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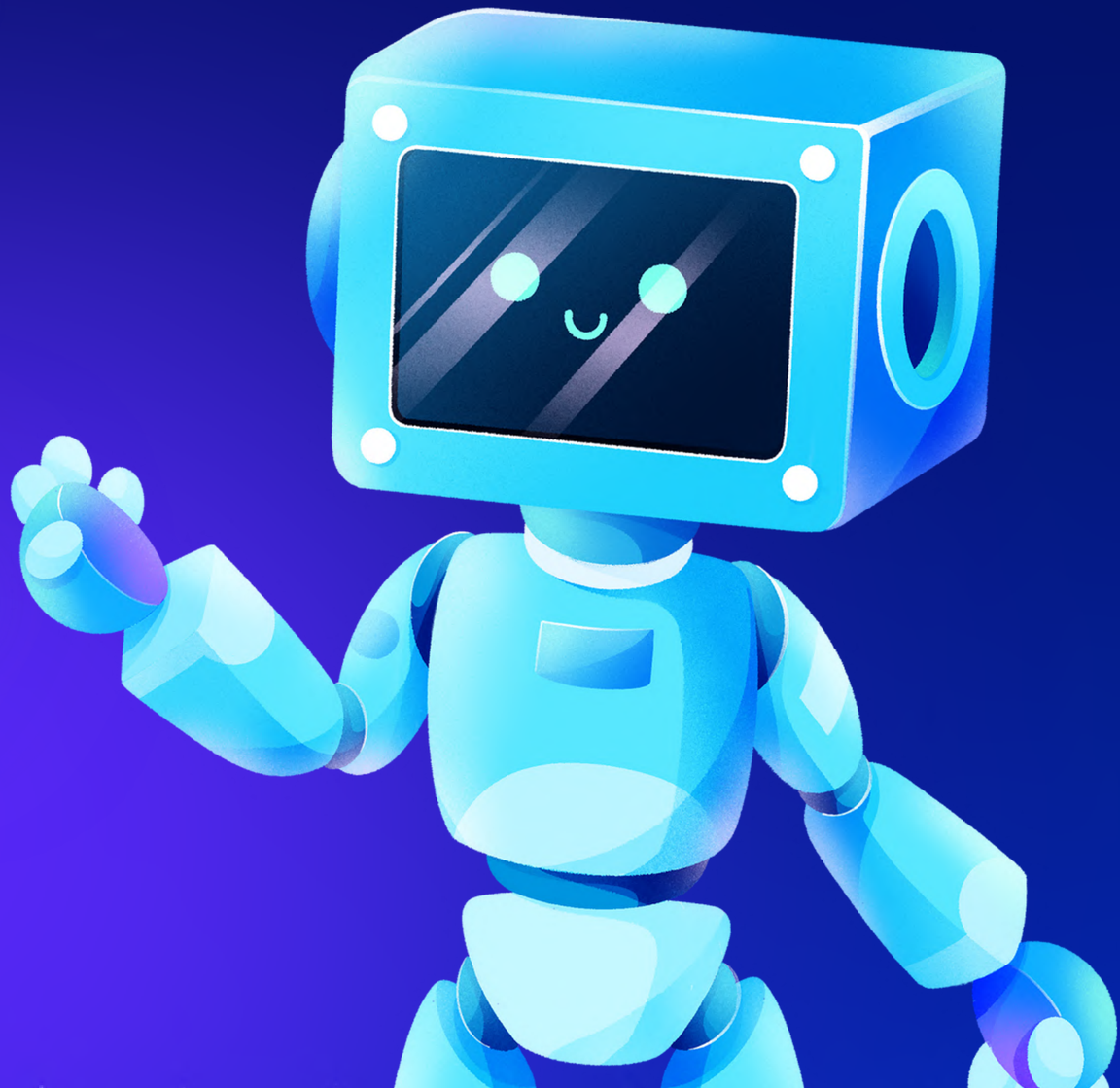
30597B

ROBOTICS
2023-2024 CAREER READINESS
CHALLENGE!!!!

PROJECT

THE IMPORTANCE OF ENGINEERING PROCESS



South Korea, Jeju, KISJ

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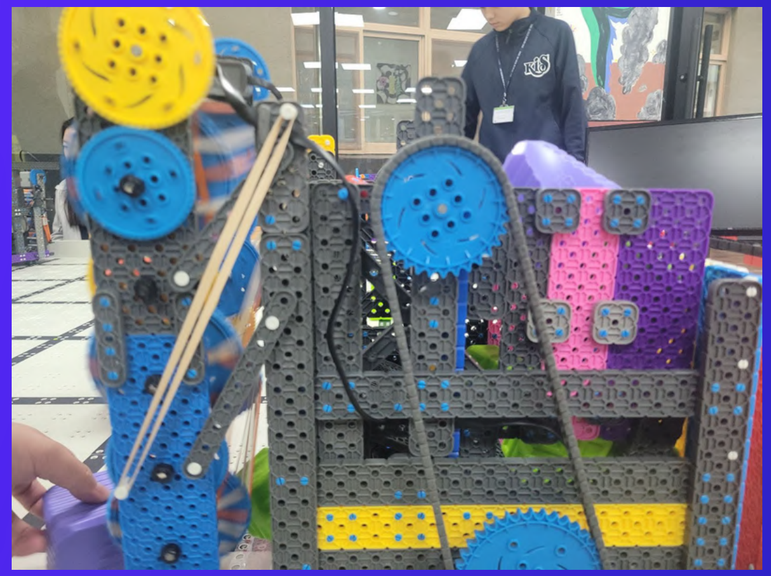


30597B's Robot

STEM CAREER

Mechanical Engineering

SPACE X

Elon Musk’s failed rocket

Our team chose “mechanical engineering” as our STEM career, as it shares two key similarities with VEX IQ. First, both mechanical engineering and VEX IQ involve manufacturing of robots. Second, engineers and programmers can express their thoughts in designing and programming the robots. Those two characteristics inspire people to strive for achievement and success in their careers.

Design Process
Yellow-Elon musk
Green-only us
white-both

Process in action!

The Design Process Cycle

01.DETERMINING OBJECTIVE +Brainstorming

The engineering design process starts when engineers brainstorm and identify the problems they want to solve.

Virtually modeling

02.PROTOTYPING (3D modeling)

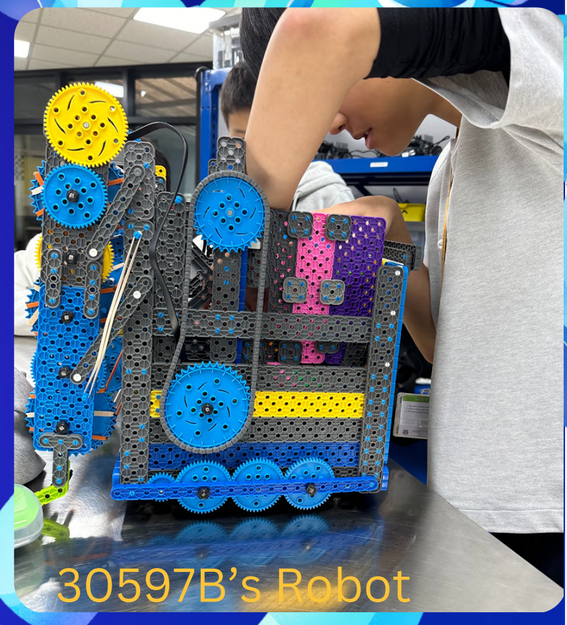
This is a process of making the small functioning parts of the robot. Making a prototype will help by trying different versions.

03.TESTING

Test the robot and prototypes under various conditions so that engineers understand the pros and cons.

04.EVALUATION

Evaluate the robot and find weaknesses and shortcomings. After identifying the issues, the design process cycles repeats again.



30597B's Robot

Design Process ex.

Elon Musk
@elonmusk

These problems are fundamentally intertwined. Building many rockets allows for successive approximation. Progress in any given technology is simply # of iterations * progress between iterations.

How Elon Musk applies the design process:

1. Provides detailed guidelines of the design process and ensures people follow exact orders
2. Continues to simplify and optimize the design process
3. Accelerates cycle time
4. Automates

SpaceX is willing to tolerate some failures to go fast. Following the "iterative design" process, the company builds, tests and launches rockets as quickly as possible.

Musk's Equation: "Progress in any given technology is the number of iterations multiplied by progress between iterations."

"Possibly the most common error of a smart engineer is to optimise a thing that should not exist." - Elon Musk

Our Design Process

“We should try this out!”

“No, that’s not how we should make it.”

“Let’s try it again!”

Our team had many heated discussions of this kind while working on our robotics project.

We questioned ourselves everyday,

“Why can‘t we fix it?“

Looking back, we learned that improvements were made when we were able to fix the mechanical and program failures.

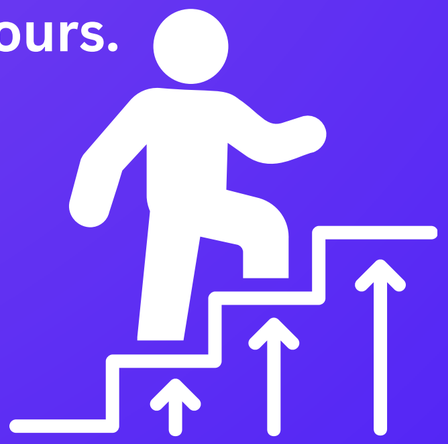
Our team members discovered that failures are the starting point of the design process.

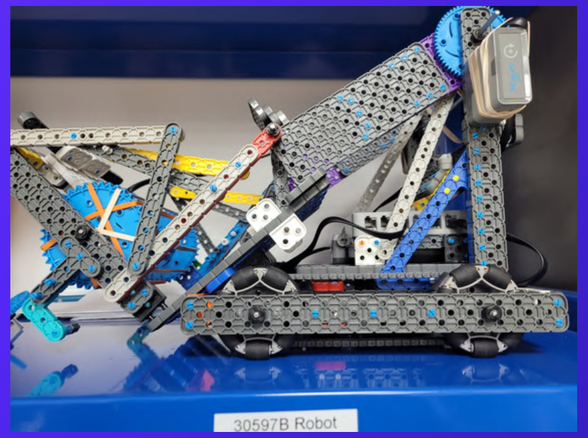
Our teammates became frustrated and fought with one another when the project didn’t work out as we planned and expected.

We define the design process as the process of finding errors.

Our Design Process

On one occasion, we changed the whole design of the robot to a completely new set. The decision was a difficult one to make. Some team-members thought we didn’t have enough time, but others insisted that we should still change it. The risk was high given the short amount of time, but it was worth changing; if the new robot worked well. We decided to proceed because we saw high quality robots in the EJ Cup that could sort different sized blocks better than ours.





Our team members proceeded through an active-design process when discussing whether or not we should make the change. The process involved brainstorming, building, and progressing through small steps, and incorporating failures to make improvements.

COMPARE AND CONTRAST OF DESIGN PROCESS

Vex IQ and Mechanical Engineering share Similarities

-make a product that works for specific needs
-optimize the process in order to save time
-make mistakes and start over to develop an improved robot
-brainstorm with team members for better ideas and make a prototype before action

DIFFERENCE:

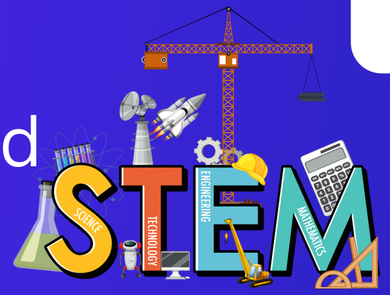
-Elon Musk optimized the process and virtually modeled before making (we went through the process slowly because we weren't familiar with some functions).

IMPORTANT:We all follow the design process.

Vex IQ:Our Future Career

How Vex IQ helps:

Vex IQ helps students learn to solve problems quickly and effectively as part of a team.



Our Future: With first-hand experience in Vex IQ and the design process, we believe we have become productive problem-solvers in various academic and practical fields. We would like to be similar mechanical engineers in our future careers. Even if we don't become engineers, we gained the advantage of problem-solving efficiently.

Advantage:

-use to repetitive task
-efficient problem-solving skills using the design process
-positive attitude and motivation
-teamwork
-data analysis

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