

Q1. Explain the terms SPI, I2C and UART interfaces

Ans. 1. SPI

- SPI or Serial Peripheral Interface, is a serial communication protocol often used in embedded systems for high-speed data exchanges between devices on the bus.
- It operates using a master-slave paradigm that includes at least four signals: a clock (SCLK), a master output/slave input (MOSI), a master input/slave output (MISO), and a slave select (SS) signal.
- The SCLK, MOSI, and MISO signals are shared by all devices on the bus.

2. I2C

- I2C or Inter-Integrated Circuit, is a simple communication protocol often used in embedded systems as a way to transfer data between a master (or multiple masters) and a single slave (or multiple ^{slaves} ~~masters~~) and a device. It is a bidirectional two-wire serial bus that uses serial clock (SCL) and serial data (SDA) wires to send and manage data bit by bit between devices connected to the bus.

3. UART

- UART, or Universal Asynchronous Receiver/Transmitter, is a physical circuit in a microcontroller or single integrated circuit (IC) that is used to implement serial communication between devices in an embedded system.
- Essentially, a UART's main purpose is to transmit and receive serial data.
- In UART communication, only two wires are

required for communication, data flows from the Tx pin of the transmitting UART (transmitter Tx) to the Rx pin of the receiving UART (Receiver Rx)

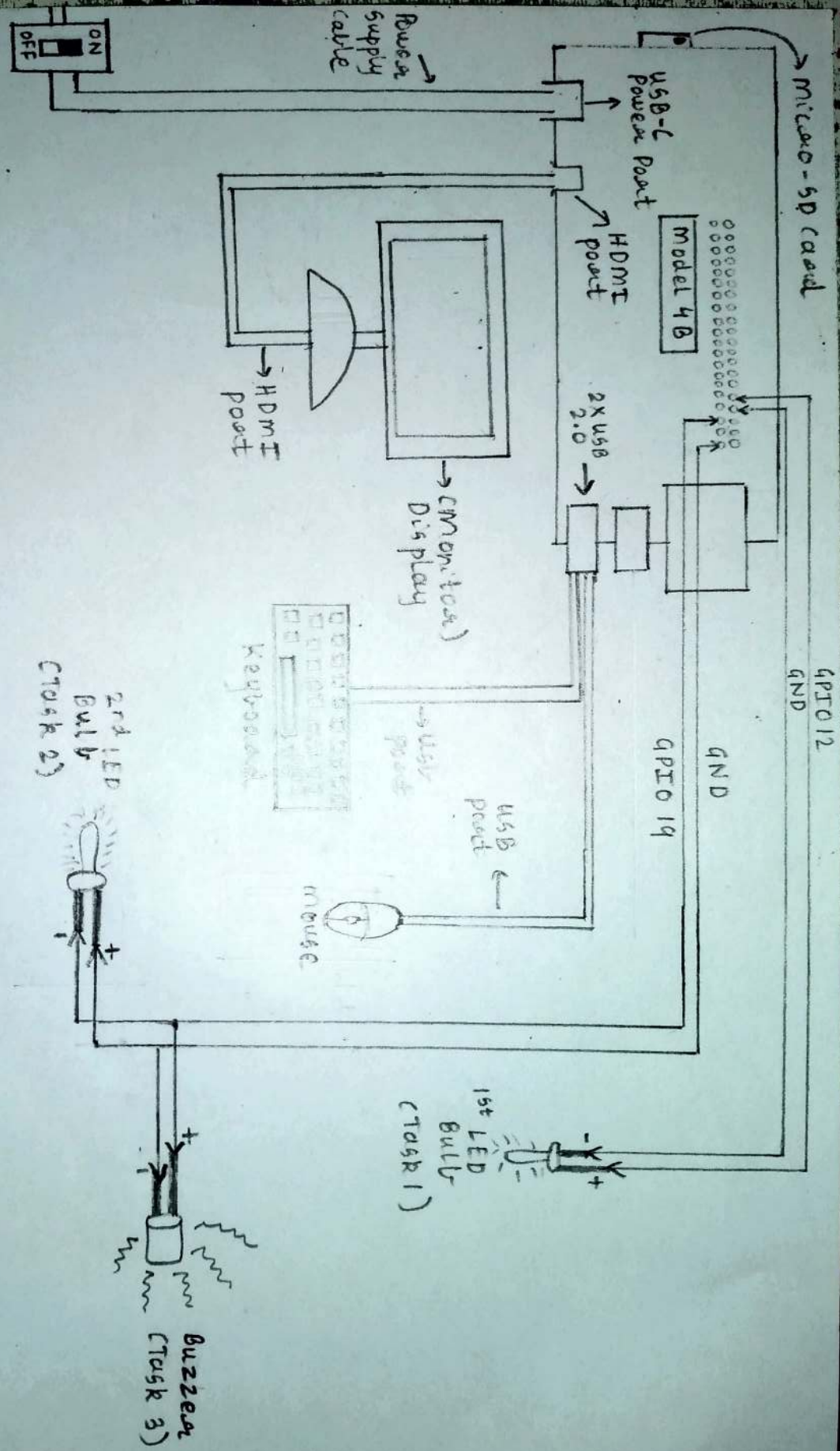
Q2 Discuss raspi-config for configuration of Raspberry pi.

Ans. # Raspi-config is a tool that can be used to configure a Raspberry pi. Here are some steps you can take to configure a Raspberry using raspi-config.

1. Insert the SD card into the Raspberry Pi
2. Connect the keyboard and HDMI monitor
3. Plug in the power
4. Open terminal and type `sudo raspi-config`
5. Click Expand filesystem to ensure the memory card is used to its full potential
6. Change the password if desired.
7. Go to ~~auto~~ advanced options and enable SSH- Secure Shell
8. Click Finish and the Raspberry Pi will reboot.
9. Once the system is rebooted, it will take some ~~setting~~ time for some settings to take effect.

Q3 Draw neat diagram showing connections used for this assignment.

Ans



Tasks	Description
Task 1	1 LED ON and OFF
Task 2	2 LED ON and OFF
Task 3	1 LED and Buzzer ON and OFF