The purpose of this lab is to introduce Raspberry Pi

Guidelines for maintaining lab notebook:

- Please mention the date and the lab no. Attempt to write C/Python/Wiring code for all the exercises mentioned.

- The source code of the program’s for the given lab is to be written in the notebook

- Simulator or hardware results also have to be mentioned in the notebook

- Each turn's lab exercise has to be signed by your Teaching Assistant

Learning objectives of the lab:

- To get started with Raspberry Pi and understand how it is different from Arduino and STK
Problem1. Boot the Raspberry Pi default OS and connect to Internet. Raspberry Pi can completely replace the CPU of your computer. There are multiple OS available in market, we will be using the most common OS Raspbian based on Debian.

Connect the following to the Raspberry Pi board

1. Desktop monitor to HDMI port using the cable provided
2. LAN cable
3. USB mouse and keyboard
4. SD card provided with the board
5. Power adapter

Once the OS boots, you will be able to see the desktop.

Double click on Midori (web browser) and login to your webmail account.

Now, open terminal window and note IP address ‘inet addr’ by typing command ifconfig
**Problem 2:** Write a program to blink LED using Raspberry Pi GPIO port.

GPIO are general purpose ports that can be configured as input/output to any external device. Raspberry Pi has 8 GPIO ports. We will use GPIO port 5 (P1 header pin 18)

Take care while connecting GPIO ports to any external device as they are sensitive to high current/ voltage (*Read the instructions on the soft board for precautions to be taken, while handling GPIO pins.*)

1. Since GPIO ports of Raspberry Pi are sensitive, we will be using driver IC ULN2003. The IC consists of Darlington pair and will protect GPIO ports from damage. An example of the configuration is shown in figure below.
Execute the following commands in terminal to add GPIO support for Raspberry Pi in Python:

```bash
sudo apt-get update
sudo apt-get install python-dev
sudo apt-get install python-rpi.gpio
```

2. Create a new Python script using IDLE from desktop. Use the Python code below to blink LED connection to GPIO.

```python
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BOARD)
GPIO.setup(18, GPIO.OUT)
while (True):
    GPIO.output(18, True)
    time.sleep(0.5)
    GPIO.output(18, False)
    time.sleep(0.5)
```

Understand every line of the command and then run it in terminal using command `Python <abc.py>`.
**Problem 3**: Send an email from Raspberry Pi using a Python script.

You will be using specific mail id provided by TA to send mail to your webmail account

The code is attached below:

```python
#!/usr/bin/python
import smtplib

MAIL_USER = 'abc@daiict.ac.in'
MAIL_PASS = 'pswd'
SMTP_SERVER = 'webmail.daiict.ac.in'
SMTP_PORT = 25

def send_email(recipient, subject, text):
    smtpserver = smtplib.SMTP(SMTP_SERVER, SMTP_PORT)
    smtpserver.ehlo()
    smtpserver.starttls()
    smtpserver.ehlo
    k = smtpserver.login(MAIL_USER, MAIL_PASS)
    header = 'To:' + recipient + '
' + 'From:' + MAIL_USER
    header = header + '
' + 'subject:' + subject + '
' + text + '

    k = smtpserver.sendmail(MAIL_USER, recipient, msg)
    k = smtpserver.close()

send_email('abc@daiict.ac.in','test_mail','If this is working, Its Awesome')
```