



STEM CAREERS IN COMPUTER PROGRAMMING

Team Info

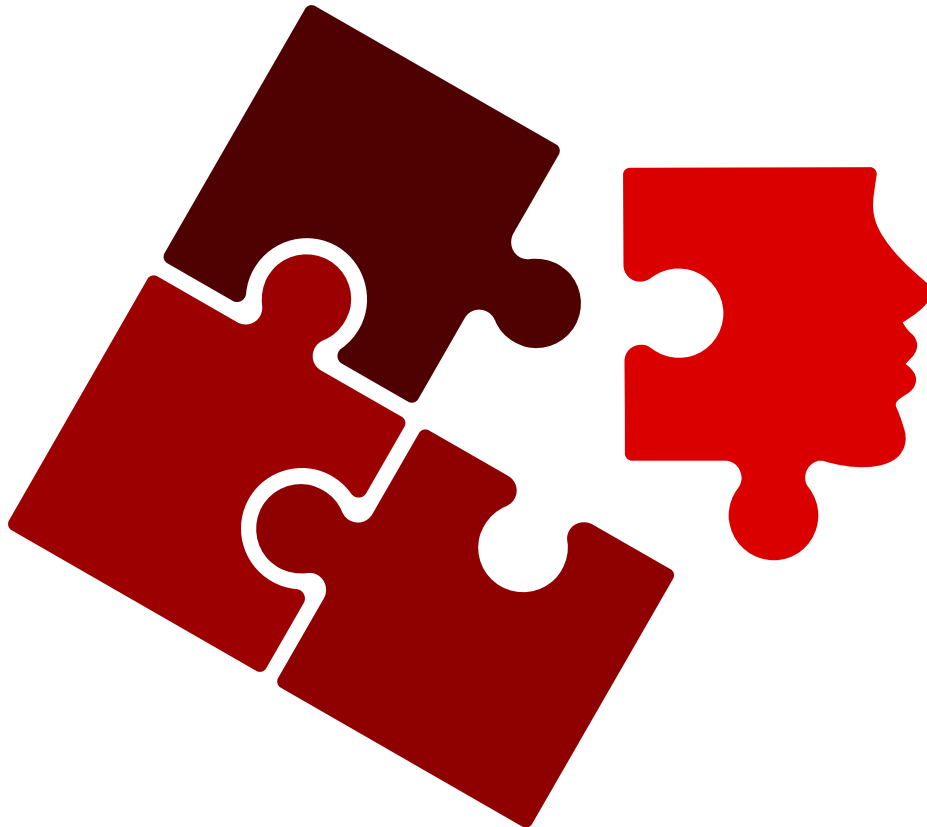
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As the world evolves around us, we are now entering a new age of digital life. As part of this, computers, and other digital devices are becoming more integral to our daily lives, each requiring specific programming to fully ensure they fulfil their role to the fullest extent possible.

This programming is done by a number of highly skilled and trained programmers from around the world, working for a number of different companies and organizations.

Computer Programming and STEM



For this project, we chose to look at computer programming for a number of reasons. Firstly, despite computer programming's obvious involvement in Technology, we feel that it also applies to every other aspect of STEM as well.

- Science, as programmers working in fields relating to robotics (as we will be focusing on here), must often take into account the physical constraints a robot has, as such requiring a certain degree of knowledge of physics.
- Technology, as it involves the development and use of new and emerging technologies to create more advanced products.
- Engineering, as computer programmers do much more than just write code. Much of their time is spent collaborating with engineers to help ensure the software takes full advantage of the hardware, and to ensure the hardware works to complement the software.
- Math, as a large part of computer programming is developing algorithms to complete specific tasks more efficiently and with greater reliability. This requires a large amount of mathematical skill and knowledge.

Secondly, it is something that our team has a lot of experience with, as demonstrated in our autonomous program for the 2020-2021 VEX IQ Rise Above season. This was capable of scoring a total of 280 points with our program we developed over the course of one month.

How the Engineering Process is Applied to Computer Programming

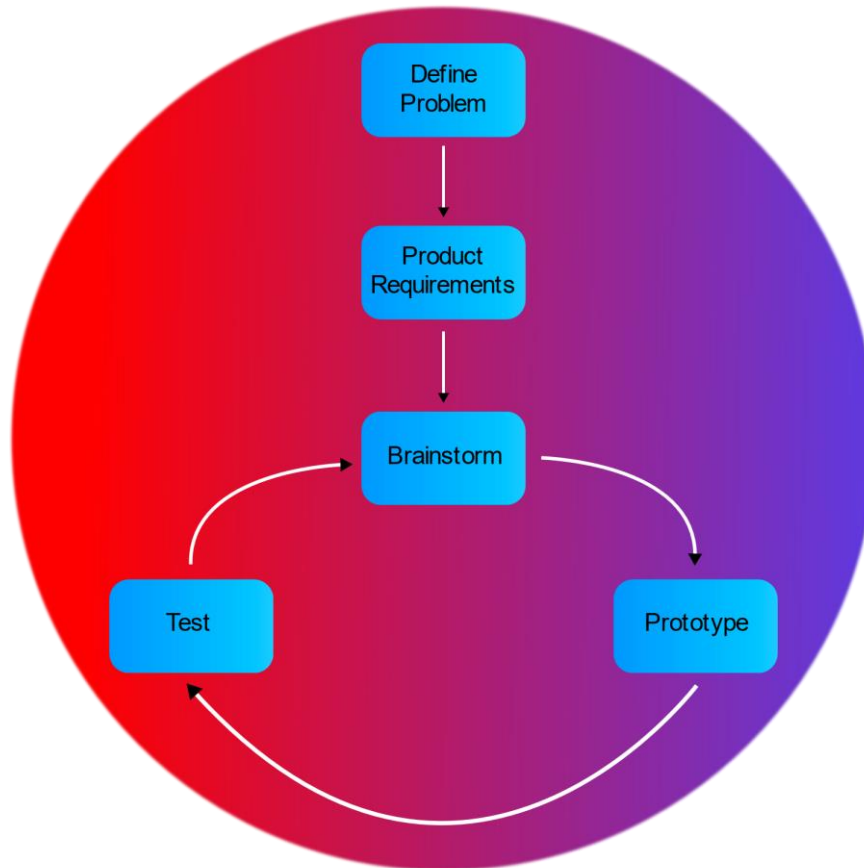


Figure 1: The design process as used in computer programming

Computer Programming makes extensive use of the design process to create a complete process. Here is a quick rundown of how computer programmers do this.

First, programmers look at what their product needs to achieve. This gives the programmer a target to work towards, helping significantly in the brainstorming phase. The brainstorming phase generally involves working backwards from the target product to simple tasks that can each be individually programmed, tested, and fixed when bugs inevitably arise.

From here, the programmer will start actually developing the project (prototyping). Once they believe they have a working prototype, they will test it, and attempt to fix any bugs that arise. This cycle repeats many times (sometimes thousands of times), resulting in the final product.

This is exactly the same process that our team uses when developing our autonomous programs.

For hardware, however, our team does some things slightly differently. For example, in the brainstorming phase, we usually work from what we have up to the target design, ensuring that it is compatible with our robot.

This highlights one of the main things that participating in VEX Robotics teaches people: Putting the design process into action. While there is much to be learnt from brainstorming ideas and thinking about them, the only way to develop the skills used in the design process is to put them into action.

This has helped our team develop a variety of skills, including CAD, robot design, computer programming, and collaboration between team members. These skills are invaluable in almost any STEM-related career, but can all be learned from computer programming (in a robotics-related environments such as VEX).