Topic: Introduction to IOT

- Subject :Internet of Things

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Introduction to IOT

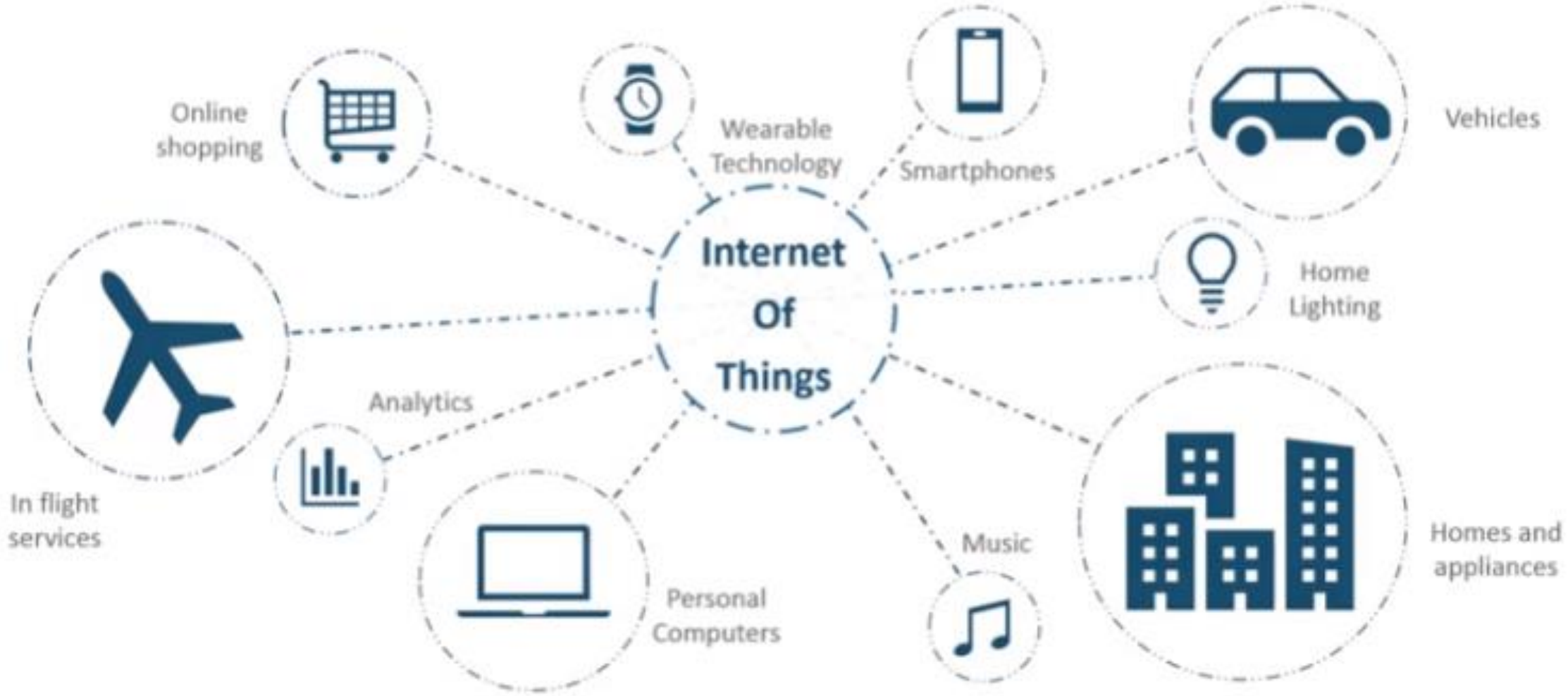
- IoT stands for Internet of Things, which means accessing and controlling daily usable equipments and devices using Internet.

- Connecting everyday things embedded with electronics, software, and sensors to internet enabling to collect and exchange data without human interaction called as the Internet of Things (IoT).

- The term "Things" in the Internet of Things refers to anything and everything in day to day life which is accessed or connected through the internet.

- IoT is an advanced automation and analytics system

Introduction to IOT



Advantages of IoT

- Efficient resource utilization
- Minimize human effort
- Save time
- Enhance Data Collection
- Improve security

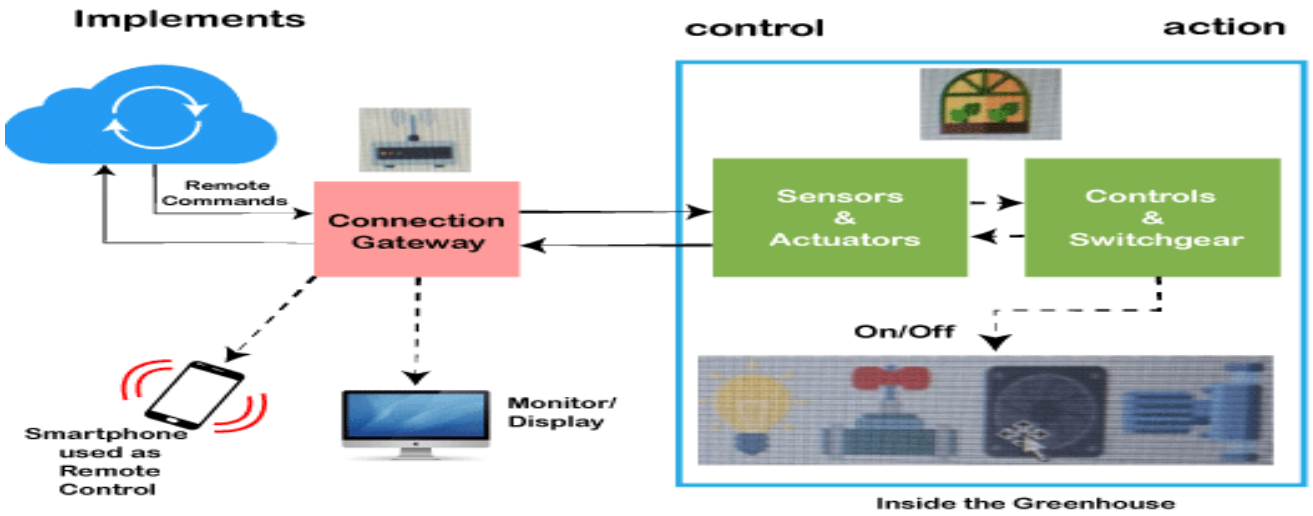
Disadvantages of IoT

- Security
- Privacy
- Complexity

Applications of IoT

- **Wearables**
- **Smart Home Applications**
- **Health care**
- **Smart Cities: Example of a smart city - Palo Alto.**
- **Agriculture**
- **Industrial Automation**
- **Smart Retail**
- **Smart Supply Chain**
- **Smart Farming**
- **Environment Monitoring**

Applications of IoT



Smart Agriculture



Smart parking in smart city
Palo Alto in San Francisco

Applications of IoT



Applications of IoT

Sensors in even the holy cow!

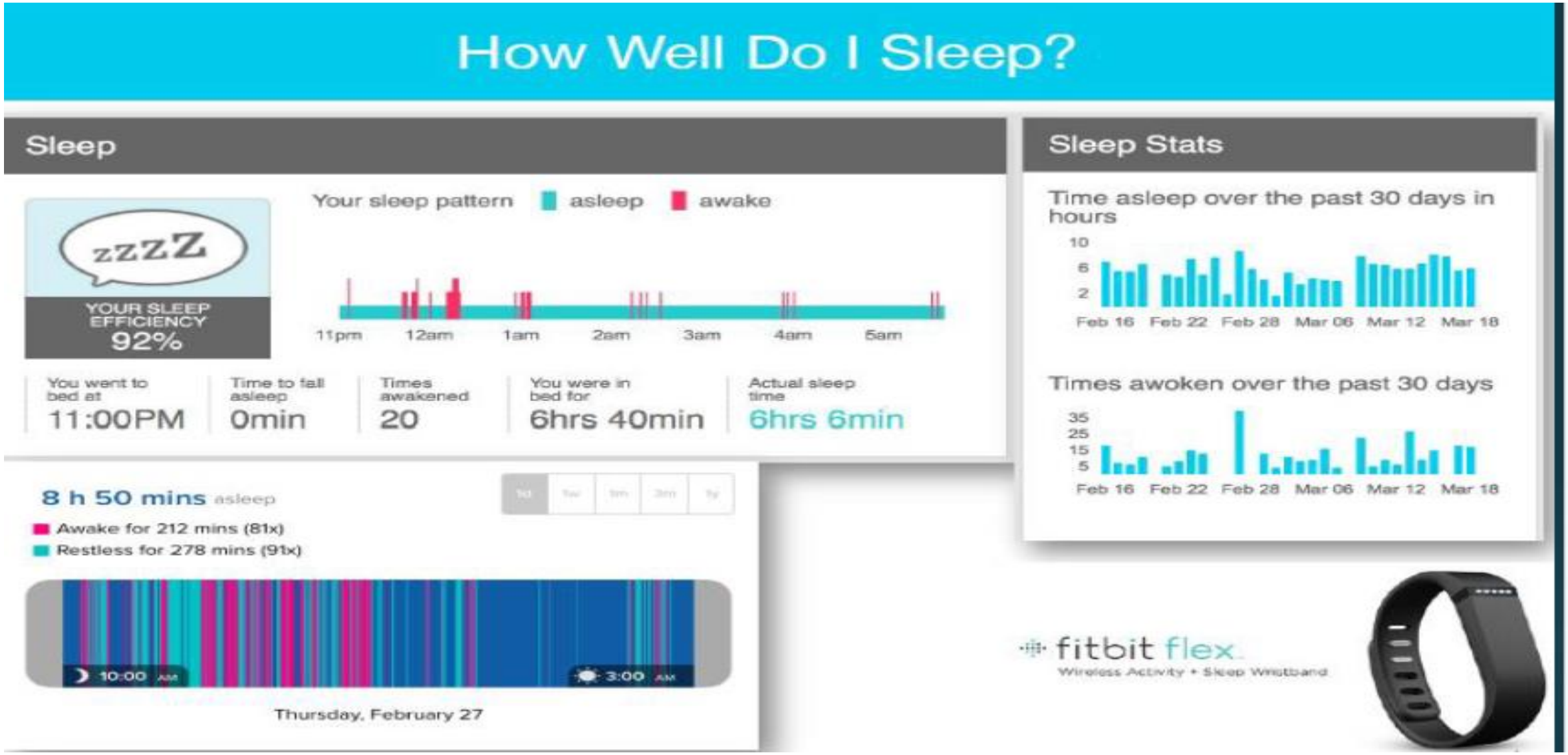
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In the world of IoT, even the cows will be connected and monitored. Sensors are implanted in the ears of cattle. This allows farmers to monitor cows' health and track their movements, ensuring a healthier, more plentiful supply of milk and meat for people to consume. On average, each cow generates about 200 MB of information per year.

Activa
Go to PC

Applications of IoT



Applications of IoT

IOT Application Scenario - Shopping

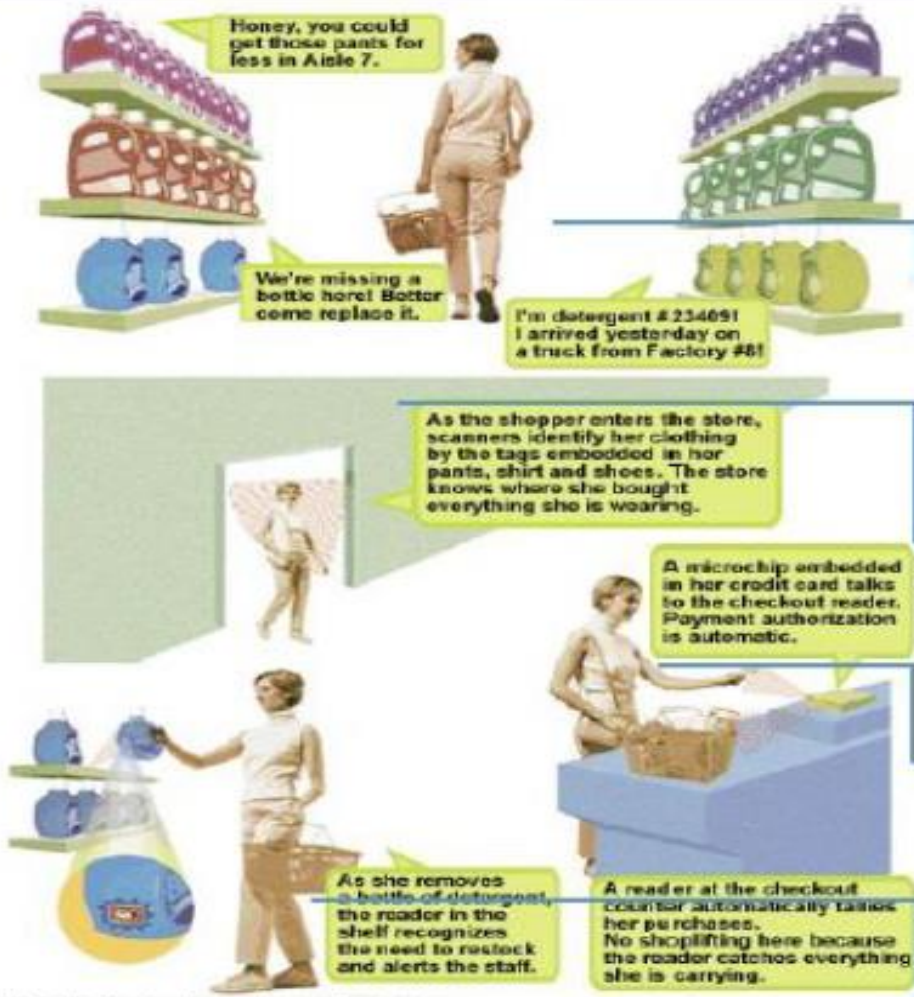


Illustration by Lisa Kreuse Breiman for Forbes

(2) When shopping in the market, the goods will introduce themselves.

(1) When entering the doors, scanners will identify the tags on her clothing.

(4) When paying for the goods, the microchip of the credit card will communicate with checkout reader.

(3) When moving the goods, the reader will tell the staff to put a new one.

Arduino – Basics

- Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software.

- It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board

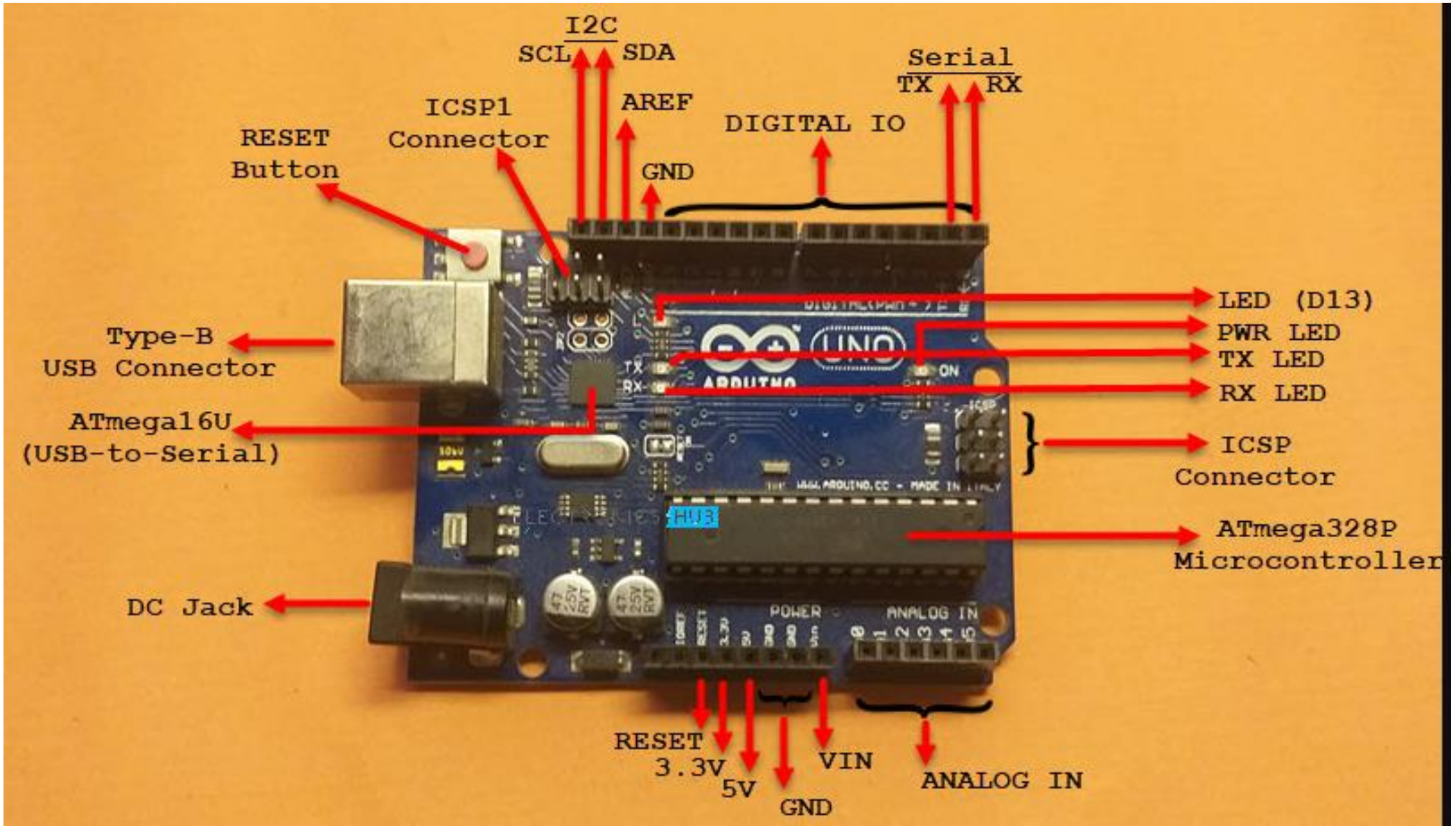
The key features of Arduino are:

- Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
- You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
- Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
- Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package

The key features of Arduino are:

- **Arduino boards based on ATMEGA328 microcontroller**
- Arduino Uno R3
- **Arduino boards based on ATMEGA32u4 microcontroller**
- Arduino Leonardo
- **Arduino boards based on ATMEGA2560 microcontroller**
- Arduino Mega 2560 R3

ARDUINO – BOARD DESCRIPTION



ARDUINO – BOARD DESCRIPTION

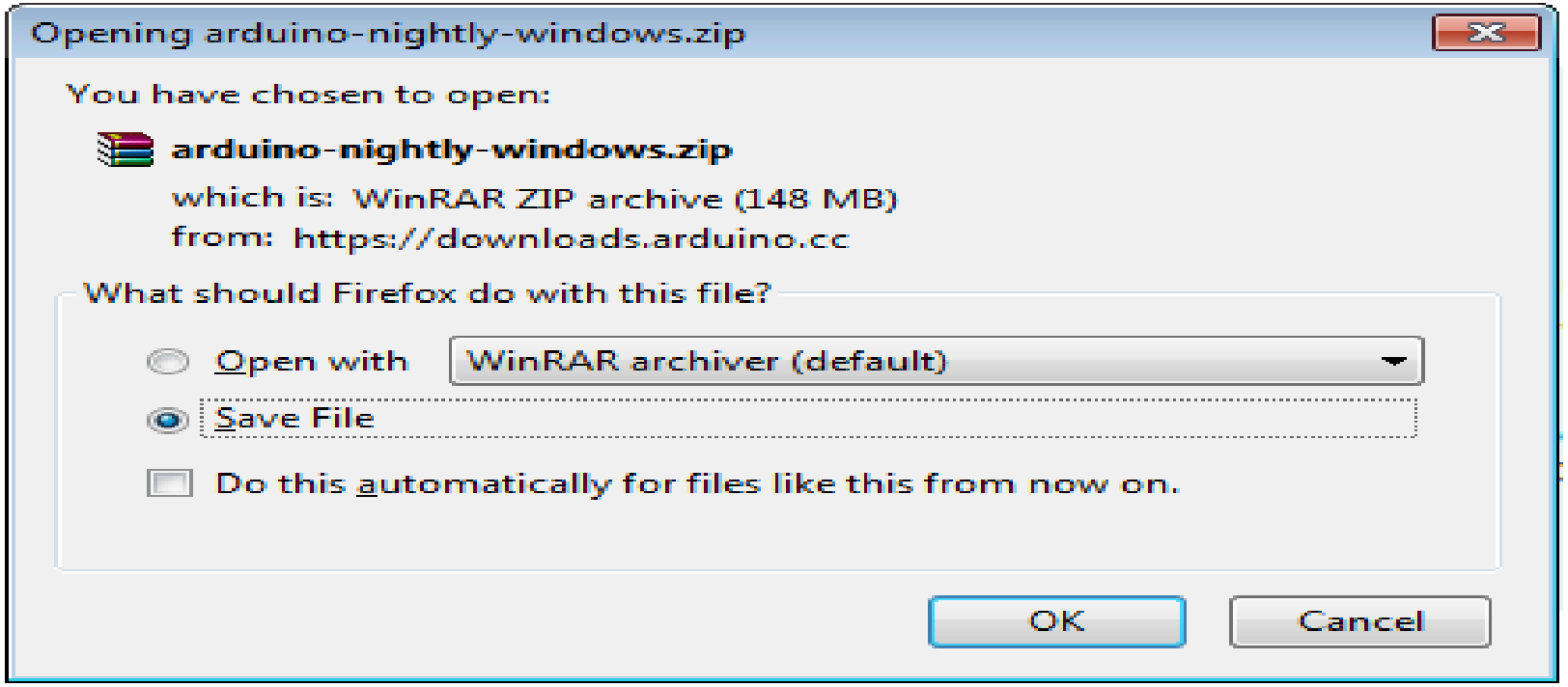
Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA. GND: ground pins
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.

ARDUINO – BOARD DESCRIPTION

Pin Category	Pin Name	Details
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

ARDUINO – INSTALLATION

- **Step 1** – First you must have your Arduino board (you can choose your favorite board) and a USB cable
- **Step 2: Download Arduino IDE Software**

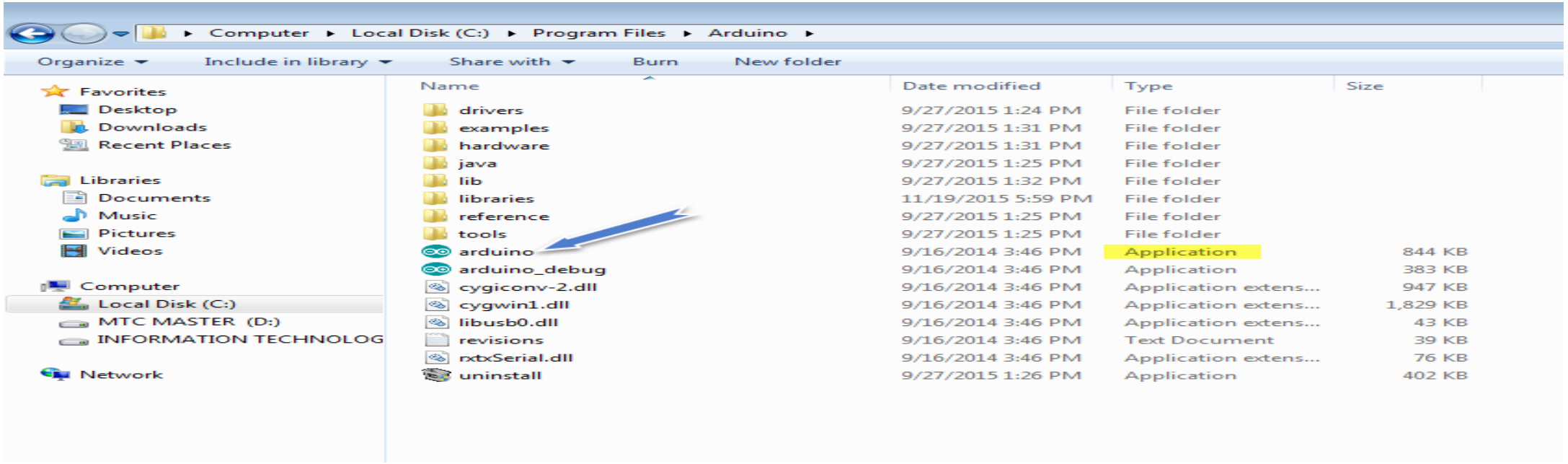


ARDUINO – INSTALLATION

Step 3: Power up your board.

Connect the Arduino board to your computer using the USB cable. The green power LED (labeled PWR) should glow.

Step 4: Launch Arduino IDE.



ARDUINO – INSTALLATION

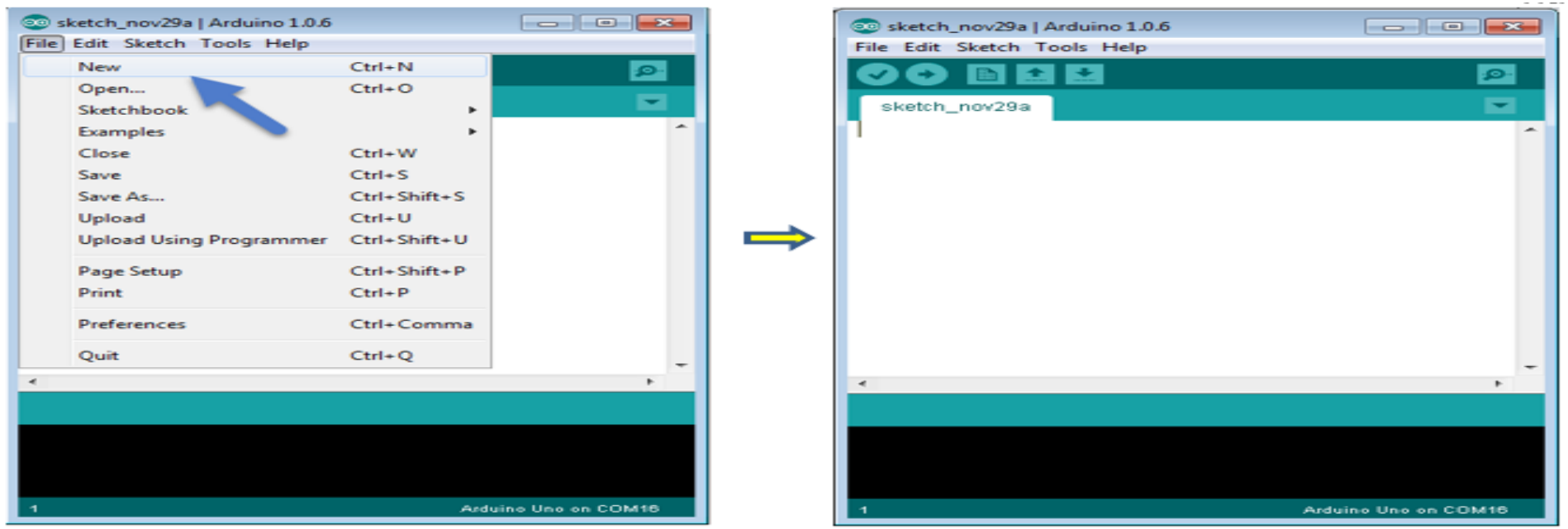
Step 5: Open your first project.

Once the software starts, you have two options:

- Create a new project.

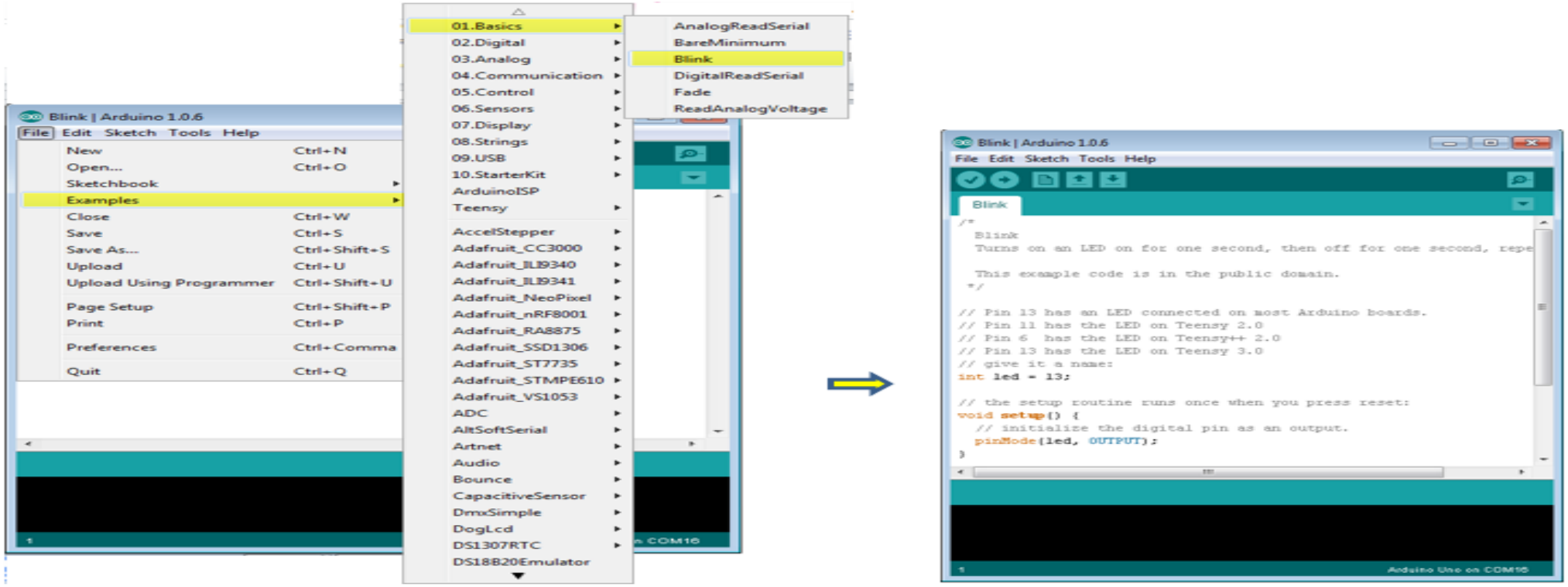
- Open an existing project example

To create a new project, select File --> New.



ARDUINO – INSTALLATION

To open an existing project example, select File -> Example -> Basics -> Blink.



ARDUINO – INSTALLATION

Step 6: Select your Arduino board.

To avoid any error while uploading your program to the board, you must select the correct Arduino board name, which matches with the board connected to your computer.

Go to Tools -> Board and select your board.

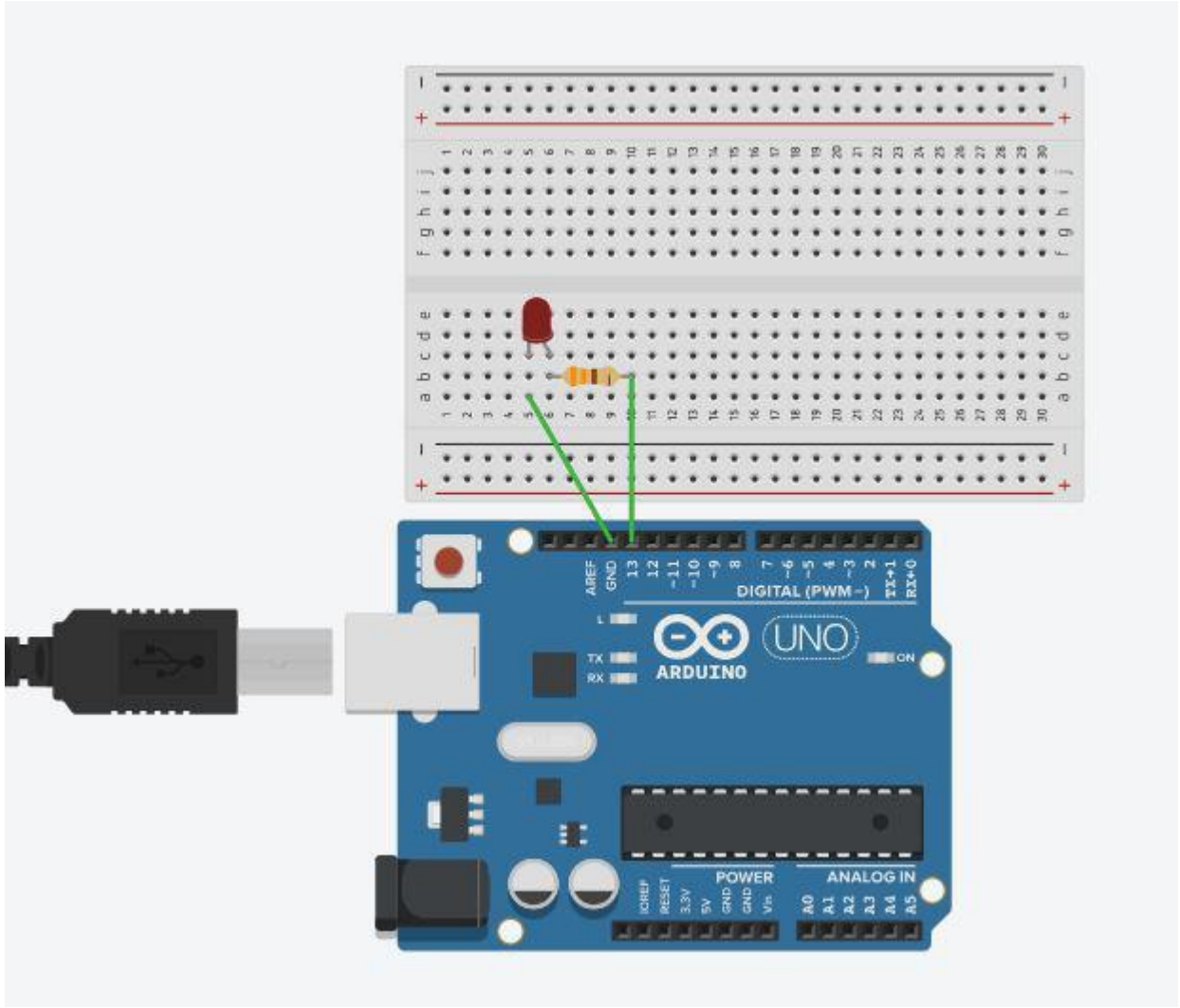
ARDUINO – Programming



LED Blinking Using Arduino

Components Required

- 1 LED
- 1 Resistor
- Breadboard
- Arduino UNO
- Jumper wires



ARDUINO – Programming

```
#define led 5
void setup()
{
  // put your setup code here, to run once:
pinMode (led, OUTPUT);
}
void loop()
{
  // put your main code here, to run repeatedly:
  digitalWrite(led,HIGH);
  delay(1000);
  digitalWrite(led,LOW);
  delay(1000);
}
```

THANK YOU