# Build Your Avatar Program

## Program Introduction

Superheroes are famous nowadays. We all have been fascinated by watching superhero movies and even fantasized about having superpowers. We have dreamed about flying like superman or have a cool suit like Ironman. In this program, your dream shall come true. Because children love superheroes, and nothing will be fun and interesting as building their own heroes, they will be going into a journey of achieving their dreams by learning new scientific concepts and applying cool engineering tricks.



The approach of this program is designed to expand the creative thinking, analytical thinking, and problem solving skills of the children. They are encouraged to think outside the box for ideas about superheroes they love to make. They will be transforming their ideas into real life project which they can interact with. This program will give you more knowledge from different fields. Also, the program will give you tremendous engineering as well as personal skills.

The goal of this program is to understand the scientific and engineering concepts of building a robot from scratch.  This program will give you an exposure to principles of design with CAD, using simulation software and statistical tools (LabView) and not to mention an exciting FabLab experience where you will see your designs come to life. This is the fun part when we can enjoy thinking about the abilities of our heroes. After that, we will learn how to transform these ideas into an engineering
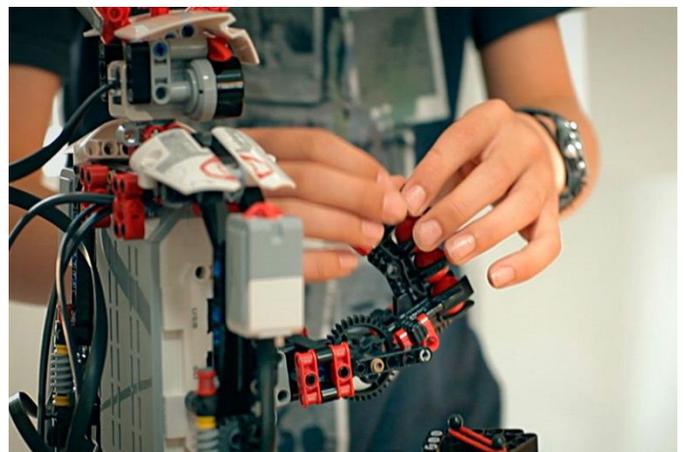
design.

Finally, we will fabricate it to be become a reality.

## Program Skills Structure

The set of skills in this program is dependent on three gears, knowledge, practice, and teamwork, so when one of them is triggered, the other two are triggered too. Yet after some time of exposure to this simple gear mechanism, you will be able to create a more complicated mechanism that fits you the most.



Knowledge gear will be the first to be triggered as it is the most important one and without it no other gear will be triggered. Knowledge 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 and try to practice your knowledge and connect it to real life problems. However, teamwork gear is very essential aspect of our programs. Thus, you and your team will be required to do some tasks through the program in which you will learn time management and collaboration to achieve success. Moreover, the program will expose you to economic and business management skills that are crucial to achieve success and to prepare you for a challenging tomorrow's world experience.

- **Scientific and knowledge skills**

As the main core of the program is to make a project but you must have to know the essence of what and how your project works according to the science and knowledge perspectives. You don't have to stress out, we will get you through the required scientific base you need.



- **Engineering and Hands-on skills**

After acquiring the knowledge, it's time to connect it to real world and practice it. Using different machines, instruments, equipment, and tools. You and your teammates will experience the joy and excitement of creating something from scratch and watch it come to life. Something that resembles everything you learnt and directed to environment and recycling.



- **Personal and Teamwork Skills**

No one can achieve success only by himself.  Yet we have different and diverse personal and social backgrounds, but we have to learn how to work as a team, as one, to achieve our goals whether it was the assigned tasks or anything else. For sure, you and your mates may get into opposite opinions, frustrated with different decisions, or even passing through hard times, but all of these things are what leads you to the best solution and ensures the best outcome. It is not

only about getting a project done, it is an experience and a skill that you will carry with you for the rest of your life and it will prepare you to face tomorrow's world with flexibility and strong character.

# Program Progress Phases

## Phase 1 - Preparation

In this phase you will be introduced to the principles of electronics, statics, dynamics, and physics as well as fabrication. The objective skills set for this phase are as follows:

- **1.S: Scientific and knowledge content**

  Scientific and knowledge content of motion basics and analysis of different models, models for walking robots, models of arms and gripers, Basics of motors mechanisms, and last but not least structure analysis of robot bodies.

- **1.E: Engineering Practices**

  Case studies for humanoid robots, researching for difference in design and understand the reason behind each mechanism of walking robots. Researching for why to use robots instead of humans

- **1.H: Hands on Activities and checkpoint assignment**

  Building and testing a cardboard model of the robot you designed.

## Phase 2 - Design

In this phase you will be through something exciting, learning whatever it takes to start designing your project. CAD Software, design structure, mechanisms, electronics, microcontrollers, sensors, motors, simulations Apps, etc.

- **2.S: Scientific and knowledge content**

    Electronics, sensors, controllers, Batteries, image processing and gripping mechanisms.

- **2.E: Engineering Practices**

    Robot design CAD (Solid Work), Coding (Arduino), Electronics CAD (MultiSIM), and Simulation and Test parameters (LabView).

- **2.H: Hands on Activities and checkpoint assignment**

    Complete CAD and Simulation test of your robot with all features (Mechanics, Electronics, Control, Sensors, Battery power management, etc.). Specify what exactly your robot will achieve.

## Phase 3 - Implementation

In this phase, all your dreams shall come true. It will completely dedicated the prototype of your project and watching it come to life. You shall re-design and re-build your project, if any error were found in the prototype.

### 3. E: Engineering Practices

Fab Lab, Real time testing, Re-Design and Re-Implement.

### 3. H: Hands on Activities and checkpoint assignment

Project Construction and Real operation.