**1. What is a Prototype?**

A [prototype](https://en.wikipedia.org/wiki/Prototype) is an early sample, model, or release of a product built to test a concept or process. It is a working model used to demonstrate and validate the design, functionality, and performance of a product before it is manufactured at scale. Prototyping is an essential phase in the product development cycle as it allows for the identification and rectification of design flaws and the gathering of user feedback.

**Open Source and Closed Source Prototype Platforms**

**Open Source Prototype Platforms:**

* These platforms offer designs and software that are publicly accessible, allowing users to view, modify, and distribute the code and design files.
* Examples include Arduino, Raspberry Pi, and BeagleBone.
* Opensource platforms encourage community collaboration and innovation.

**Closed Source Prototype Platforms:**

* These platforms have proprietary designs and software that are not freely accessible to the public. The source code and design files are controlled and protected by the company that developed them.
* Examples include platforms like Microsoft's Azure Sphere and some proprietary development boards from companies like Intel and TI.
* Closed source platforms often come with official support and documentation but limit customization and modifications.

**2. What is Arduino?**

[Arduino](https://en.wikipedia.org/wiki/Arduino) is an open-source electronics platform based on easy-to-use hardware and software. It is designed for anyone interested in creating interactive projects. Arduino boards are equipped with sets of digital and analog input/output (I/O) pins that can be interfaced with various expansion boards and other circuits. The platform uses the Arduino programming language, based on Wiring, and the Arduino Software (IDE), based on Processing, to write and upload code to the physical board.

**3. Arduino Uno R3 Key Specifications**

**Main Processor:**

* **Microcontroller:** [ATmega328P](https://en.wikipedia.org/wiki/ATmega328) a  [8-bit](https://en.wikipedia.org/wiki/8-bit) [RISC](https://en.wikipedia.org/wiki/Reduced_instruction_set_computer) processor core.

**Memory:**

* **SRAM:** 2 KB (ATmega328P) [SRAM](https://en.wikipedia.org/wiki/Static_random-access_memory)
* **Flash Memory:** 32 KB (ATmega328P) of which 0.5 KB is used by the bootloader. [Flash memory](https://en.wikipedia.org/wiki/Flash_memory)
* **EEPROM:** 1 KB (ATmega328P) [EEPROM](https://en.wikipedia.org/wiki/EEPROM)

**I/O Pins:**

* **Digital I/O Pins:** 14 (of which 6 provide PWM output)
* **Analog Input Pins:** 6
* **PWM Pins:** 6
* **UART:** 1
* **SPI:** 1
* **I2C:** 1
* **External Interrupts:** 2 (pins 2 and 3)

By : Rudra Prasanna Mishra  
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