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IOT ASSIGNMENT

1)What is a Prototype? What are Open source and closed source prototype platforms?

Ans: A prototype is an early sample, model, or release of a product built to test a concept or process. It is used to evaluate a new design, enhance precision by system analysts and users, and to provide specifications for a real, working system rather than a theoretical one. Prototyping serves several purposes, including understanding the user requirements, refining design choices, and testing functionality before full-scale production.

Types of Prototypes:

1. Low-Fidelity Prototypes:
2. High-Fidelity Prototypes**:**

**Open Source Prototype Platforms:**

Open source prototype platforms are those whose source code is available to the public, allowing anyone to study, modify, and distribute the software. These platforms often foster community collaboration and innovation.

1. **Arduino:**
   * A popular open-source electronics platform based on easy-to-use hardware and software.
   * Used for building digital devices and interactive objects that can sense and control the physical world.
   * Ideal for prototyping IoT devices, robotics, and other electronic projects.
2. **Fritzing:**
   * An open-source initiative to support designers, artists, researchers, and hobbyists to work creatively with interactive electronics.
   * Provides a software tool that helps design, prototype, and document electronic projects.
3. **KiCad:**
   * An open-source software suite for electronic design automation (EDA).
   * Facilitates the design and simulation of electronic circuits and the creation of PCB layouts.

**Closed Source Prototype Platforms:**

Closed source prototype platforms are those whose source code is not available to the public. These platforms are usually proprietary and controlled by a single organization.

1. **Adobe XD:**
   * A vector-based user experience design tool for web apps and mobile apps.
   * Offers tools for wireframing, UI/UX design, and prototyping.
   * Features collaborative tools and integrations with other Adobe products.
2. **Axure RP:**
   * A comprehensive tool for creating wireframes, prototypes, and documentation.
   * Supports dynamic content, conditional logic, animations, and interactions.
   * Often used for detailed and high-fidelity prototyping.
3. **Sketch:**
   * A vector graphics editor mainly used for UI/UX design and prototyping.
   * Offers tools for designing interfaces, creating interactive prototypes, and collaborating with other team members.
   * Known for its user-friendly interface and integration with other design tools.

2) What is Arduino?

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consists of a microcontroller (a small computer on a single integrated circuit) and an integrated development environment (IDE) used to write and upload computer code to the physical board. Arduino boards are widely used for creating interactive projects, prototyping electronic devices, and educational purposes due to their simplicity and flexibility.

Key Components of Arduino**:**

1. **Hardware:**
   * Microcontroller: The brain of the Arduino board, which can be programmed to sense and control objects in the physical world.
   * Digital and Analog Pins**:** Used for input and output operations. Digital pins can read or write binary values (high or low), while analog pins can read varying voltage levels.
   * Power Supply**:** Usually powered through a USB connection or an external power supply.
   * Built-in LED: Commonly connected to pin 13 for easy testing.
2. **Software:**
   * Arduino IDE: A free, cross-platform application written in Java, which includes a code editor, a message area, a text console, a toolbar with buttons for common functions, and a series of menus.
   * Sketch: A program written with the Arduino IDE. Sketches are written in a simplified version of C++.

3)Write down Arduino Uno R3 Key Specifications:  
Main Processor  
Memory (SRAM, FLASH MEMORY, EEPROM)  
I/O Pins

Ans:Arduino Uno R3 Key Specifications:

Main Processor

* Microcontroller: ATmega328P

Memory

* SRAM: 2 KB (ATmega328P)
* Flash Memory: 32 KB (ATmega328P) of which 0.5 KB used by bootloader
* EEPROM: 1 KB (ATmega328P)

I/O Pins

* Digital I/O Pins: 14 (of which 6 provide PWM output)
* Analog Input Pins: 6
* PWM Pins: 6
* UART: 1 (Serial communication)
* I2C: 1
* SPI: 1
* LED\_BUILTIN: 1 (pin 13)

Additional Features

* Operating Voltage: 5V
* Input Voltage (recommended): 7-12V
* Input Voltage (limits): 6-20V
* DC Current per I/O Pin: 20 mA
* DC Current for 3.3V Pin: 50 mA
* Clock Speed: 16 MHz