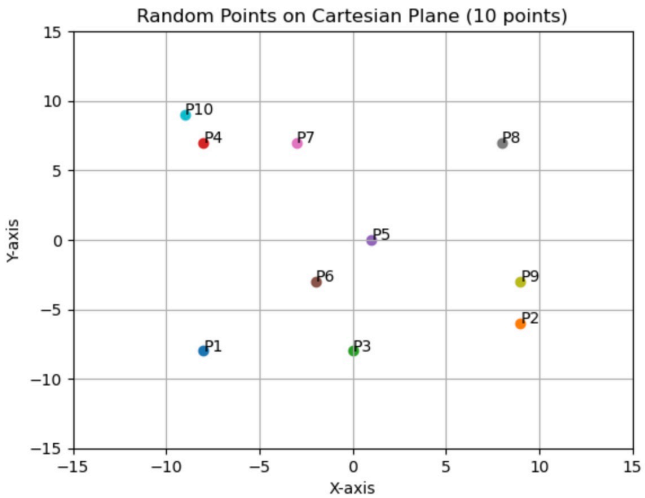
**Example 1:**



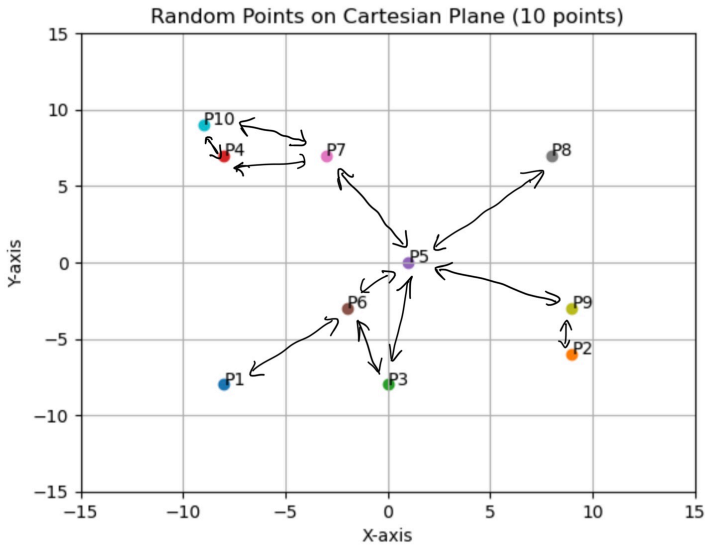

distance matrix for each tag pair is.

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **P1** | 0.000000 | 17.117243 | 8.000000 | 15.000000 | 12.041595 | 7.810250 | 15.811388 | 21.931712 | 17.720045 | 17.029386 |
| **P2** | 17.117243 | 0.000000 | 9.219544 | 21.400935 | 10.000000 | 11.401754 | 17.691806 | 13.038405 | 3.000000 | 23.430749 |
| **P3** | 8.000000 | 9.219544 | 0.000000 | 17.000000 | 8.062258 | 5.385165 | 15.297059 | 17.000000 | 10.295630 | 19.235384 |
| **P4** | 15.000000 | 21.400935 | 17.000000 | 0.000000 | 11.401754 | 11.661904 | 5.000000 | 16.000000 | 19.723083 | 2.236068 |
| **P5** | 12.041595 | 10.000000 | 8.062258 | 11.401754 | 0.000000 | 4.242641 | 8.062258 | 9.899495 | 8.544004 | 13.453624 |
| **P6** | 7.810250 | 11.401754 | 5.385165 | 11.661904 | 4.242641 | 0.000000 | 10.049876 | 14.142136 | 11.000000 | 13.892444 |
| **P7** | 15.811388 | 17.691806 | 15.297059 | 5.000000 | 8.062258 | 10.049876 | 0.000000 | 11.000000 | 15.620499 | 6.324555 |
| **P8** | 21.931712 | 13.038405 | 17.000000 | 16.000000 | 9.899495 | 14.142136 | 11.000000 | 0.000000 | 10.049876 | 17.117243 |
| **P9** | 17.720045 | 3.000000 | 10.295630 | 19.723083 | 8.544004 | 11.000000 | 15.620499 | 10.049876 | 0.000000 | 21.633308 |
| **P10** | 17.029386 | 23.430749 | 19.235384 | 2.236068 | 13.453624 | 13.892444 | 6.324555 | 17.117243 | 21.633308 | 0.000000 |

suppose in this example Radius is **9.90** then neighbor table and map will be as follows:

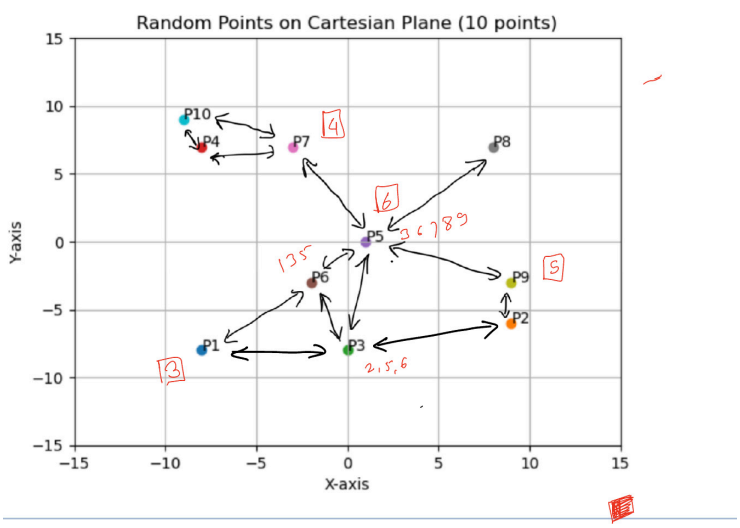
neighbor_table

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **P1** | 0 | 100000 | 1 | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 100000 |
| **P2** | 100000 | 0 | 1 | 100000 | 100000 | 100000 | 100000 | 100000 | 1 | 100000 |
| **P3** | 1 | 1 | 0 | 100000 | 1 | 1 | 100000 | 100000 | 100000 | 100000 |
| **P4** | 100000 | 100000 | 100000 | 0 | 100000 | 100000 | 1 | 100000 | 100000 | 1 |
| **P5** | 100000 | 100000 | 1 | 100000 | 0 | 1 | 1 | 1 | 1 | 100000 |
| **P6** | 1 | 100000 | 1 | 100000 | 1 | 0 | 100000 | 100000 | 100000 | 100000 |
| **P7** | 100000 | 100000 | 100000 | 1 | 1 | 100000 | 0 | 100000 | 100000 | 1 |
| **P8** | 100000 | 100000 | 100000 | 100000 | 1 | 100000 | 100000 | 0 | 100000 | 100000 |
| **P9** | 100000 | 1 | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 0 | 100000 |
| **P10** | 100000 | 100000 | 100000 | 1 | 100000 | 100000 | 1 | 100000 | 100000 | 0 |




suppose tag 1, 5,  7 and 9 have messages. tag 1 has 2 messages and rest have single messages.

and message destination of tag 1 is tag 3,  for 5 it is tag 6, for 7 it is tag 4, and for 9 it is tag 5



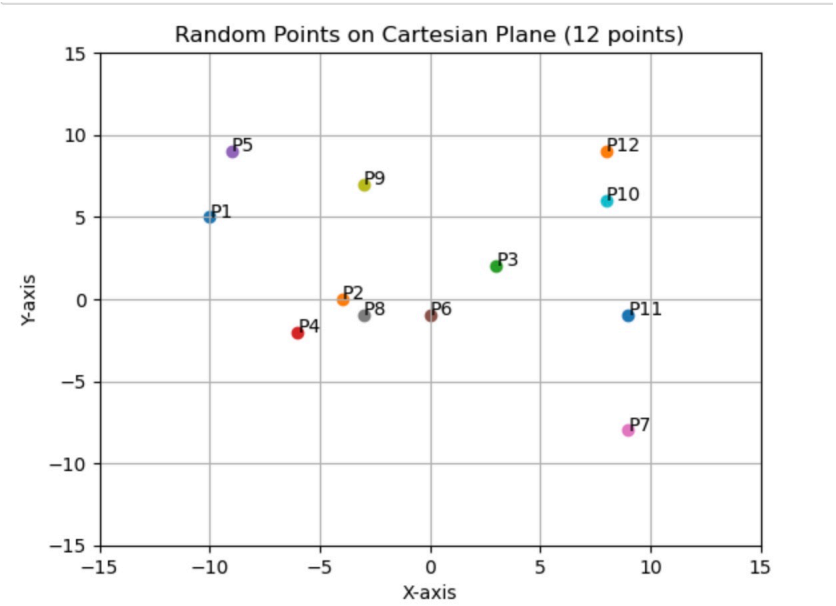

Constraints C2 and C3 are as follows:

```
['x1(c11c̄12 + c12c̄11)+x̄1c̄11c̄12', 'x̄2', 'x̄3', 'x̄4', 'x5(c51)+x̄5c̄51', 'x̄6', 'x7(c71)+x̄7c̄71', 'x̄8', 'x9(c91)+x̄9c̄91', '
x̄10']
```

```
['g(c12, x2 + x5 + x6 )', 'g(c51, x1 + x3 )', 'g(c71, x10 )', 'g(c91, x3 + x6 + x7 + x8 )']
```

**Example 2:**

Now taking 12 tags.

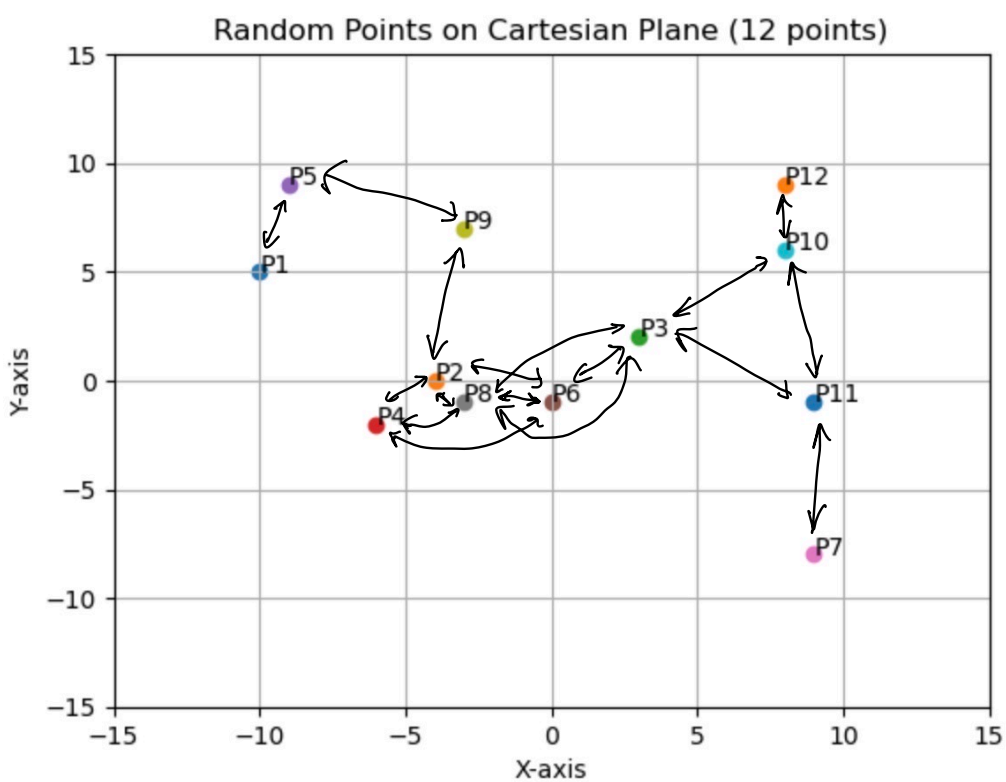



distance matrix for each tag pair is.

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P1** | 0.000000 | 7.810250 | 13.341664 | 8.062258 | 4.123106 | 11.661904 | 23.021729 | 9.219544 | 7.280110 | 18.027756 | 19.924859 | 18.439089 |
| **P2** | 7.810250 | 0.000000 | 7.280110 | 2.828427 | 10.295630 | 4.123106 | 15.264338 | 1.414214 | 7.071068 | 13.416408 | 13.038405 | 15.000000 |
| **P3** | 13.341664 | 7.280110 | 0.000000 | 9.848858 | 13.892444 | 4.242641 | 11.661904 | 6.708204 | 7.810250 | 6.403124 | 6.708204 | 8.602325 |
| **P4** | 8.062258 | 2.828427 | 9.848858 | 0.000000 | 11.401754 | 6.082763 | 16.155494 | 3.162278 | 9.486833 | 16.124515 | 15.033296 | 17.804494 |
| **P5** | 4.123106 | 10.295630 | 13.892444 | 11.401754 | 0.000000 | 13.453624 | 24.758837 | 11.661904 | 6.324555 | 17.262677 | 20.591260 | 17.000000 |
| **P6** | 11.661904 | 4.123106 | 4.242641 | 6.082763 | 13.453624 | 0.000000 | 11.401754 | 3.000000 | 8.544004 | 10.630146 | 9.000000 | 12.806248 |
| **P7** | 23.021729 | 15.264338 | 11.661904 | 16.155494 | 24.758837 | 11.401754 | 0.000000 | 13.892444 | 19.209373 | 14.035669 | 7.000000 | 17.029386 |
| **P8** | 9.219544 | 1.414214 | 6.708204 | 3.162278 | 11.661904 | 3.000000 | 13.892444 | 0.000000 | 8.000000 | 13.038405 | 12.000000 | 14.866069 |
| **P9** | 7.280110 | 7.071068 | 7.810250 | 9.486833 | 6.324555 | 8.544004 | 19.209373 | 8.000000 | 0.000000 | 11.045361 | 14.422205 | 11.180340 |
| **P10** | 18.027756 | 13.416408 | 6.403124 | 16.124515 | 17.262677 | 10.630146 | 14.035669 | 13.038405 | 11.045361 | 0.000000 | 7.071068 | 3.000000 |
| **P11** | 19.924859 | 13.038405 | 6.708204 | 15.033296 | 20.591260 | 9.000000 | 7.000000 | 12.000000 | 14.422205 | 7.071068 | 0.000000 | 10.049876 |
| **P12** | 18.439089 | 15.000000 | 8.602325 | 17.804494 | 17.000000 | 12.806248 | 17.029386 | 14.866069 | 11.180340 | 3.000000 | 10.049876 | 0.000000 |

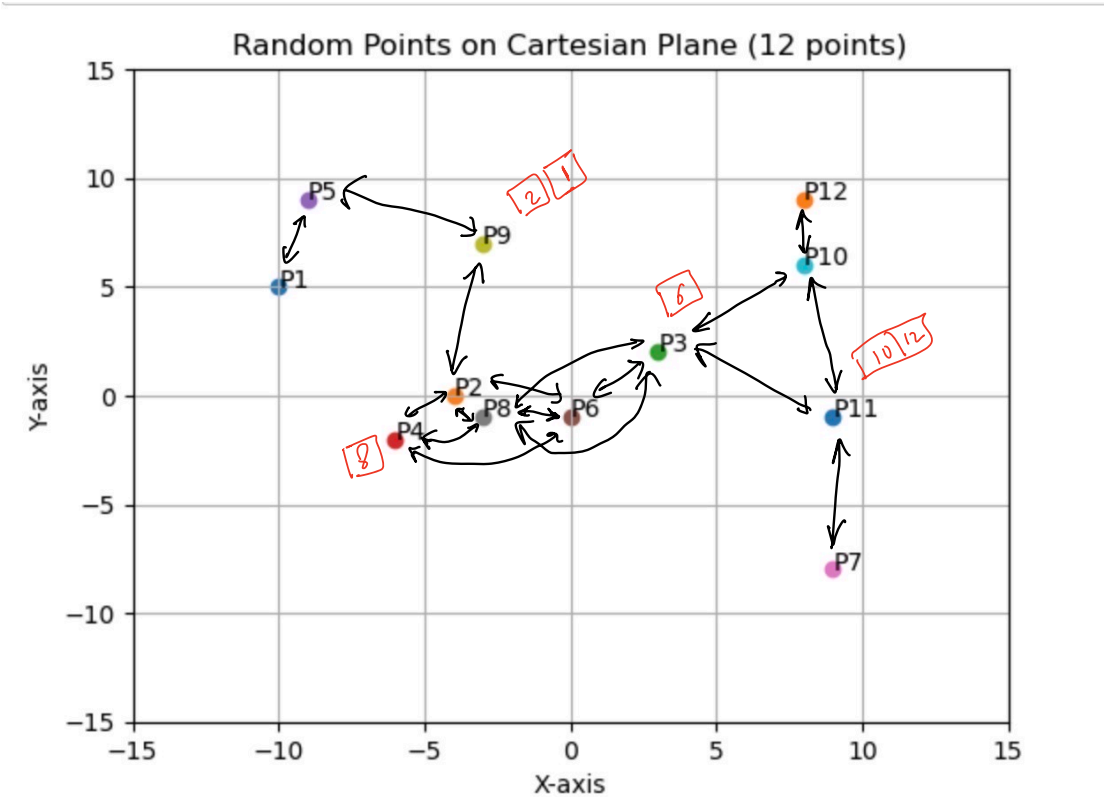
suppose in this example Radius is **7.08** then neighbor table and map will be as follows:

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P1** | 0 | 100000 | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 |
| **P2** | 100000 | 0 | 100000 | 1 | 100000 | 1 | 100000 | 1 | 1 | 100000 | 100000 | 100000 |
| **P3** | 100000 | 100000 | 0 | 100000 | 100000 | 1 | 100000 | 1 | 100000 | 1 | 1 | 100000 |
| **P4** | 100000 | 1 | 100000 | 0 | 100000 | 1 | 100000 | 1 | 100000 | 100000 | 100000 | 100000 |
| **P5** | 1 | 100000 | 100000 | 100000 | 0 | 100000 | 100000 | 100000 | 1 | 100000 | 100000 | 100000 |
| **P6** | 100000 | 1 | 1 | 1 | 100000 | 0 | 100000 | 1 | 100000 | 100000 | 100000 | 100000 |
| **P7** | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 0 | 100000 | 100000 | 100000 | 1 | 100000 |
| **P8** | 100000 | 1 | 1 | 1 | 100000 | 1 | 100000 | 0 | 100000 | 100000 | 100000 | 100000 |
| **P9** | 100000 | 1 | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 0 | 100000 | 100000 | 100000 |
| **P10** | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 0 | 1 | 1 |
| **P11** | 100000 | 100000 | 1 | 100000 | 100000 | 100000 | 1 | 100000 | 100000 | 1 | 0 | 100000 |
| **P12** | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 100000 | 1 | 100000 | 0 |



suppose tag 3, 4,  9 and 11 have messages to send. tag 9 and 11 have 2 messages and rest have single messages.

and message destination of tag 3 is tag6,  for 4 it is  8, for 9 it is tag 2, and for 11 it is tag 10




Constraints C2 and C3 are as follows:

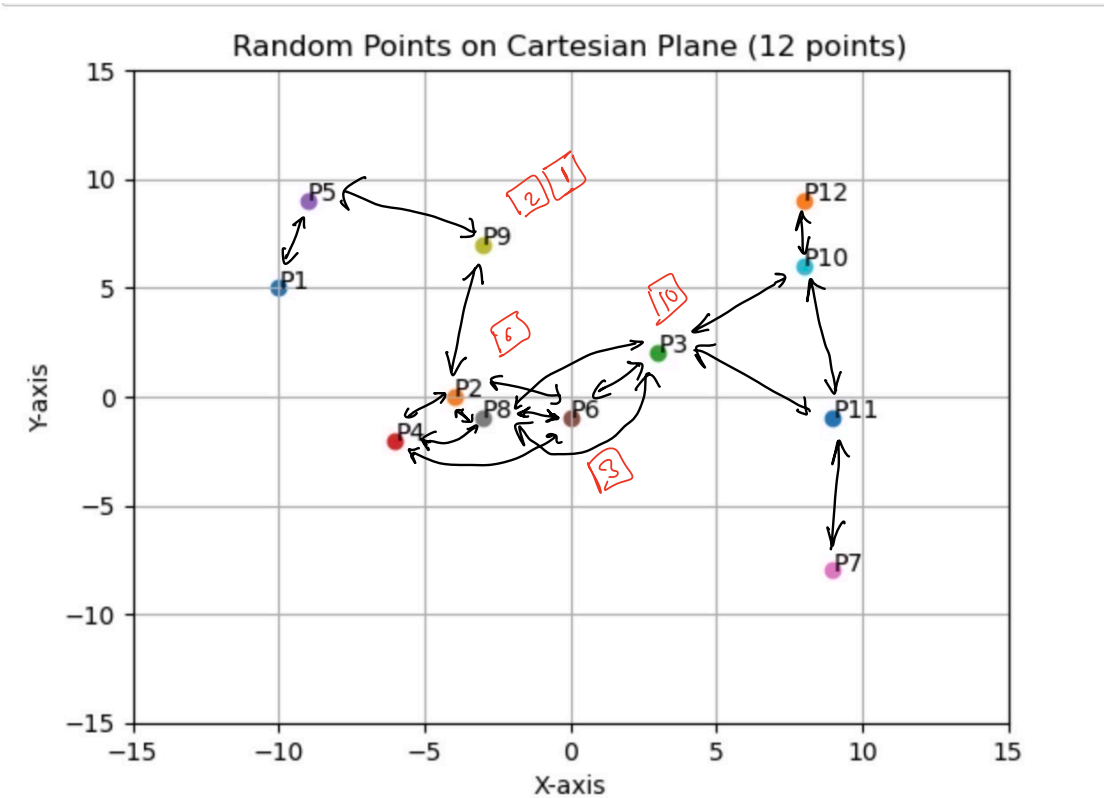
```
['x̄1', 'x̄2', 'x3(c31)+x̄3c̄31', 'x4(c41)+x̄4c̄41', 'x̄5', 'x̄6', 'x̄7', 'x̄8', 'x9(c91c̄92 + c92c̄91)+x̄9c̄91c̄92', 'x̄10', 'x11(
c111c̄112 + c112c̄111)+x̄11c̄111c̄112', 'x̄12']
```

```
['g(c31, x2 + x4 + x8 )', 'g(c41, x2 + x3 + x6 )', 'g(c91, x4 + x6 + x8 )', 'g(c111, x3 + x12 )']
```

**Example 3:**

suppose in the previous tag arrangement,
tag 9, 2, 6 and 3 have messages to send. tag 9 has 2 messages and rest have single messages.

and message destination of tag 9 is tag 2, for 2 it is 6, for 6 it is tag 3, and for 3 it is tag 10.




Constraints C2 and C3 are as follows:

```
['x̄1', 'x2(c21)+x̄2c̄21', 'x3(c31)+x̄3c̄31', 'x̄4', 'x̄5', 'x6(c61)+x̄6c̄61', 'x̄7', 'x̄8', 'x9(c91c̄92 + c92c̄91)+x̄9c̄91c̄92',
x̄10', 'x̄11', 'x̄12']
```

```
['g(c21, x3 + x4 + x8 )', 'g(c31, x11 + x12 )', 'g(c61, x8 + x10 + x11 )', 'g(c91, x4 + x6 + x8 )']
```