**Script**

1.

hello sir and madam, we are assigned to implement a basic solution of channel allocation problem using greedy approach.

2.

We will go through all this contents one after another in upcoming time. So let’s see what is channel allocation.

3.

In this part, we give a theoretical background on the channel allocation problem and describe

the cellular concept. We also describe the different channel allocation schemes, namely fixed channel allocation, dynamic channel allocation.

What is channel allocation?

Channel allocation is a process in which a single channel is divided and allotted to multiple users in order to carry user specific tasks. There is user’s quantity may vary every time the process takes place. If there are N number of users and channel is divided into N equal-sized sub channels, each user is assigned one portion.

4.

So now there exist a problem,

How to allocate a single broadcast channel among competing users?

Determining who gets to use the channel, when there is a competition.

Channel allocation problem can be solved by two schemes: Static Channel Allocation in LANs and MANs, and Dynamic Channel Allocation.

5.

Static channel allocation is mainly used in MAN, LAN where the no of users is fixed.

It is the classical approach of allocating a single channel among multiple competing users Frequency Division Multiplexing (FDM). if there are N users, the bandwidth is divided into N equal sized portions each user being assigned one portion. since each user has a private frequency band, there is no interface between users. It is not efficient to divide into fixed number of chunks.

6.

But the problem with this solution,

Most real-life network situations have a variable number of users, usually large in number with bursty traffic. If the value of N is very large, the bandwidth available for each user will be very less. This will reduce the throughput if the user needs to send a large volume of data once in a while.

New users wont be able to use the channel until the whole channel is made free and therefore time consumption will be more.

If the number of users is more than N, then some of them will be denied service, even if there are unused frequencies.

7.

As mentioned earlier, in order to overcome those deficiencies of FCA schemes, DCA strategies have been introduced. In dynamic channel allocation scheme, frequency bands are not permanently assigned to the users. Instead channels are allotted to users dynamically as needed, from a central pool. The allocation is done considering a number of parameters so that transmission interference is minimized.

This allocation scheme optimises bandwidth usage and results is faster transmissions. DCA do not own any particular channels and a channel is released when a call is completed.

This project proposes a Greedy-based Dynamic Channel Assignment (GDCA) strategy in cellular mobile communication networks. Its main feature is that it dynamically allocates the channels based on greedy method.

8.

In this approach we can utilize an efficient usage of the available spectrum and reassigning the unused channel to the user.

Channel not pre-divided into the number of users. A mapping can be established when a new station appears, and the mapping can be removed when the station disappears.

Devices left the channel after completing data transfer and new device joins without affecting existing communications

9.

The basic model of the channel assignment problem can be represented as follows

10. 11. 12.

13.

To create a simulation, we implement a Web application of static and dynamic situation.

In the static situation when we know the number of devices will communicate and no of channels where they can communicate. There are two types of device one with higher data rate and other with lower data rate.

There is a base station placed with random coordinate.

Here each device submits its information (location, data rate) to server as a client randomly. In the server the above channel allocation algorithm runs and then the server informs the allocated device so that they can communicate on these channels.

The green dots specify allocated device and red dot indicates unallocated device. Blue dot is the base station.

The page refreshes after 5 seconds and randomly allocate devices with above algorithm, some device got allocation for data transfer and some are in waiting state.

We have another simulation of dynamic situation where A device after completing its communication will release the channel and new devices join. The channel allocation is to be done for the new set of devices without affecting existing communications. Some priority may be given to devices denied earlier.

Let’s see the simulation,

Here the system takes the no of channels which are available and the location of the base station generated randomly. This page runs a script that clear all the existing data in database.

This is a client request form where one client can send request to the server for allocation of his required data transfer,

The client sends all its details like required data rate location and data size to be transferred, all this data is saved into database through AJAX script.

The system takes the data size value to calculate how much time required for transmission by dividing the data size with the given data rate. And when the time required is 0 the device then leaves the channel.

This random data button will run a php page that insert random device data into database after every 3 second.

There is another button shows the table from database and after 20 data insertion it runs the algorithm automatically , which will starts the allocation.

So let’s send data to server randomly.

We can see the chart

The green dots specify allocated device and red dot indicates unallocated device. Blue dot is the base station.

The page refreshes after 5 seconds and randomly allocate devices with above algorithm, some device got allocation for data transfer and some are in waiting state.

So we can see here that red dots are becoming green means some devices are leaving the channels and some requesting devices are getting allocated. So this algorithm runs continuously in the server and new devices will join, gets allocated in the channel, transfer data and then leave.

This chart is implemented with scatter chart js and php.