There are n devices $d_1, d_2, \ldots d_n$ placed randomly with X-coordinates (1 to 200), Y-Co-ordinates (1 to 200).
One base station BS placed randomly within 200×200
distance of device d_i from BS: f_i
There are k channels.
First p devices ($p < k$), $d_1, d_2, \ldots d_p$ has data rate above 20 Mbps (generate random value between 20 to 30)
The next $n - p$ devices $d_{p+1}, d_{p+2} \ldots d_n$ has data rate below 20 Mbps (generate random value between 1 and 20)
Sort the devices d_{p+1} to d_n in ascending order of data rate r_i.
r_i: data rate in Mbps for device d_i in sorted order, i, $i = 1, 2, \ldots n$.
$\tau_i = \frac{1}{2^{r_i/20}-1}$
$I_{i,j} = (f_i/f_j)^4$, if $i \neq j$
$I_{i,j} = 0$, if $i = j$
Initialize $allocated_i = i$ for $i = 1$ to p.
$allocated_i = 0$ for $i = p + 1$ to n
Greedy Algorithm to allocate channels to devices

```
1  begin
2      for i = p + 1 ··· n do
3          for c = 1 ··· k do
4              allocated_i = c.
5              D = {j : allocated_j = c}
6              for each d ∈ D do
7                  sum_d = Σ_{x∈D} I_{d,x};
8                  if sum_d > τ'_d then
9                      allocated_i = 0;break;
10             if allocated_i = c then
11                 break;
```

Try with $n = 30$, $k = 10$ and $p = 5$.

Web application You can assume each device submits its information (location, data rate) to server as a client. 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.

dynamic situation A device after completing its communication will release the channel. Thus in a dynamic situation some devices leave and new devices may 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.