



2.3.2 Teachers uses ICT enabled tools for effective teaching learning process.

PowerPoint Presentation on subject

Topic is:- Short Range Wireless





Introduction Short Range Wireless Technologies :-

Short-range communications systems characterize a wide range of scenarios, technologies and requirements. There is no formal definition of such systems though one can always classify short-range systems according to their typical reach or coverage. We define short range communications as the systems providing wireless connectivity within a local sphere of interaction. Short-range systems involve transfer of information from millimeters to a few hundreds of meters. However, short-range communication systems are not only systems providing wireless connectivity in the immediate proximity, but in a broader perspective they also define technologies used to build service access in local areas.

Together with wide/metropolitan area cellular systems, short-range systems represent the two main developing directions in today's wireless communications scene. In terms of design rules and target capabilities, short-range systems have certain commonalities as well as marked differences from their counterparts, cellular systems. Maximizing the supported data throughput is quite often one of the main design targets for both types of wireless networks though a detailed comparison between them is not straightforward.

Bluetooth :-

It is a Wireless Personal Area Network (WPAN) technology and is used for exchanging data over smaller distances. This technology was invented by Ericson in 1994. It operates in the unlicensed, industrial, scientific and medical (ISM) band at 2.4 GHz to 2.485 GHz. Maximum devices that can be connected at the same time are 7. Bluetooth ranges up to 10 meters. It provides data rates up to 1 Mbps or 3 Mbps depending upon the version.

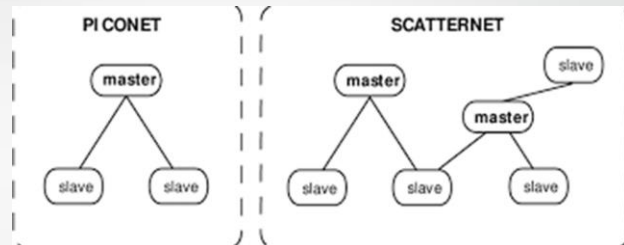
The spreading technique which it uses is FHSS (Frequency hopping spread spectrum). A bluetooth network is called **piconet** and a collection of interconnected piconets is called **scatternet**.

Bluetooth Architecture :-

The architecture of bluetooth defines two types of networks:

Piconet

Scatternet



Piconet	Scatternet
In this bluetooth network, device can function either as master or slave.	In this bluetooth network, device can function as master or slave or (master + slave)
It serves smaller coverage area.	It serves larger coverage area.
It supports maximum 8 nodes.	It supports more than 8 nodes.
It allows less efficient use of available bluetooth channel bandwidth.	It allows more efficient use of available bluetooth channel bandwidth.



Piconet :-

Piconet is a type of bluetooth network that contains one primary node called master node and seven active secondary nodes called slave nodes. Thus, we can say that there are total of 8 active nodes which are present at a distance of 10 meters. The communication between the primary and secondary node can be one-to-one or one-to-many. Possible communication is only between the master and slave; Slave-slave communication is not possible. It also have 255 parked nodes, these are secondary nodes and cannot take participation in communication unless it get converted to the active state.

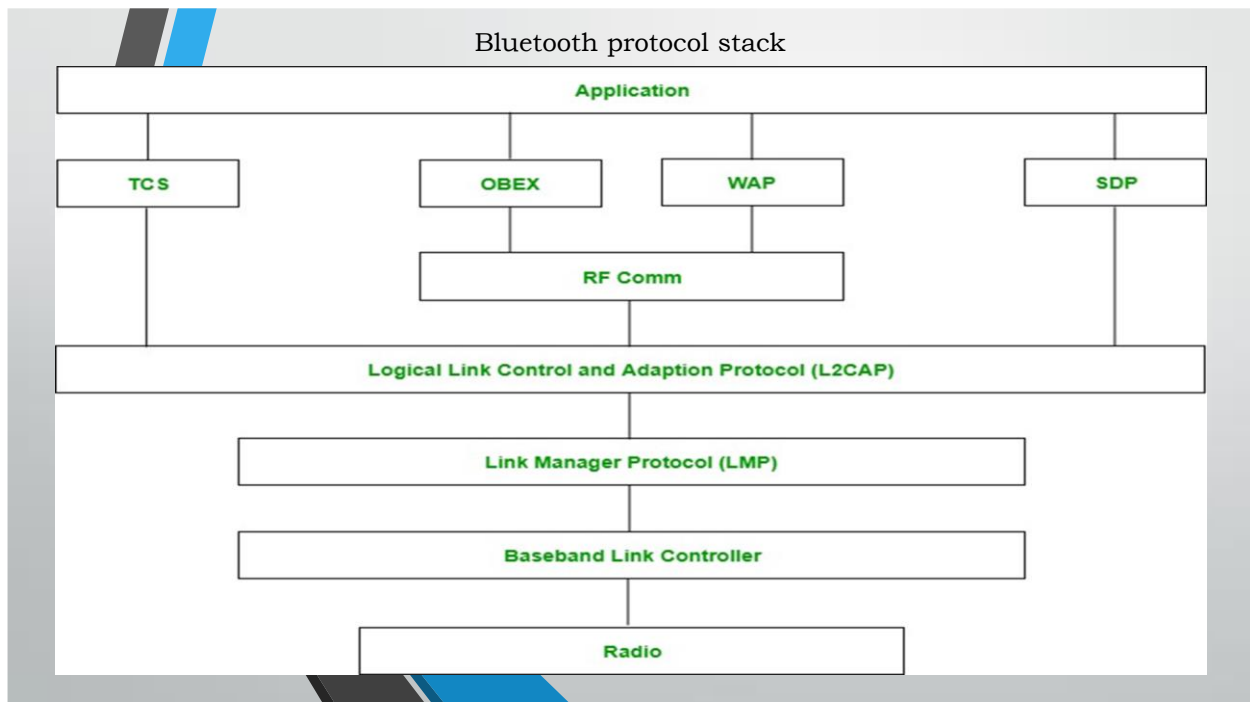
Scatternet :-

It is formed by using various piconets. A slave that is present in one piconet can be act as master or we can say primary in other piconet. This kind of node can receive message from master in one piconet and deliver the message to its slave into the other piconet where it is acting as a slave. This type of node is refer as bridge node. A station cannot be master in two piconets.

Bluetooth protocol stack :-

Radio (RF) layer: It performs modulation/demodulation of the data into RF signals. It defines the physical characteristics of bluetooth transceiver. It defines two types of physical link: connection-less and connection-oriented.

Baseband Link layer: It performs the connection establishment within a piconet.





Link Manager protocol layer: It performs the management of the already established links. It also includes authentication and encryption processes.

Logical Link Control and Adaption protocol layer: It is also known as the heart of the bluetooth protocol stack. It allows the communication between upper and lower layers of the bluetooth protocol stack. It packages the data packets received from upper layers into the form expected by lower layers. It also performs the segmentation and multiplexing.

SDP layer: It is short for Service Discovery Protocol. It allows to discover the services available on another bluetooth enabled device.

RF comm layer: It is short for Radio Frontend Component. It provides serial interface with WAP and OBEX.

OBEX: It is short for Object Exchange. It is a communication protocol to exchange objects between 2 devices.

WAP: It is short for Wireless Access Protocol. It is used for internet access.

TCS: It is short for Telephony Control Protocol. It provides telephony service.

Application layer: It enables the user to interact with the application.

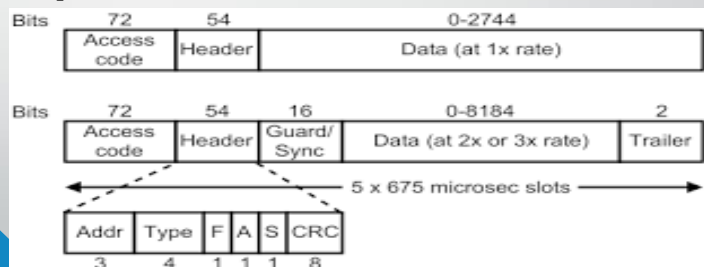
Advantages :-

- Low cost.
- Easy to use.
- It can also penetrate through walls.
- It creates an ad-hoc connection immediately without any wires.
- It is used for voice and data transfer.

Disadvantages :-

- It can be hacked and hence, less secure.
- It has slow data transfer rate: 3 Mbps.
- It has small range: 10 meters.

Bluetooth frame structure :-





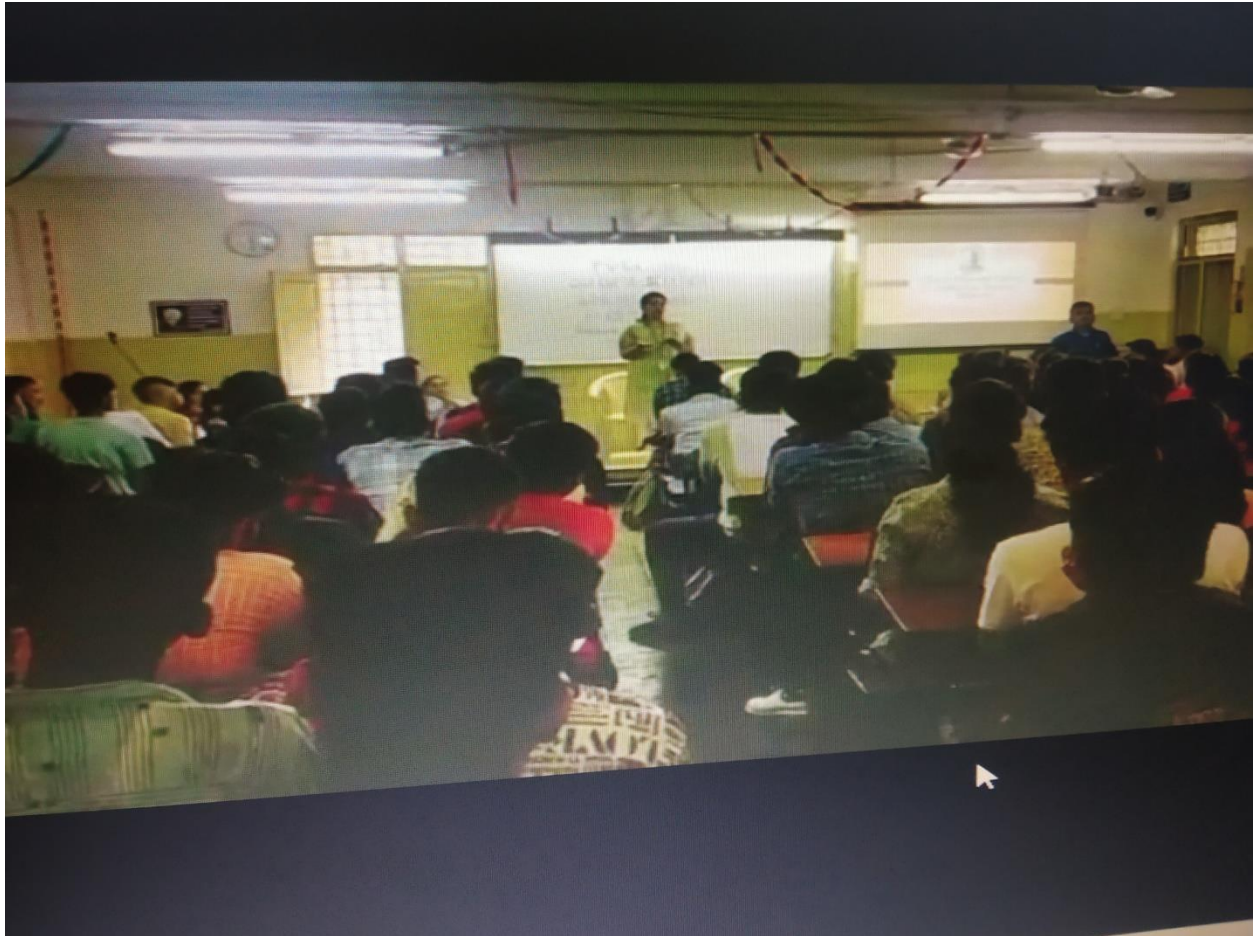
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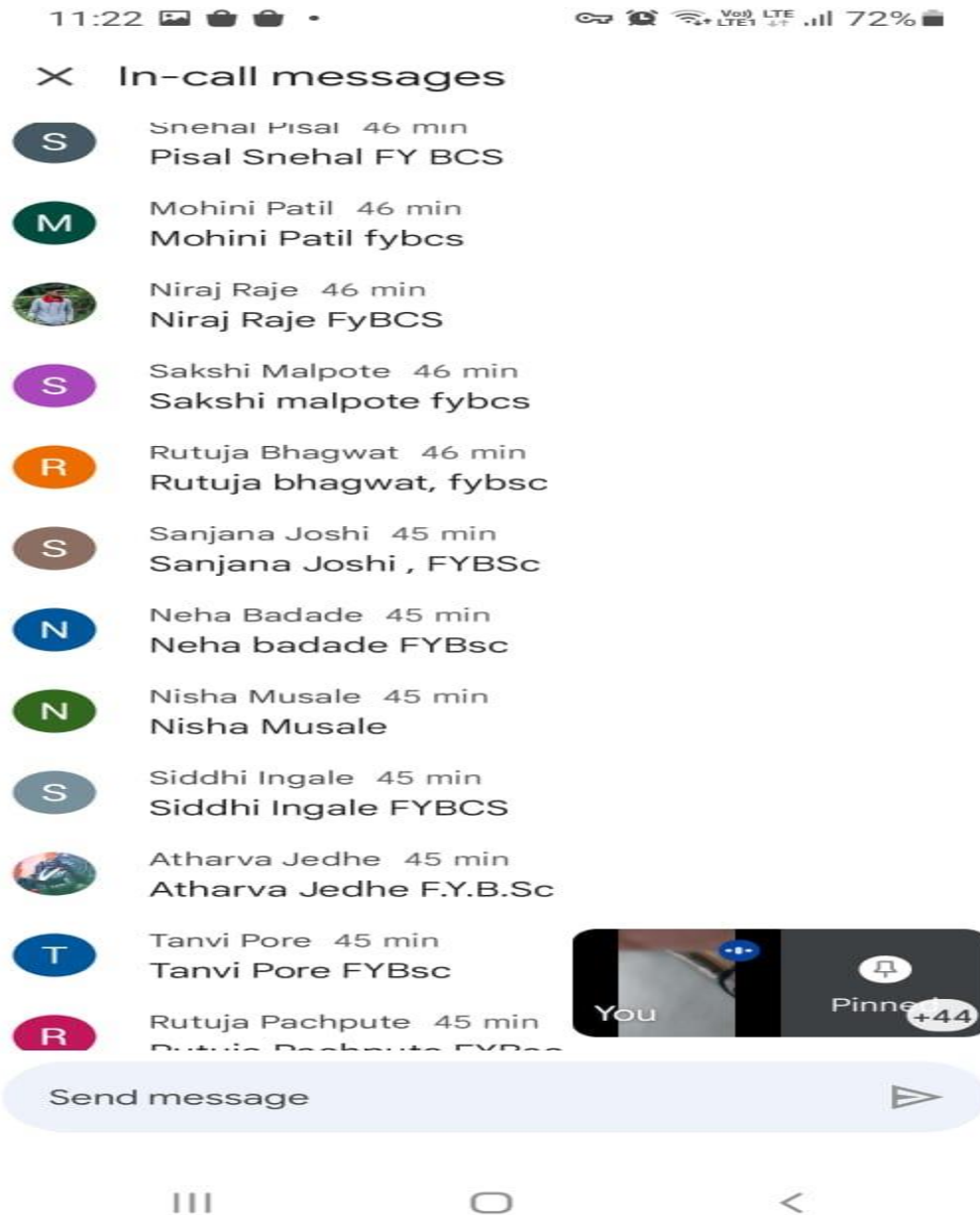
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2.3.2

2021-22

11:22

VoLTE LTE 72%

X In-call messages

-  Gayatri Admane 46 min
Gayatri Admane, FYBSC
-  Parth Gurav 46 min
Parth Gurav Fybcs
-  Shravani patil 46 min
Shravani patil Fybcs
-  Kaustubh Vispute 45 min
Kaustubh Vispute FYBCS
-  LALIT NILEE 45 min
Lalit Nilee Fybcs
-  Nikita Bhargude 45 min
Nikita Bhargude FYBCS
-  Yash Borade 45 min
Yash Borade, FYBCS
-  Meghana Deshpande 45 min
Meghana Deshpande FYBSC
-  Atharva Kamble 45 min
Atharva kamble fybcs
-  Sakshi Kusekar 45 min
Sakshi kusekar fybcs
-  Bipin Mandal 45 min
Bipin mandal fybcs
-  Snehal Pisal 45 min



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