**Output Design**

Computer output is the most important and direct source of information to the user. Efficient, intelligible output design should improve the system’s relationships with the user and help in decision making. It proves a means of storage by copying the result for later reference. The output generally refers to the results and information that is generated from the system. Outputs from the computers are required primarily to communicate the result of processing to the users.

The objective of the output design is to convey the information of all the past activities, current status and emphasize important events. The output page shows only the details of the ph values obtained from the ph sensor and displays chemical detected or not.

**Input Design**

The input design is the process of converting the user-oriented inputs into the computer-based format. Therefore, the user interface design is very important for any application. It defined how the software communicates with in itself, to system that interpreted with it and with human who use it. Input forms are always an important part of the system design functions. The data is fed into the system using simple interactive forms. The forms have been supplied with messages so that user can enter data without any difficulty. In addition to this, data is validated wherever it requires in the project.

**Hardware Specification**

**1.Arduino 2560 microcontroller**

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

The key features are −

* Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
* You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
* Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
* Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
* Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

Various kinds of Arduino boards are available depending on different microcontrollers used. However, all Arduino boards have one thing in common: they are programed through the Arduino IDE.The differences are based on the number of inputs and outputs (the number of sensors, leds, and buttons you can use on a single board), speed, operating voltage, form factor etc. Some boards are designed to be embedded and have no programming interface (hardware), which you would need to buy separately. Some can run directly from a 3.7V battery, others need at least 5V.

The Mega 2560 is a microcontroller board based on the [ATmega2560](http://www.atmel.com/Images/Atmel-2549-8-bit-AVR-Microcontroller-ATmega640-1280-1281-2560-2561_datasheet.pdf). It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila.

**pH sensor**

pH is the numeric representation of gram-equivalent per liter  of hydrogen ion concentration  in any solution. It varies between 0 to14. It is the logarithmic measurement of moles of hydrogen ions per liter of solution. The solutions having pH value between 0 to 7 are acidic solutions with large concentration of hydrogen ions whereas solutions having pH value between 8 to 14 are basic solutions with small hydrogen concentration. The solutions having pH value of 7 are neutral solutions. Measuring the pH gives the measure of alkalinity or acidity of a solution.