, 2027. The penalty is applied to the candidate in every award category the candidate enters.
EVENT DATE	April 24, 2027
EVENT LOCATION	Citrus Heights Event Center, 6300 Fountain Square Dr, Citrus Heights, CA 95621

7 Scholarships & Awards

The SVMA Tic Tac Toe Manufacturing Challenge offers scholarships across several award categories, plus awards for participants and their programs.

STUDENT AWARD CATEGORIES

Top-performing students can earn scholarships in the following award categories.

AWARD CATEGORY	SCHOLARSHIP AMOUNT
Best Overall *(awarded once)*	**$1,000**
Most Innovative Design *(one per division — three awarded)*	**$500 each**
Best Technical Documentation *(one per division — three awarded)*	**$500 each**
Most Complex Approach / Processes *(one per division — three awarded)*	**$500 each**
Coolest Electronics *(one per division — three awarded)*	**$500 each**
Most Artistic *(one per division — three awarded)*	**$500 each**
People's Choice *(voted on by students — awarded once)*	**$500**

PROGRAM AWARDS

- **Mentor of the Year.** A $1,000 award is presented to the teacher or program with the greatest number of student participants.

PARTICIPATION REWARDS

- Every participant who submits a project will receive a swag bag containing various tools and items, including a ruler, caliper, tape measure, micrometer, safety glasses, charts, and a tote bag.

Attachment A — Scoring Rubric

2027 SVMA High School Manufacturing Challenge

COMPETITION DIVISIONS *chosen at registration — may change on event day*

- **Machining.** CNC and/or manual.
- **Metals Fabrication.** Welding, soldering, brazing, mechanical fasteners, laser, plasma cutter, etc.
- **Hybrid.** 3D printing, wood, plastic, fabrics, electronics, etc. or a combination of these and/or any of the above processes.

AWARD CATEGORIES *a maximum of two, nominated at check-in*

Each criterion is scored from 0 to 10, where 0 means the criterion was not addressed and 10 is excellent. Five criteria give a maximum of 50 rubric points per award category.

AWARD CATEGORY	SCORING CRITERIA — EACH SCORED 0 TO 10	MAX
Most Innovative Design	Originality · Problem Solving · Risk-Taking · Quality · Completeness	**50**
Best Technical Documentation	Clarity · Professionalism · Process · Quality · Completeness	**50**
Most Complex Approach / Processes	Process Difficulty · Multi-Step Integration · Execution Mastery · Quality · Completeness	**50**
Coolest Electronics	Electronics Integration · Functions & Features · Technical Skill · Quality · Completeness	**50**
Most Artistic	Visual Impact · Creativity in Style · Craftsmanship · Quality · Completeness	**50**
Best Overall	*Determined by a vote of the judges*	—
People's Choice	*Determined by a vote of the students*	—
Early Registration Bonus	Registered on or before January 1, 2027	**+5**
Day-of Registration Penalty	Registered on or after 12:00 a.m. (midnight), April 24, 2027	**−5**
MAXIMUM PER AWARD CATEGORY	*per award category: 50 rubric + 5 early-registration bonus*	**55**

Note. A candidate may enter up to two award categories but may win only one award. The early-registration bonus and the day-of penalty attach to the candidate, not the project, so each applies in both. Judges may adjust a candidate's division or award category during judging.