Hatchling Development Program

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Number of Members : 106 TURTLE (200 total)

TEXAS A&M UNIVERSITY Engineering

TEXAS A&M UNIVERSITY
ROBOTICS TEAM & LEADERSHIP EXPERIENCE

What is Hatchling?

Since its inception in 2015, Hatchling has grown into a multi-university program and the primary pipeline for advanced project members. This self-sustained 10-week program accepts 200+ members and introduces them to foundational engineering, technical, and soft skills. Members receive mentorship throughout the design process and hands-on creation of their first robot, culminating in a friendly internal challenge. Members graduate from the program with a community, passion for engineering, and the following skills:

- **SolidWorks Competency (CAD):**
  - Design custom parts and modify assemblies
  - Reading and designing around manufacturing constraints
- **Electronics**
  - Evaluating hardware specifications and datasheets
  - Circuit design and implementation
- **Programming**
  - Utilize Git/GitHub
  - Control hardware via a microcontroller
  - Python and C++
- **Manufacturing**
  - Soldering and crimping
  - Additive manufacturing
- **Problem Solving and Critical Thinking**
  - Teams go through the design process from concept creation to testing

Schedule

- **Week 1:** Introduction
- **Week 2:** SolidWorks (CAD) Foundation
- **Week 3:** SolidWorks 3D
- **Week 4:** Tools, Project, and Process
- **Week 5:** Design Review and C++
- **Week 6:** SolidWorks Assembly
- **Week 7:** Programming and Git/GitHub
- **Week 8:** Electronics and Soldering
- **Week 9:** Prototype Week
- **Week 10:** Build Week

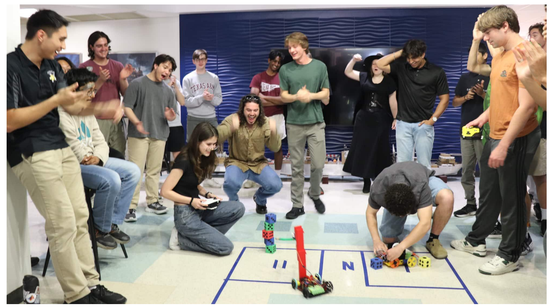

Figure 1. *The Spring 2025 TURTLE Towers Competition.*

Why Introduce a Game?

Introducing a game gives students a focused, engaging way to apply their skills in a hands-on project. By setting clear goals and challenges, the game encourages teamwork, creativity, and motivation, helping participants gain soft and technical engineering skills. It also reduces the open-ended nature of robotics projects, allowing student leaders to offer more specific guidance and mentorship for meaningful growth. Through this structure, every participant gains direction, confidence, and a stronger sense of community.

What is this Semester's Game?

TURTLE Towers - Squeeze Enterprises has recently acquired rights to build student housing in College Station. The contractor chosen to develop their properties will be whomever can acquire the most points in three minutes. The contract states that points are awarded on the number of living areas (blocks) and the height of the tallest skyrise. Hatchling members are contractors trying to win the lucrative contract.

- Teams are composed of 2 to 4 Hatchling members
- Robots will traverse a 6 ft long field to collect blocks and return the blocks to their respective team zone
- Points are rewarded based on the number of blocks within the team zone and the height of their tallest stack
- Bonus points are awarded for any robot that integrates sensor data into their function

Software

Hatchling members are given the opportunity to explore and learn the following softwares:

- SolidWorks ⟶ Computer-Aided Design
- VSCODE ⟶ Integrated Development Environment
- PlatformIO ⟶ VSCODE Extension for microcontrollers
- GitHub ⟶ Version Control and Collaboration for code
- Python and C++ ⟶ Programming Language

Hardware

Each Hatchling group is provided the following:

- ESP32-WROOM-32D Development Board
- HC-SR04 Ultrasonic Distance Sensor
- AS5600 Magnetic Encoder
- MPU6050 Gyroscope and Accelerometer
- 7.2V 2200mAH NiMH Battery Pack
- SG90 Micro Servos
- TT motors
- L298n Motor Driver
- Buck Converter

Lab Resources

All lab resources are available to Hatchling including:

- All lab tools with proper training
- All items not claimed by an Advanced Project
- 3D-Printers
  - PLA non CF
  - PETG non CF
- Fasteners

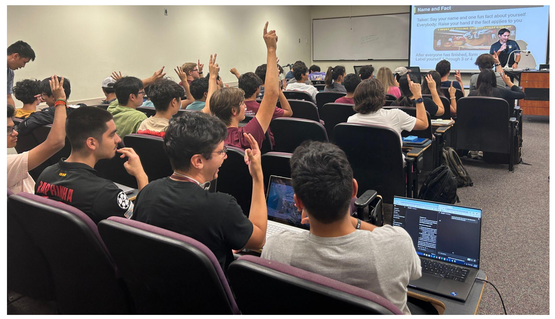

Figure 2. *Hatchlings partake in week 1 icebreakers.*

Expansion

Since 2015, Hatchling has been integral to the success of TURTLE. We believe every student organization should have a trusted development program to provide incoming members with technical and leadership growth opportunities. Starting in Spring 2024, expansion efforts overhauled the program from 16 members to the current capacity of 100+. Furthermore, Hatchling has partnered with several TAMU and TAMU Galveston organizations to provide more undergraduate engineers this unique opportunity.

- Texas A&M College Station
  - **Texas A&M University Robotics Team and Leadership Experience (TURTLE)**
  - Society of Mechatronics Engineers (SOMTECH)
- Texas A&M Galveston
  - TAMUG Aquatics Robotics Team (TART)

Success after Completion

Graduates of the Hatchling program include:

- Engineering student org presidents & officers
- Hatchling leaders
- Project team leads
- Project sub-team leads
- Solidworks certified (CSWA and CSWP)
- Undergraduate researchers and Interns

Learn More

Hatchling's goal is to develop the next generation of engineers. To continue this mission, we are always looking for passionate organizations, potential members, and student leaders.
More information can be found at:

turtlerobotics.org/hatchling