Q1. List and explain types of IR sensor

Ans. Infrared sensors are classified into 2 types like active IR sensors and passive IR sensor:

1. Active IR sensor

- This active infrared sensor includes both the transmitter as well as the receiver.
- In most of the applications, the light-emitting diode is used as a source.
- LED is used as a non-imaging infrared sensor whereas the laser diode is used as an imaging infrared sensor.
- These sensors work through energy radiation, received and detected through radiation.
- Further, it can be processed by using the signal processor to fetch the necessary information.
- The best examples of active infrared sensor are reflectance and break beam sensor.

2. Passive IR sensor

- The passive infrared sensor includes detectors only but they don't include a transmitter.
- These sensors use an object like a transmitter or IR source.
- This object emits energy and detects through infrared receivers.
- After that, a signal processor is used to understand the signal to obtain the required information.

Q2. Write the working principle of IR sensor with neat diagram.

Ans. → working principle:-

• An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation.

→ Structure and working:-

1. Part 1: Connecting IR sensor

• IR sensor has 3 pins, viz VCC, GND and OUT. We will use GPIO 18 (do not get confused with pin number 18) for receiving input from the sensor.

i) Connect the VCC pin of IR sensor to 3.3 V (pin) of Raspberry Pi module.

ii) Connect the GND pin of IR sensor to GND pin of Raspberry Pi module.

iii) Connect the DATA pin of IR sensor to pin GPIO 18 of Raspberry Pi module.

2. Part 2: Connecting LED

• Connect positive point of the LED (longer pin of the LED) to GPIO 4 from the Raspberry Pi module via Breadboard.

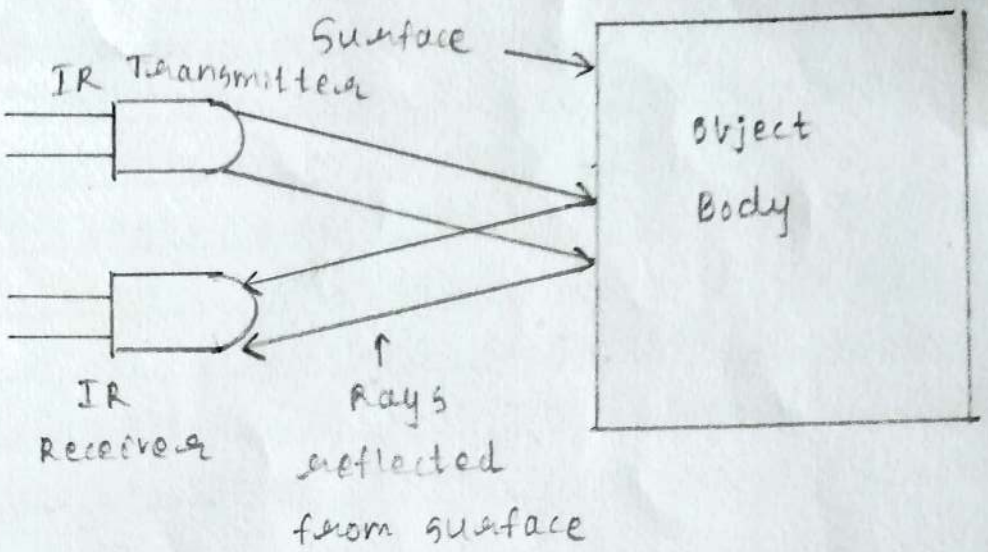
• Connect negative point of the LED (smaller pin of the LED) to GND pin of Raspberry Pi module via Breadboard.

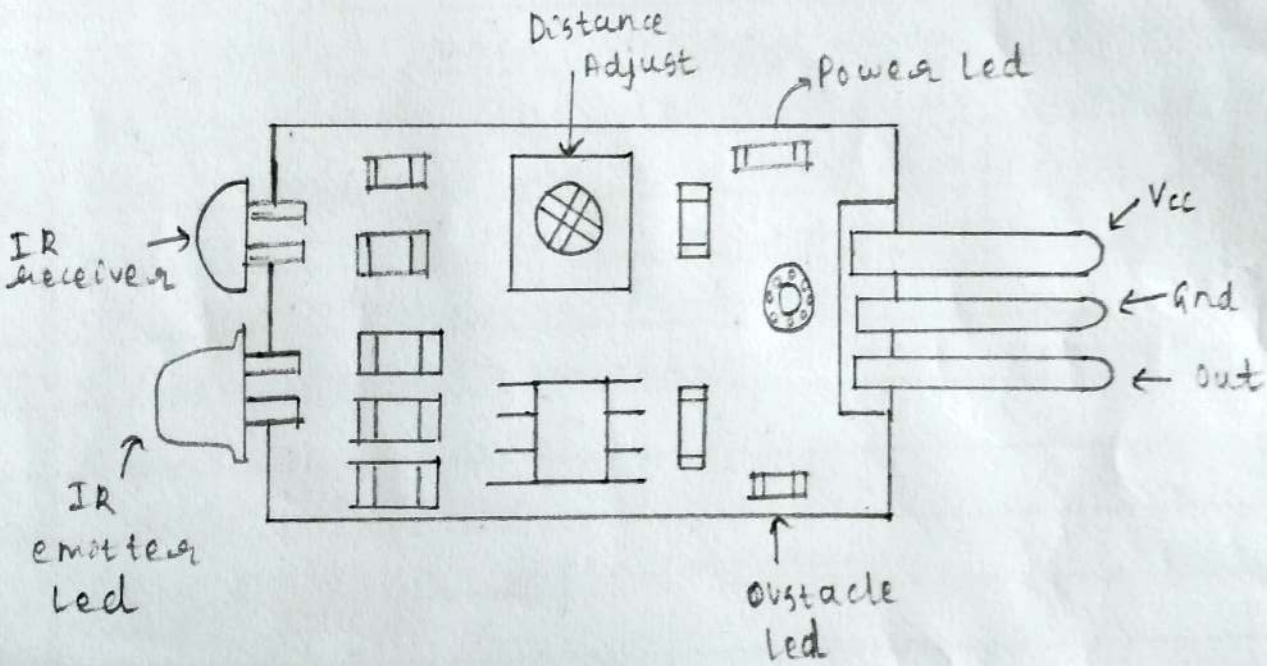
Q3 Explain any two applications of IR sensor.

Ans.

1. Night vision Devices

2.





IR sensor Structure

- An infrared technology implemented in night night vision equipment of there is not enough visible light available to see unaided.
- Night vision devices convert ambient photons of light into electrons and then amplify them using a chemical and electrical process before finally converting them back into visible light.

2. Radiation Thermometers
- IR sensors uses in radiation thermometers to measure the temperature depend upon the temperature and the material of the object and these thermometers have some of the following features:

i) measurement without direct contact with the object
ii) Faster response
iii) Easy pattern measurements.

Q4. Give the connections used to perform this assignment.

Ans.

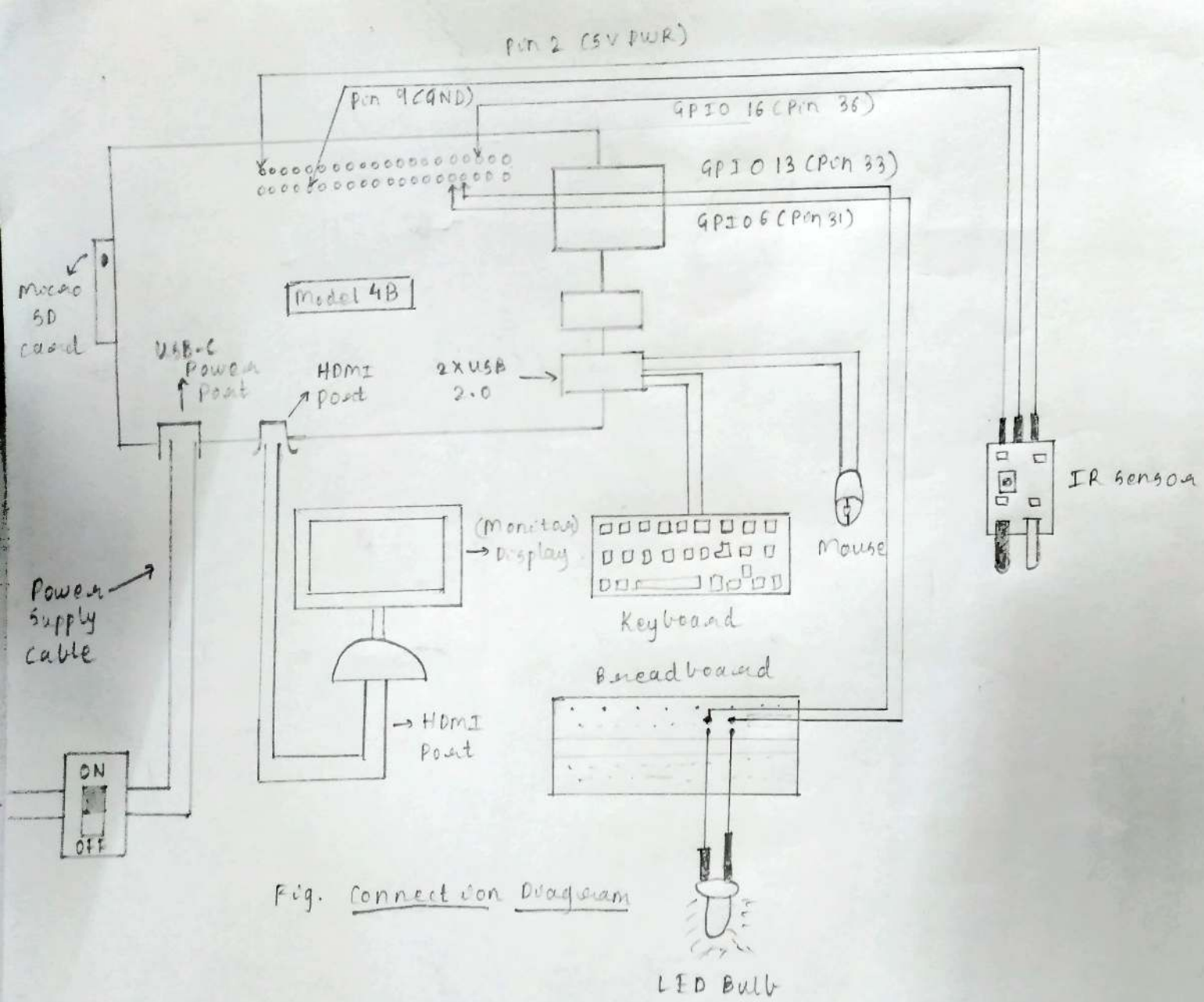


Fig. Connection Diagram