COMP9336 Mobile Data Networking

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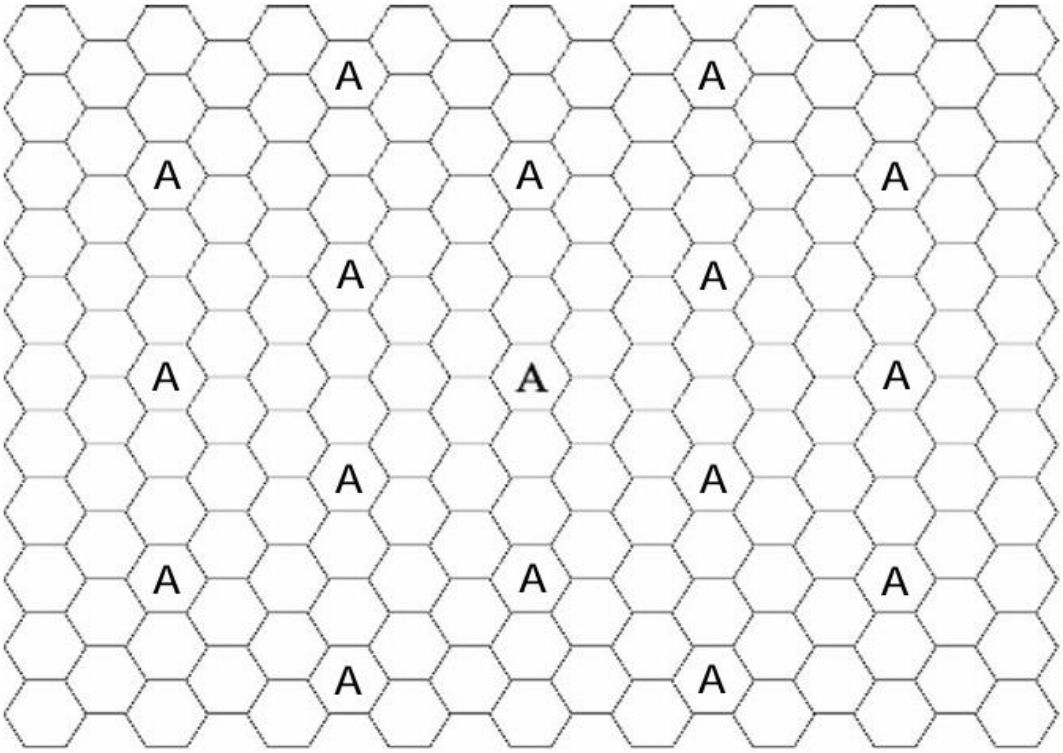
Task-1 Frequency re-use [2 marks]

a.

```
N = 9
0.0s

import math

for i in range(10):
    for j in range(10):
        if i**2 + j**2 + (i*j) == N:
            print(f"i: {i}, j: {j}")

0.0s

i: 0, j: 3
i: 3, j: 0
```

Therefore, when N = 9. We used **i=3, j=0.**



b.

```
N = 12
```

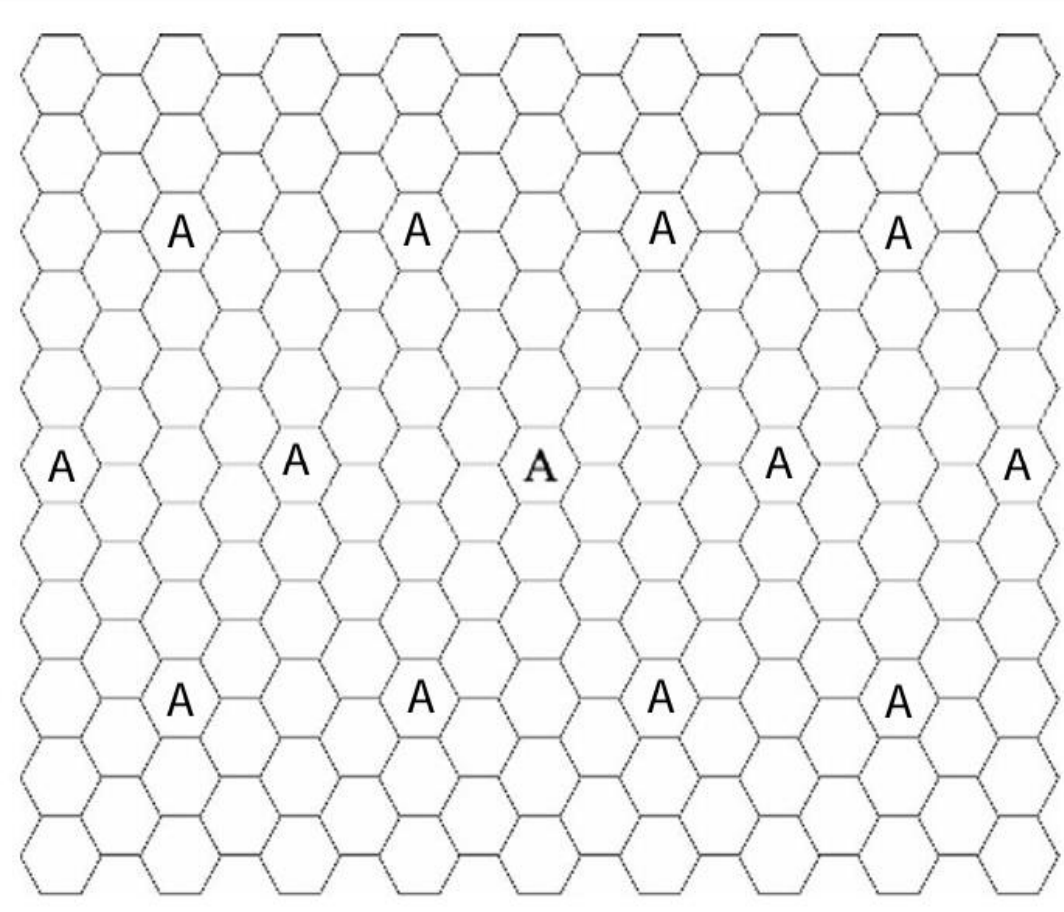
0.0s

```
import math

for i in range(10):
    for j in range(10):
        if i**2 + j**2 + (i*j) == N:
            print(f"i: {i}, j: {j}")
```

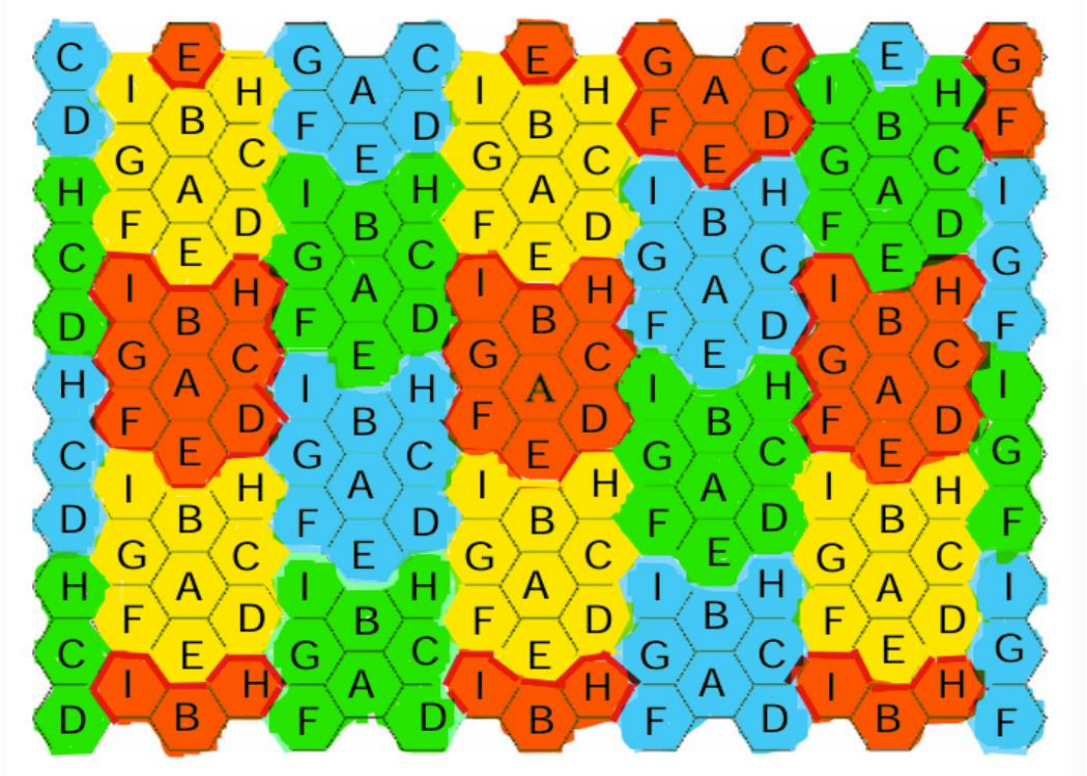
0.0s

```
i: 2, j: 2
```

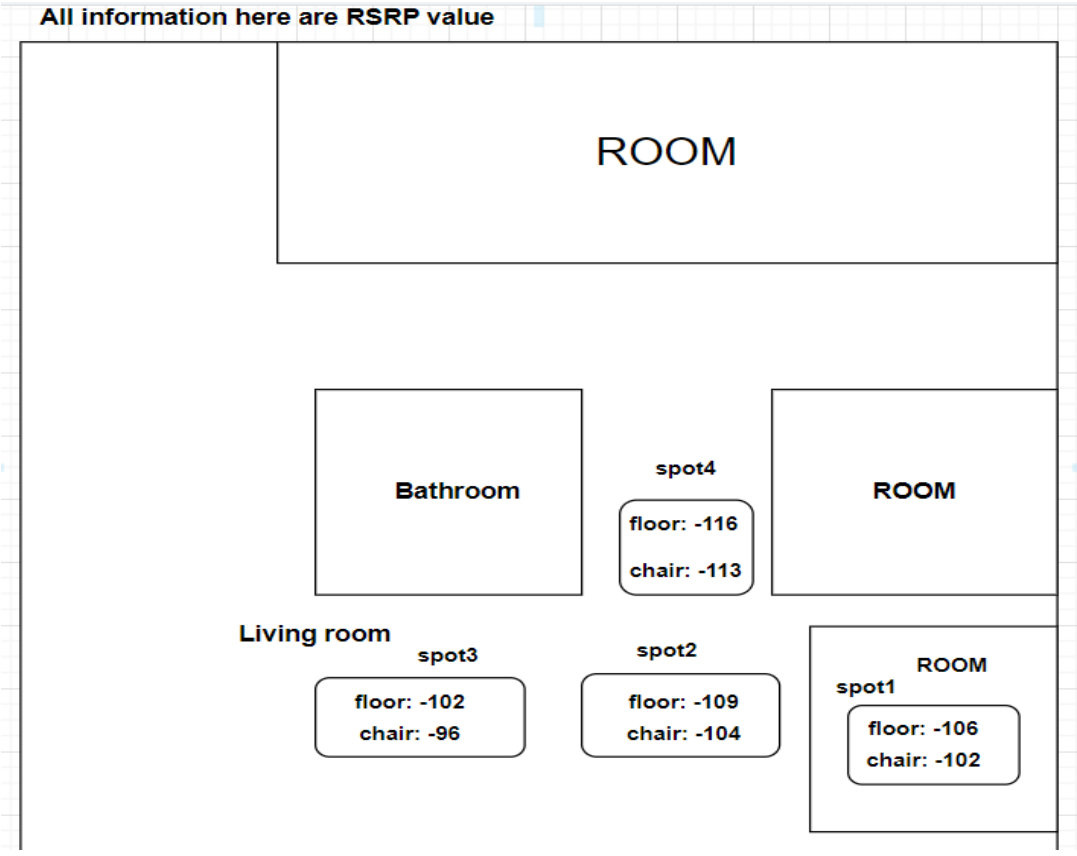
Therefore, when N = 12. We used **i=2, j=2.**



c.

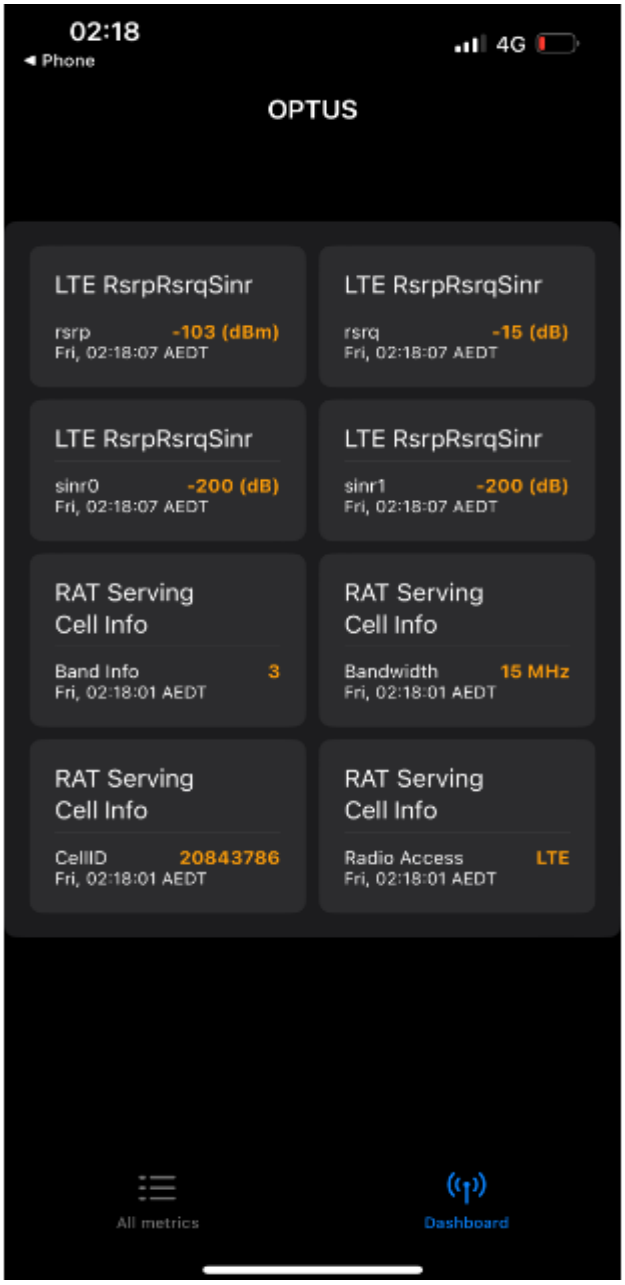


Task-2 Measuring cellular signal strength [2 marks]



I measured the RSRP value at four different spots within my home, ensuring each spot was no more than 1 meter away (horizontally) from the nearest spot. I used two different heights: the floor and a chair. I turned off WiFi and set my phone to 4G mode. Then, I placed my phone on the floor and on the chair, holding it in position for a few seconds at each spot to collect the RSRP data.

My screenshot:

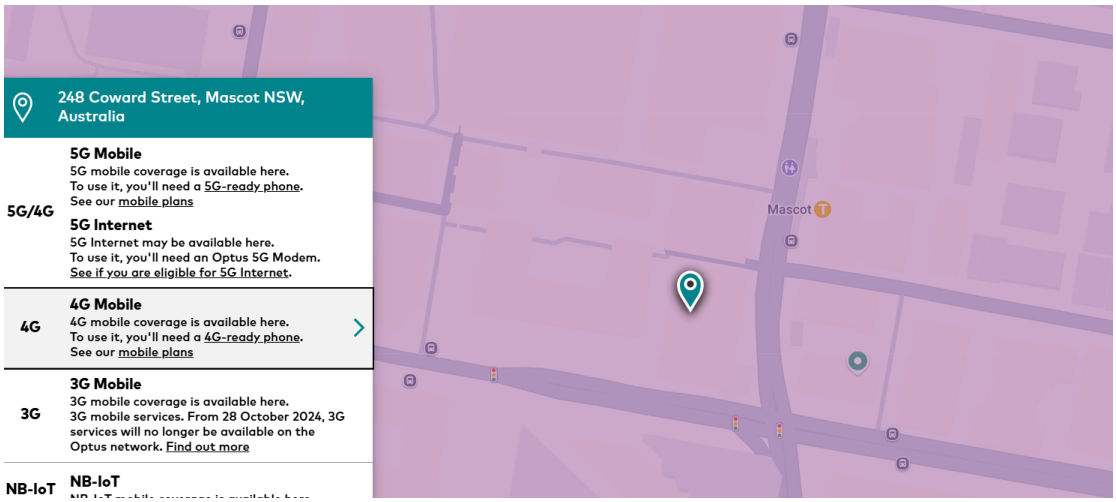


RSRP value table:

	In bedroom(spot1)	Outside the bedroom (spot2)	Living room center (spot3)	Between two rooms (spot4)
Floor(dBm)	**-106**	**-109**	**-102**	**-116**
Chair(dBm)	**-102**	**-104**	**-96**	**-113**

The RSRP data indicates expected indoor signal behavior: strongest in the living room center (fewer obstacles, direct signal path), almost similar in and near rooms (wall attenuation), lowest between rooms (multiple wall blockage causing interference and a dead zone), and higher on a chair than the floor (less ground absorption and interference).

My carrier is **optus,** this is the coverage map for my place:



I live on the 6th floor at a street corner, this could benefit from fewer ground-level obstacles and an open corner location, improving the RSRP. However, multipath reflections from nearby buildings might affect the signal stability.