Arduino and Prototyping Questions and Answers

### 1. What is a Prototype?

A prototype is an early version or model of a product created to explore and validate ideas. It serves as a tangible representation of a concept, allowing designers and engineers to test functionality, evaluate design decisions, and gather user feedback. Prototypes can range from basic sketches or mockups to fully functional models, depending on the stage of development.

**Open Source Prototype Platforms:**  
Open source platforms provide free access to the design, software, and hardware specifications. Users can freely modify, share, and distribute their versions. Examples include Arduino, Raspberry Pi, and BeagleBone.

**Closed Source Prototype Platforms:**  
Closed source platforms are proprietary, meaning their design and software are controlled by a single entity or company. Users must obtain permission to modify or distribute the platform. Examples include Intel's Edison and various proprietary development boards from companies like Texas Instruments or Microchip.

### 2. What is Arduino?

Arduino is an open-source electronics platform designed to be easy to use for both beginners and advanced users. It consists of programmable microcontrollers that can be connected to a wide range of sensors, lights, motors, and other components to create interactive projects and prototypes. Arduino boards are widely used in education, DIY projects, and professional prototyping due to their versatility and accessibility.

### 3. Arduino Uno R3 Key Specifications:

* **Main Processor:** ATmega328P microcontroller
* **Memory:**
  + SRAM: 2 KB
  + Flash Memory: 32 KB (0.5 KB reserved for bootloader)
  + EEPROM: 1 KB
* **I/O Pins:**
  + 14 Digital I/O Pins (6 support PWM output)
  + 6 Analog Input Pins
  + 1 Serial (UART) Port
  + 1 SPI Port
  + 1 I2C Port
* **Additional Features:**
  + Reset Button
  + USB connection for programming and power
  + 16 MHz quartz crystal