

ADVANTAGE OF THE ARDUINO PLATFORM IN FORMING CREATIVE SKILLS IN YOUTH

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ABSTRACT:

This article describes the main advantages of the arduino platform and the process of working with the arduino microcontroller, as well as ideas on how to create projects using arduino.

Keywords: Arduino UNO, microcontroller, board, mechatronics, robotics, LED matrix, project, innovation, innovative technologies, software, programming, tinkercad.

INTRODUCTION:

The development of modern society requires the preparation of the basis for education engineering personnel starting from the secondary level of secondary schools. Such disciplines such as robotics, electronics, radio engineering and programming meet the demands of the technical industries of advanced research and manufacturing enterprises.

The creation of automatic control systems requires intensive development advanced science-intensive engineering disciplines, a large-scale revival of production and deep modernization of the scientific and technical base.

In this light, the initial engineering training of students in specialized technical disciplines, further professional orientation in the sectors of innovative production.

The robotics industry is relatively new and already now the leading countries of the world are showing active interest. Statistics show the following data - there are more than ten dedicated robotics engineers specialists in related areas (chemical production, new

materials, communication systems, etc.). Thus, the training of specialists in the industry robotics is a critical task to achieve advanced technical development and contributes to the diversification of the country's economy.

The use of autonomous control systems on microcontrollers is possible in almost all areas of people's daily life - from home use to automation of production processes at enterprises, participation in search and rescue operations, the creation of unmanned ground and air robotics, learning and more.

Creativity is a special type of human activity that creates new material and spiritual values with novelty and social significance. The creative process is characterized by a variety of forms: scientific, artistic, technical, musical, etc.

Technical creativity is associated with practical (technological) transformation of reality, the result of which is the creation various technical objects (models, devices, all kinds of mechanisms).

Like any activity, technical creativity presupposes development abilities. Creativity, as an independent factor, is considered researchers are the result of learning creative activities.

In the study, we distinguish the following components of creative (creative) abilities of younger students: creative thinking, creative imagination, the application of methods of organizing creative activities. An important task of additional education is implementation of pedagogical support on the path of finding and discovering a junior schoolboy. For this, it is important to determine the forms and methods

that will contribute to the development of students' creativity.

Arduino is an open-source electronic prototyping platform that also sells microcontrollers. Tinkercad Circuits allows anyone to virtually create and program Arduino projects without the need for physical hardware.

The Arduino language is C++, but it is very different from most C++ varieties. The Arduino language has a lot of abstraction built in, especially in the hardware interfaces, which makes it very simple to use. If you have a background in Java, C and C++ should be very similar.

Arduino programming is very simple and easy to learn. If you are comfortable with programming languages like C/C++ then learning Arduino programming will be like a child's play for you.

The Arduino electronic designer is a convenient platform for the rapid development of electronic devices. It is programmed in a special programming language based on C / C ++. The operation of the created algorithm can be visually checked on a physical device. The Arduino platform (www.arduino.cc) allows you not only to collect all kinds of electronic devices and program them, but also to conduct experimental and research laboratory work that stimulates the cognitive activity of students. This is the most important condition for the effectiveness of the educational process. Having written a program, students immediately see the results of their activities. An incomprehensible sequence of English words turns into an algorithm for controlling a real device, moreover, assembled by hand.

With Arduino, you can easily learn and test different behavior algorithms. As a basis for educational equipment, you can use the open platform Arduino (or any other platform of a similar level) and the environment for its programming. Arduino is easily combined with

various electronic components, allows you to create a variety of automatic and robotic devices. During classes and studying the material, it is imperative to set the practical direction of the classes.

Is Arduino Worth Learning?

Microcontrollers are the heart of every electronics project. Whether you're a student or an electronics hobbyist, learning how to program and use a microcontroller would benefit you in many ways.

But, is Arduino worth learning? Yes, Arduino is worth learning! Arduino is one of the most widely known microcontroller boards used by students, engineers, and hobbyists to create a multitude of different projects on robotics, home automation, and many others.

It's usual for a person to wonder why Arduino is so popular. And this question has many different answers.

5 Reasons Arduino is Worth Learning:

One of the best ways to utilize your time in this newfound lockdown era is to learn a new skill, and if you're someone who is into robotics and building new stuff using microcontrollers, then learning Arduino is your best bet!

Here are 5 reasons why you should add Arduino to your skillset:

1. Arduino Projects Won't Cost You an Arm and A Leg:

Building a robot sounds pretty cool yet expensive. But that's not true at all! With Arduino, you don't need to worry about spending a fortune on buying microcontroller boards.

Arduino boards are generally available under \$40, and you'll be surprised to know that some of their versions are selling for as low as \$20.

Isn't that too good to be true? You're paying such a small amount of money for a

microcontroller board, which you can program however you like.

And if you use it the right way, your Arduino board can last you a lifetime!

2. Arduino Is Easy to Program and Learn:

Yes, you read that right! You don't need to be a software engineer to write an Arduino program.

All you need to do is download the Arduino IDE for free, install it in your computer and start learning the basic commands and program structure through the built-in codes present in its library.

You can start with the elementary LED blinking program and gradually build up your skills by executing all of the codes present in the Arduino library one by one.

You can further dig into plenty of codes available on various websites on the internet.

Once you know the basics of writing an Arduino program, then you can write your code according to your project.

Arduino uses a combination of C and C++ programming, and these languages are the easiest to learn because of their easy-to-read commands.

3. Arduino Can Help You Build Cool Stuff:

Once you learn the basics of how to program an Arduino board and how to make its primary connections, you'll do wonders with this microcontroller.

You'll be only one step away from building cool stuff ranging from basic electronic sensor circuits to complex robotic circuits.

Here are some exciting Arduino projects which you can build once you learn how Arduino works:

Fingerprint Scanner: You can build your low-budget fingerprint scanner with Arduino and use it as a security check at your main gate.

Fingerprint-sensor-with-arduino:

Fingerprint Sensor With Arduino by robocraze.com

With a fingerprint scanner like this, you can allow just your family members to enter the house by recording their fingerprints in the board's database.

You can also use this fingerprint scanner outside your room's door so that no one except you can enter. How cool is that?!

Motion Detector Alarm System: Another way to boost up your home's security is to build a motion detector alarm system that goes off whenever it detects someone is standing in front of it.

All you need is a keypad, an ultrasonic sensor, a buzzer, an LCD, and an Arduino board to build this cool project of course.

Motion Detector Alarm By zishan123A

Robotic Car: A trendy project for beginners is an Arduino based robotic car. There can be two types – line following robot or an obstacle to avoiding robotic cars.

Arduino-robotic-car: "larryBot v0.6 completed" by Lucky Larry is licensed under CC BY-NC 2.0

This project attracts many people because, after all, it's exciting to build a robot that works its way around the house without any human help. You can also incorporate a brush or a mini broom beneath it and use it as a help to clean around the house.

4. Learning Arduino Prepare Your Kids for the Future:

If you're a parent with the responsibility to nurture young minds, then Arduino is worth learning for you. You can learn Arduino to teach it to your kids because it will help them immensely when they grow up. After all, the future is all about automation and robotics.

Learning how to program Arduino will help them grasp the concept of programming, and it'll also develop their interest in the field of robotics.

They'll enjoy building new projects with Arduino and develop their skills in the process.

5. Learning Arduino You Can Solve Problems Inside Your House:

Arduino can prove to be your best friend when it comes to home automation hacks and DIY household projects. It can be of great help in solving daily household problems such as keeping an eye on the water tank, so it doesn't overflow or switching off lights when no one is in the house, saving you money on monthly bills.

You can also build a programmable thermostat using Arduino and let it control the temperature inside your house by controlling the fans and the air-conditioning system.

If you're a fan of gardening, then Arduino can help you grow some greens as well. You can build an auto-irrigation system using Arduino and let it water your garden while you sit back and relax.

Another way to use Arduino as a gardening tool is to build your very own robotic lawnmower. With a robotic lawnmower, you don't need to put any effort into trimming the grass, all you need to do is watch the lawnmower do its job.

As Arduino is open-source software, there's plenty of resources on the web for building such Arduino projects. It's just a matter of using the right components for each project.

Arduino Education creates the next generation of STEAM programs that empower students on their learning journey through middle school, high school, and university and help them thrive.

The easiest way for beginners to get started with Arduino is by creating circuits using a solderless breadboard. These simple projects will teach you the basics of Arduino

Uno, electronics and programming. In this tutorial, you will be creating circuits using the following electronic components:

LED, RGB LED, Temp Sensor, Pushbutton, Potentiometer, Photoresistor, Servo, Motor, Buzzer, LCD screen

Before you can start working with Arduino, you need to make sure you have the IDE software installed on your computer. This program allows you to write, view and upload the code to your Arduino Uno board. You can download the IDE for free on Arduino's website.

Once the IDE is installed, you will need to connect your Arduino to your computer. To do this, plug one end of the USB cable to the Arduino Uno and then the other end of the USB to your computer's USB port.

Once the board is plugged in, you will need to open the IDE and click on Tools > Board > Arduino Uno to select the board. Select Serial Port

Next, you have to tell the Arduino which port you are using on your computer. To select the port, go to Tools > Port and then select the port that says Arduino.

Select Arduino Port:

Project Code. To complete the projects in this tutorial, you will need to download the project code which are known as sketches. A sketch is simply a set of instructions that tells the board what functions it needs to perform.

For some of these projects, we are using open-source code that was released by the good people at Sparkfun and Arduino. Use the link below to download the zip folder containing the code.

Once the file has been downloaded, you will need to unzip/extract the folder in order to use it.

Tinkercad Software: This is an advanced software, an online 3D modeling program running in a web browser, known for

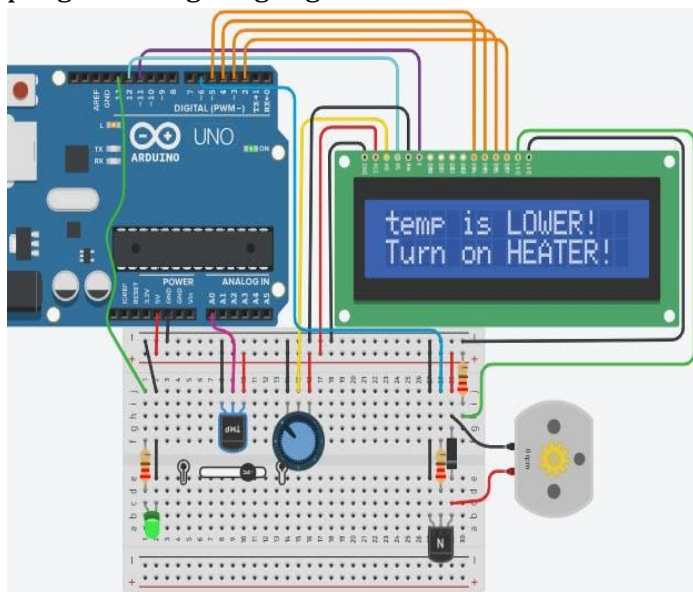
its simplicity and ease of use. we can simulate Arduino based circuits without hardware.

Tinkercad is a free-to-use, browser-based tool for 3D modeling, electronics simulation, and coding. It's cloud-based and accessible across different operating systems such as Windows, MacOS, and Linux.

Tinkercad's 3D modeling features are well known, but its expansion into circuits opens up a lot of possibilities for simulating circuits with Arduinos. This can be very handy in the prototype phase of your projects, or if you're just starting to learn about electronics!

Tinkercad Circuits is a website where you can prototype and simulate circuits of Arduino or your project. You can also use this as an initial simulation to make sure if everything is working fine and proceed with the hardware.

Once you open Tinkercad Circuits, the main window displays all the components. The sidebar allows for access to common electrical components as well as generic setups for prototyping. There's also a code panel to write code, based on the Arduino programming language.



Almost all innovative electronic devices, considering the designers, are controlled by microprocessors. Which implement their cooperation witheach other?

Also cooperation with people. Arduino kits are built on modular structures from popular processor families such as the MK Atmega328P.

Arduino's constructor programming code is built in C. This language is quite easy to learn and includes a special generalized development environment. That will allow you to create unusual projects for those who do not have the highest level of software development.

Today, almost all adolescents 12-13 years old are interested in learning programming skills, and microcontrollers. Now even the smallest have a chance to acquire the skills they need in the future. Classes and schools of computer technology and robotics for schoolchildren of 10-11 years old are being created everywhere. In these circles, the guys begin to learn about the computer as a mechanism for diversified development, develop Internet sites themselves, deal with fictional reality, program simple computer adventure games, but also invent complex electromechanical systems. Teenagers of all ages from school have the opportunity to orient themselves with the election of a level in IT and to comprehend whether they should continue their formation in a similar field. At the same time, these lectures prepare children to instantly accumulate decisions, act in a group and be able to find a way out of the most difficult situations.

For today's teenager, an electromechanical kit, such as a transformable construction set, would be a cool gift. Thanks to him, he acquires the skills necessary in school, and will be able to independently design and implement new ideas that will later become necessary for the entire society.

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