Assignment 1

Study of Arduino board with pin specifications in detail.

Shreya Pawaskar
Cno - C22018881961
Roll no - 3947
Division - C

Question 1: What do you mean by embedded development boards?
Answer 1:
An experiment board for a microcontroller is a printed circuit board (PCB) comprising circuits and hardware for experimenting with a specific microcontroller board's features. It includes a CPU, memory, chipset and debugging facilities such as LCDs and Keypads. No more fiddling with jumper wires and circuit boards for us. Embedded boards are boards with processors, multiple integrated circuits, interfaces and other essential components assembled on them to serve a dedicated function.
Embedded boards comprise of multiple technologies, including processors, core logic, networking, connectivity and multimedia components to provide functionality and performance for embedded system design applications. Systems in the electronic industry comprise of processing, software, storage and external interface components. In a system all of these sub components would work together to form one central processing system. Applications include Super Computing, Transport, Automotive, Industrial,Military and Audio/Video applications.

Question 2: List different types of embedded development boards
Answer 2:

1) Raspberry Pi 3 B
The Raspberry Pi development board is a small pocket-sized computer running the Raspbian operating system, which is a variant of Debian Linux.

2) Qualcomm Snapdragon
This is a single board computer (SBC) that uses the powerful Snapdragon processor from Qualcomm. It supports various interfaces like Wi-Fi, Bluetooth, and Global Positioning System (GPS). It is well suited for Internet of Things (Iot), medical, and robotic applications.

3) BeagleBone Black
The BeagleBone Black uses a Texas Instruments (TI) Sitara processor running on ARM Cortex-A8 core. The system clock frequency is 1GHz, which supports various operating systems like Windows, Linux, Android, QNX, Embedded CE, and ThreadX.

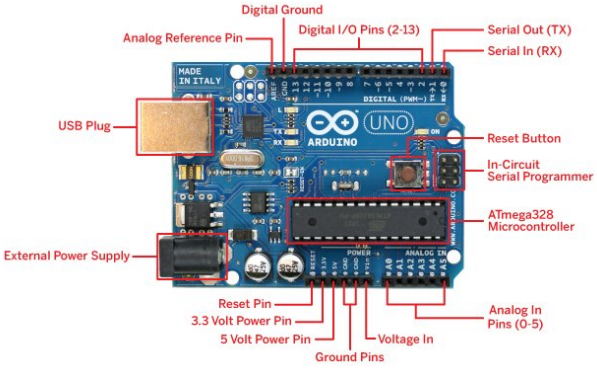
4) PandaBoard
The PandaBoard is a low-power, low-cost development board based on TI's OMAP4460 (Open media application platform). This board supports operating systems like Windows, Linux, Window CE, Palm
OS, and Symbian.

5) Intel Galileo Gen 2
The Galileo development board comes from Intel and features an Intel Quark SoC X1000 processor. It is designed using Pentium technology. The advantage of this board is it is compatible with
shields for the Arduino Uno R3.

6) Arduino Mega 2560
Arduino is an open source hardware and software platform family with thousands of active users and contributors. It is one of the best platforms for making electronic projects. If you are a beginner, you can quickly develop applications with less effort than with other platforms.

7) Banana Pi M2+
The Banana Pi M2+ is a portable SBC that supports various interfaces like Bluetooth, Wi-Fi, and Ethernet. It offers great computing performance with its quad-core ARM Cortex-A7 processor running at 1.2GHz.

Question 3: Write detailed information about the Arduino board.
Answer 3:
Uno is an open-source microcontroller board from Arduino.cc based on the Microchip ATmega328P. These pins can be used to interact with various expansion boards and other circuits, such as those found on shields. The board includes 14 digital I/O pins (six of which are capable of PWM output) and 6 analogue I/O pins, and it can be programmed using the Arduino IDE (Integrated Development Environment) through a type B USB cable.
There are two ways to power it: either with a USB connection or with an external 9-volt battery. The operating voltage of the unit is 5V which projects the microcontroller on the board and its associated circuitry operates at 5V while the input voltage ranges between 6V to 20V and the recommended input voltage ranges from 7V to 12V.
"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



Question 4: What Operating Systems are supported by Arduino uno board?
Answer 4:
A computer's operating system does not support Arduino uno since it is a microcontroller board capable of completing a specific task. Others, like the Raspberry Pi, have CPUs, which necessitates the use of a computer operating system. Arduinos are easy to use, thus software is written straight to the hardware. The Arduino itself has no real operating system.

Question 5: Detailed layout with specification and features of Arduino uno
Answer 5:
Features of Arduino Uno :–

1)The operating voltage is 5V
2)The recommended input voltage will range from 7v to 12V
3)The input voltage ranges from 6v to 20V
4)Digital input/output pins are 14
5)Analog i/p pins are 6
6)DC Current for each input/output pin is 40 mA
7)DC Current for 3.3V Pin is 50 mA
8)Flash Memory is 32 KB
9)SRAM is 2 KB
10)EEPROM is 1 KB
11)CLK Speed is 16 MHz

Question 6: Different languages used to program Arduino uno board.
Answer 6:
C#, C++, Python, Arduino programming language, Ardublock

Question 7: Write different applications for the Arduino board.
Answer 7:

- Weighing Machines
- Weighing Machines
- Traffic Light Countdown
- Timer Parking Lot Counter
- Systems embedded in devices
- Automating the House
- Automation in the Industrial Sector
- an instrument used in treating or diagnosing disease
- Emergency Light for Railways

Crossword:

- ➢ This pin used to reset microcontroller: RESET
- ➢ A way of constructing electronics without soldering: Breadboard
- ➢ Arduino is microcontroller
- ➢ Language used CPP
- ➢ Open source hardware – Arduino
- ➢ Arduino101 Is real time operating system functions, values and structure are PARTS of Arduino programming
- ➢ A device transforms physical quantity into electrical value – sensors
- ➢ Increment operator - ++
- ➢ These pins used to receive & transmit TTL serial data – serial
- ➢ Does Arduino run linux – No
- ➢ Serial connection over USB - communication