



## What is HATCHLING?

Since its inception in 2018, HATCHLING has grown into the primary pipeline for advanced project members. This self-sustained 10-week program accepts 105 members and introduces them to essential technical concepts. Members receive mentorship throughout the ideation and creation of their first robot, culminating in an internal competition. Members graduate from the program with a community, passion for engineering, and the following skills:

- **SolidWorks Competency (CAD):**
  - CAD parts and modify an assembly
  - Read part drawings and evaluate parts
- **Electronics**
  - Identify components and the robotic applications
  - Navigate documentation for important information
- **Programming**
  - Utilize Git/GitHub
  - Control hardware via a microcontroller
- **Tools**
  - Identify common lab tools
  - Safely operate lab power tools
- **Soldering**
  - Safely solder wires and PCBs
- **Problem Solving and Critical Thinking**
  - See through the creation of a robot from ideation to completion

## Schedule

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



Figure 1. A HATCHLING Director lecturing on Week 4

## Why Introduce a Game?

Introducing a challenge, i.e. the game, gives members extra motivation to complete and improve a robot. Implementing a competition also narrows the scope allowing easier collaboration between members. Giving them guidelines on robot constraints provides directors an opportunity to better understand robot goals and provide more personalized advice. It's necessary to stress the importance of having a goal and working towards it. After the competition, members are able to keep their first robot..

## 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 skysrise. HATCHLING members are contractors trying to win the lucrative contract.

- Teams are composed of 2 to 4 HATCHING 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

## Competition Information

Haynes Engineering Building (HEB)

Saturday, April 26th

1:00 PM

Watch as 100 HATCHLING members take on this years challenge "TURTLE Towers". Will a HATCHLING team take down the juggernaut of Jonathan Foltyn (BLNC lead)? Who will be crowned the champion? Find out and support the future of TURTLE Advanced Projects.



Figure 2. Exclusive HATCHLING trophies for the winners

## 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
- 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

## Success after Completion

Graduates of the HATCHLING program include:

- TURTLE Officers
- HATCHLING Directors
- Advanced Project Leads
- Advanced Project Sub-Team Leads
- SolidWorks Certifications (CSWA and CSWP) Recipients
- Student Researchers and Interns
- Graduate Students

## Next Steps:

After completing HATCHLING, members get to apply to join Advanced Projects and become a contributing member with their new skills. These skills learned in HATCHLING apply to Advanced Projects, but are marketable and look very good on a resume; many members have been hired for internships after completing HATCHLING and continuing onto Advanced Projects.

HATCHLING has been integral to the success of TURTLE, now more than ever. Starting in the Spring of 2024, expansion efforts overhauled the program from 16 members to the current capacity of 105 members.

HATCHLING is looking for passionate people to serve as HATCHLING directors and develop the next generation of TURTLE members. Keep an eye out for applications!