

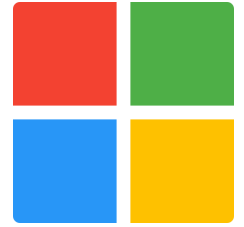
West Vancouver, BC, Canada
Ten Ton Robotics Academy
1010N

The Microsoft logo graphic is composed of four colored squares arranged in a 2x2 grid. The top-left square is orange, the top-right is green, the bottom-left is blue, and the bottom-right is yellow. The word "Microsoft" is written in a bold, dark grey sans-serif font, with the letters "o", "s", "o", "f", and "t" overlapping the orange, green, blue, and yellow squares respectively.

Microsoft

**2024 Career Readiness
Online Challenge**

Why Microsoft?



Founded by Bill Gates and Paul Allen in 1975, Microsoft Corporation, Inc. is one of the world's largest technology companies. This trillion-dollar company has an ever-growing influence from its Windows operating system and a suite of productivity solutions such as Excel and Word in Microsoft Office to its electronic gaming console system, Xbox. Spearheading software development, Microsoft created its products and applications indispensable for millions of users by relying on a fundamental design thinking process. Inspired by Microsoft's continuous high-quality innovations, our team aspires to also achieve excellence through a rigorous engineering process. Therefore, we explored their website and interviews with employees to understand their fundamental design cycle.

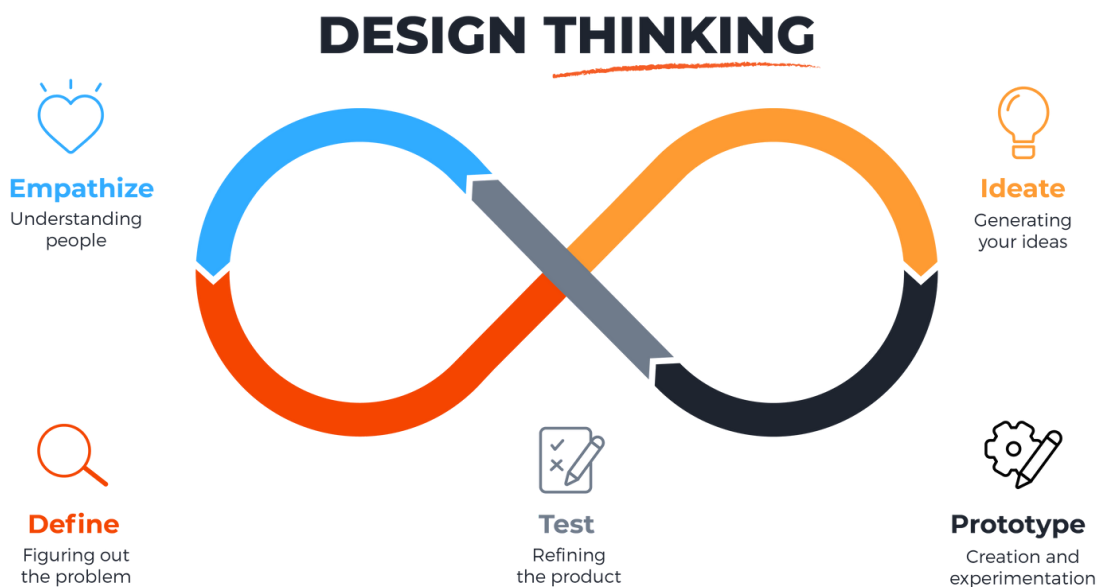


"Xbox Series S – 1TB (Black)." *Microsoft,*

"Microsoft Office 2021 -
ASI Canada." *ASI Partner,*

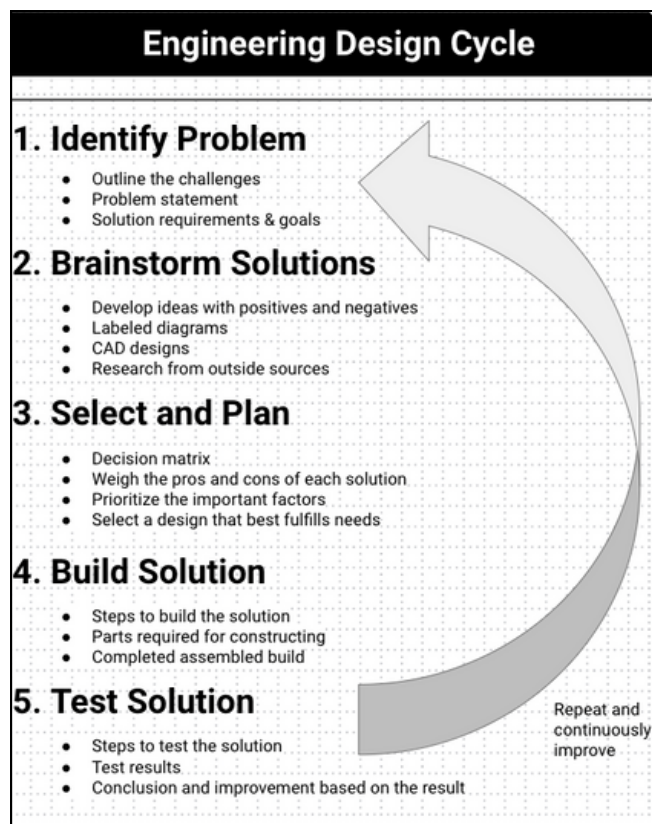


Design Processes



“The Design Thinking Process - How does it work?” MAQE,

Microsoft applies the model of the design thinking process to create or reshape its products for user-centricity. This approach encourages design and engineering teams to explore problems and solutions beyond the initial level of understanding to achieve commercial and technological success. The 5 main steps of the design thinking process are: Empathize, Define, Ideate, Prototype, and Test. These key focuses overlap with our team’s engineering design cycle. However, we aim to create a robot personalized to the challenge of each VEX season while Microsoft’s design process centers around the demands of end users.



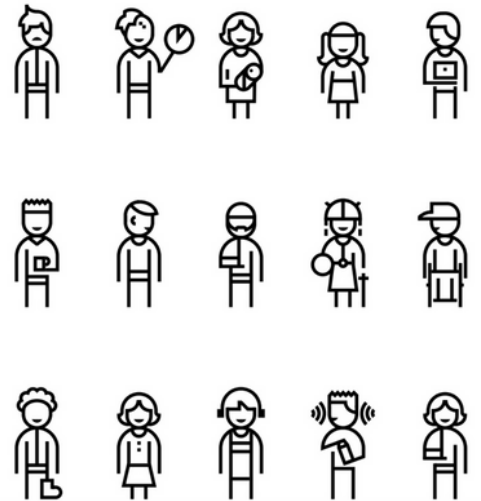
1010N Engineering Notebook

Empathize + Define / Identify Problem

Microsoft focuses on the overall spectrum of its future. The professionals plan the evolution and operation of an entire ecosystem of products, rather than the execution of one. They strive for better harmony between software and hardware to evolve around the user's expectations and experiences. To achieve this, they empathize with their customers and consider *why* before *what*. Then, they evaluate *who* with one of Microsoft's major principles, the inclusive design ethos. To empower the greatest number of people, this comprehensive design method allows them to learn from diverse perspectives and identify exclusion.

Inclusive

A Microsoft Design Toolkit



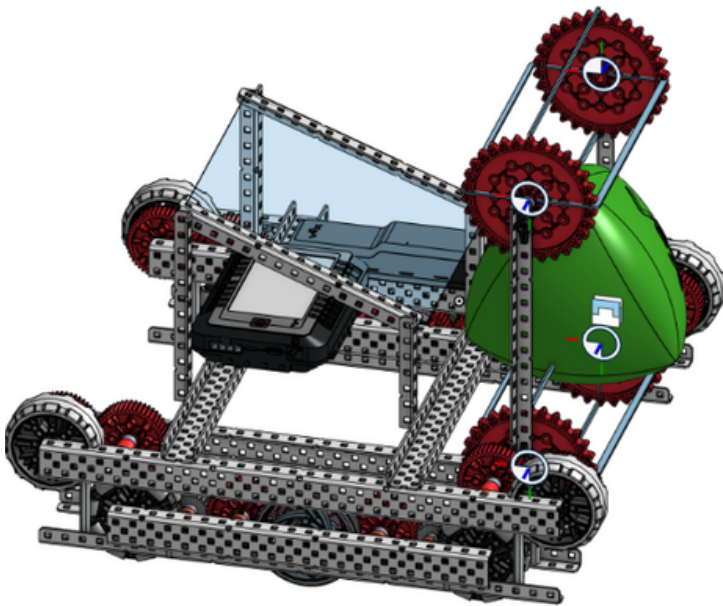
Bringolf, Jane. "Microsoft's new inclusive design toolkit - a CUDA post." Universal Design Australia,

For VEX, our team outlines the criteria of the annual game to develop solutions and goals. So forth, we can plan and design our robot accordingly.

Ideate / Brainstorm + Select and Plan

Previously, Microsoft had separate teams to work on the various aspects of a product to put together in the end. This company has switched to promoting an open integration of ideas as opposed to the fragmented approach. This way, designers can share their work and exchange concepts to collaborate more freely. As a result, they can gain multiple insights and rounds of brainstorming.

To develop an iteration of the robot, our team ideates multiple subsystems and weighs them with pros and cons. We 3D designed the drivetrain with CAD (Computer-Aided Design) during the early season to use as a reference when building. Additionally, we do secondary research to discover useful trends that can improve our robot design.



1010N Pre-Season Drivetrain CAD

Prototype / Build

At this stage, designers build a scaled-down version of their solution to visualize outcomes, identify errors, and receive feedback.

Our team create a prototype of the most effective solution from our team's decision matrix to use as a guide when building the finalized design.

Test

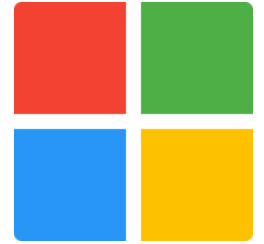
Lastly, the professionals uses benchmarks, comparison studies, and product usability to evaluate the prototype and validate if the user problems are solved.

For our team, we make tables and lists to record the performance of individual subsystems or all functionalities of the robot. Then, we analyze this information to recognize areas of improvement.

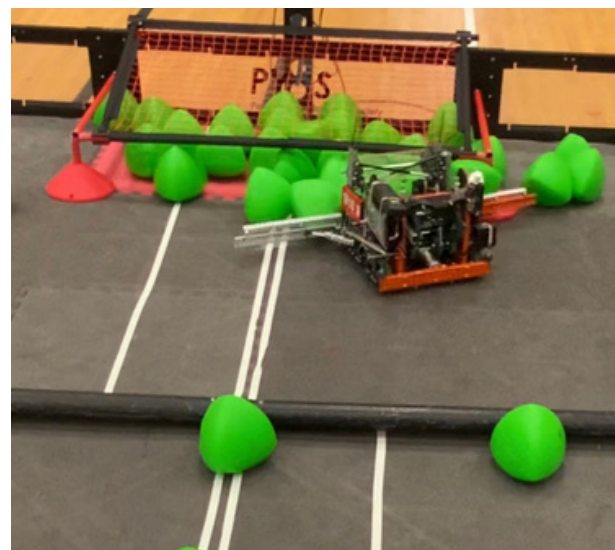


Warren, Tom. "Microsoft's prototype Xbox controllers for phones look ideal for xCloud." The Verge,

Career Readiness



With various connections between the design thinking process utilized by multinational corporations and the engineering design cycle of VEX Robotics students, we have already been gifted the fundamentals of success in STEM fields. We developed a habit of learning from errors, an innovative mindset, a profound understanding of hardware and software, productive teamwork, and excellent adaptability. Following the iterative process, we analyze our mistakes to understand their causes and how to avoid them by reviewing engineering notebooks. Meanwhile, we practice thinking outside the box to creatively approach the components failing to perform satisfactory results. Throughout this cycle, we gain deep knowledge of an effective robot design as we carefully select gear ratios, find the appropriate torque, and explore various concepts. Moreover, we become accustomed to seamlessly collaborating with peers of different strengths, whether they are proficient in programming, skilled at building, well-practiced at driving, or have a keen eye for scouting. We foster this team synergy to cultivate a culture of respect and constructive criticism. Even under pressure during unexpected situations, we can articulate complex concepts in succinct terms to quickly make effective decisions, whether to troubleshoot technical issues, change game strategies, or modify robot design. Ultimately, we have learned from this hands-on experience the leadership skills that we can apply in the real world.



1010N Robot in Autonomous Skills

Sources

- Microsoft Inclusive Design*, <https://inclusive.microsoft.design/>. Accessed 19 November 2023.
- Bringolf, Jane. "Microsoft's new inclusive design toolkit - a CUDA post." *Universal Design Australia*, 24 May 2023, <https://universaldesignaustralia.net.au/microsofts-new-inclusive-design-toolkit/>. Accessed 24 November 2023.
- "The Design Thinking Process - How does it work?" *MAQE*, 20 April 2020, <https://www.maqe.com/insight/the-design-thinking-process-how-does-it-work/>. Accessed 24 November 2023.
- Gurung, Prajaktha. "How Microsoft Reshaped Products by Embracing Design Thinking." *Great Learning*, <https://www.mygreatlearning.com/blog/how-microsoft-reshaped-products-by-embracing-design-thinking/>. Accessed 19 November 2023.
- "How Microsoft Design A Product – icsid.org." *icsid.org*, 8 September 2022, https://www.icsid.org/uncategorized/how-microsoft-design-a-product/#google_vignette. Accessed 19 November 2023.
- "Microsoft Office 2021 - ASI Canada." *ASI Partner*, 20 October 2021, <https://www.asipartner.com/canada/partners/microsoft-office-2021/>. Accessed 19 November 2023.
- Shum, Albert. "Inclusive Design Thinking at Microsoft | by Albert Shum | Microsoft Design." *Medium*, 3 May 2018, <https://medium.com/microsoft-design/inclusive-design-thinking-at-microsoft-5509da5f8ac0>. Accessed 19 November 2023.
- Warren, Tom. "Microsoft's prototype Xbox controllers for phones look ideal for xCloud." *The Verge*, 9 July 2019, <https://www.theverge.com/2019/7/9/20687750/microsoft-xbox-controller-phones-tablets-prototype-xcloud>. Accessed 24 November 2023.
- "Xbox Series S – 1TB (Black)." *Microsoft*, <https://www.microsoft.com/en-ca/d/xbox-series-s-1tb-black/8zcbggtt29h9c?activetab=pivot:overviewtab>. Accessed 19 November 2023.