

BOEING STEM HUB-EGYPT

ARDUINO PROGRAM



PROGRAM OUTLINES

Contents

Program Introduction	2
Program Skills Structure	3
1. Scientific and knowledge skills	3
2. Engineering and Hands-on skills.....	3
3. Personal and Teamwork Skills.....	4
Program Progress Phases	5
Phase 1 – Preparation.....	5
1. S: Scientific and knowledge content	5
2. E: Engineering Practices	5
3. H: Hands on Activities and checkpoint assignment	5
Phase 2 – Design	6
1. S: Scientific and knowledge content	6
2. E: Engineering Practices	6
3. H: Hands on Activities and checkpoint assignment	6
Phase 3 – Implementation.....	7
1. E: Engineering Practices	7
2. H: Hands on Activities and checkpoint assignment	7

Program Introduction

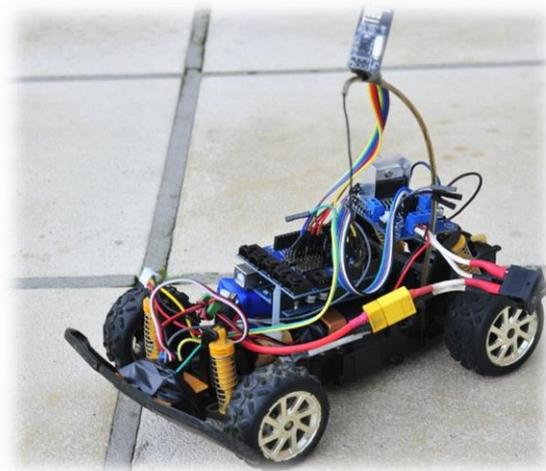
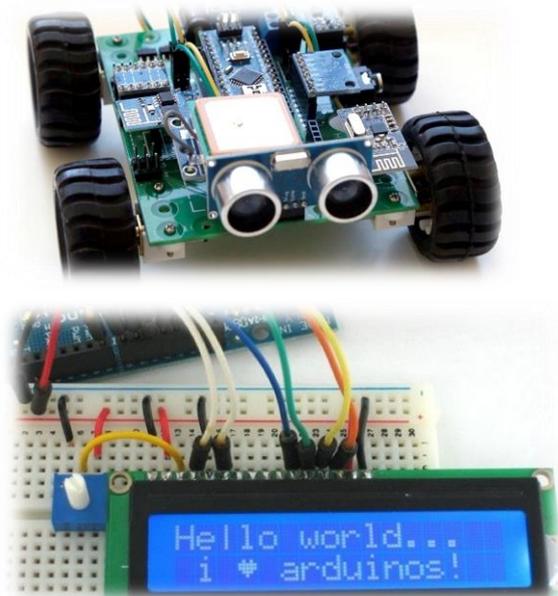
Have ever wondered how all the electronic devices around us work? Did you want before to build your own, but you have no previous knowledge? So, you are welcome! This program is intended to help you acquire the basic science and knowledge of how electricity, electronic devices, and controlled systems work. Not just that, but also a hands-on experience dealing with various electronic components and mainly depending on Arduino.

Welcome to the world of Microcontrollers, but first you need to be equipped with the suitable knowledge; thus, this program covers various topics from Physics and Mathematics till Programming, Design and Engineering skills; all combined to help you have a solid background enables you to apply many inter-disciplinary concepts, which the theme of how all our programs are.



It does NOT stop here; we will move to know more about the design process, circuits simulators software, FabLab and the measuring techniques; then, each learner will be encouraged to design his own system with his own imagination and visualization about its functionality.

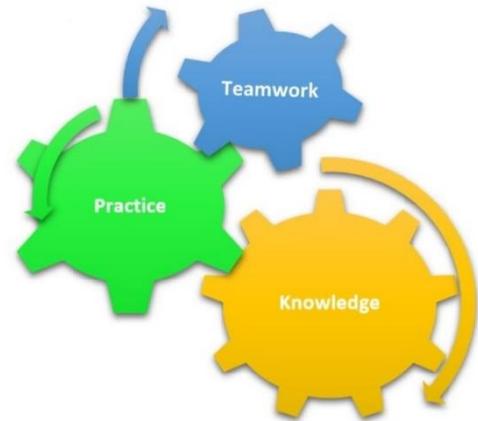
Finally, learners collect all the information and skills they gained to make that manufactured controlled system as they visualized it to do certain function, collecting data, or accomplish a specific task; Hence, ignites the spirit of competition.



Program Skills Structure

Objectiveless approach isn't what we intend to deliver. There are certain set of skills that are highly targeted to you. These skills will be the core value that we present. Each one will be a trigger for the other, so the skeleton of our programs is truly the essence of those skills. As illustrated in this gear mechanism Get used to this, sooner you will understand, design, and build a complicated gear system of your own.

Knowledge gear is what drives us all, the true and the very meaningful value we need you to acquire. Then here comes the next gear -Practice- where you will do science and knowledge. However, teamworking gear is very essential aspect of our programs. In response to the previous gears, You and your team will be assigned to tasks through the program. You will learn how to manage your time and collaborate with your team mates to accomplish them. Success isn't just about building great things, the economic and business management skills are also crucial in our program to prepare you for a challenging tomorrow's world experience



1. Scientific and knowledge skills

This is the main core of any program we provide. It's not about making fancy stuff without getting into the essence of what and how they are according to the science and knowledge perspectives. Don't worry, we will prepare you so well for that to take you to the exciting part of building your flying machine.



2. Engineering and Hands-on skills

After you got the knowledge, now it's time to practice it. Using different machines, instruments, equipment, and tools. Enjoy creating something from scratch and make it alive. Nothing can be more joyful than that. You will love the mess you will do in favor of making your first flight. But wait, it's not only about you, you should do that with your teammates. So, make as mess as you all want



3. Personal and Teamwork Skills

We are humans, Right? We can't live by ourselves. Although we have different personal and social backgrounds, but we need to learn how to work as a team to accomplish the assigned tasks and pass them. You and your mates may get into opposite opinions, frustrated with different decisions, or even passing through hard times. You will not have the privilege of selecting whom you are working with, Life isn't always generous. It's a lesson in your whole life far more than getting a project done. It's about how to be one for all and all for one. You also would go through challenging experience of making business model for you project. It is going to be a great leap in building your character to get ready for the future.



Phase 2 – Design

It is the stage that differentiates those who succeed, it is the stage where we plan how our final product will look like; the design stage. And, basically it is the stage where our young youth will start thinking of how their control-system will look like and draw it on pieces of paper.

1. S: Scientific and knowledge content

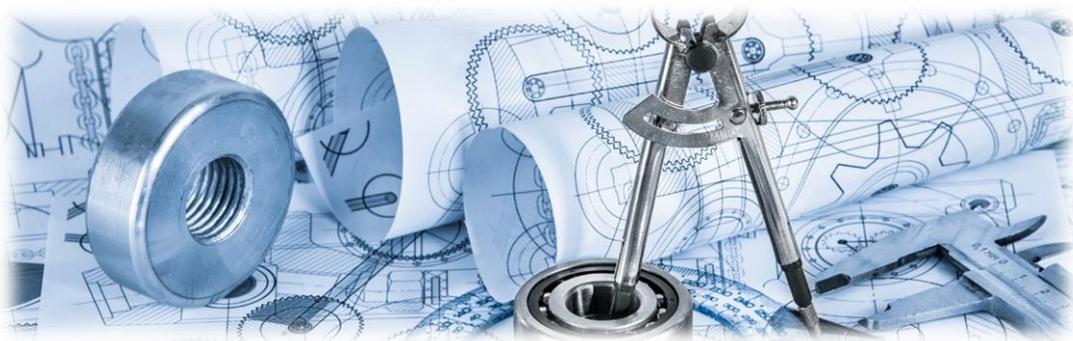
Engineering design process, circuits simulators, analysis and measuring tools and techniques, FabLab, control-systems' applications and their design.

2. E: Engineering Practices

Learners will be encouraged to make their own visualization to build and design; they will introduced to various circuits schemes, new different electronics components & structures, and useful tools and devices like the CNC and the laser cutter; then using different circuits simulators along with advising they will make their own manufacture's plan.

3. H: Hands on Activities and checkpoint assignment

It will be required to provide the circuits built, a detailed description of their system and all the used components. Also, specify what exactly their control-system will achieve and how this can be authentically measured.



Phase 3 – Implementation

It is the phase where young youth shall put what they've learned into action, and we as instructors see the fruit of what we've seeded. Although it is the most interesting phase, it is one of the hardest one because you may fail many times and face many problems. Yet, you've to keep testing, refining and trying to reach up the best prototype.

1. E: Engineering Practices

Let's now combine the components together, Real time components test, Re-Design and Re-Implement for improvement. Learners will have access to all the available tools and machines in the FabLab and all the electronics components and modules introduced in the Program.

2. H: Hands on Activities and checkpoint assignment

Each learner will finally construct his/her project collecting all the pieces together along with their knowledge to have their system performing real operations with all specified functions working. They will be assessed based on how their product meets the functionality of their proposal; also, they will be required to showcase their work to their peers and make useful discussion.

