



# **SNS COLLEGE OF TECHNOLOGY**

**An Autonomous Institution**

**Coimbatore-35**



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **19ECT308-WIRELESS TECHNOLOGIES FOR IoT**

***III YEAR/ VI SEMESTER***

#### **UNIT 4 – PROTOTYPING AND DESIGNING SOFTWARE FOR IOT APPLICATIONS**

**TOPIC – PROTOTYPING EMBEDDED DEVICE SOFTWARE**



# Prototyping development of the programs



- Prototyping development of the programs requires bootloader, OS and IDE.
- Software embeds into a device platform.
- An IDE enables development of software for functions of data gathering, consolidation, and connection to Internet.
- The IDE may also enables the use of OS or RTOS functions at an embedded device.
- Bootloader stores at flash/ROM of a microcontroller device and enables communication with a computer having an IDE.
- IDE has APIs, libraries, compilers, RTOS, simulator, editor, assembler, debugger, emulators, logic analyzer, code burner.
- IDE enables the development of codes on a computer and downloads the codes on to an embedded device.
- The code burner places codes into flash memory or EEPROM or EPROM.
- Hence the application code is embedded into the device.



## ■ Prototyping and Designing the software for IoT Applications

- **What is Prototyping?**
- It is the process of building **IoT** hardware and devices enhanced with smart sensors and embedded systems using many off-the-shelf components like sensors, circuit boards, and microcontrollers.
- Develop the codes, design and test the embedded devices for IoT and M2M using IDEs and development platform
- To develop IoT software five levels are needed.
  1. Gather+Consolidate
  2. Connect
  3. Collect+Assemble
  4. Manage and Analyse
  5. Applications and Services.



## ■ PROTOTYPING EMBEDDED DEVICE SOFTWARE.

- IDE(Integrated development environment) enables development of software at first and second level for embedding into device platform.
- IDE enables development of codes on a computer, and later on downloading of codes on to embedded device, such as Arduino or microcontroller boards.



## ■ Programming Embedded Device Arduino Platform using IDE.

- An **Integrated Development Environment (IDE)** is software for building applications that combines common developer tools into a single graphical user interface (GUI).
- **IDE**, or Integrated Development Environment, is a software application that combines all of the features and tools needed by a software developer
- The **Arduino** Integrated Development Environment (**IDE**) is the main text editing program used for **Arduino** programming. ... Essentially, the **IDE** translates and compiles your sketches into code that **Arduino** can understand. Once your **Arduino** code is compiled it's then uploaded to the board's memory.



## ■ Programming Embedded Device Arduino Platform using IDE.

- Arduino board can be programmed using avr-gcc tools.
- Arduino board has a pre-installed bootloader embedded in to the firmware.
- Arduino programmer develops codes using graphical cross-platform IDE.
- Arduino board connects to a computer which runs IDE.
- IDE consists of set of software modules, which provide the software and hardware environment for developing and prototyping the software for a specific device platform.
- Bootloader enables computer to push the developed codes into board using Arduino IDE through USB cable.