**Personalised Parameters:**
See this Google Sheet to know your parameters.

**Wireless MAC Type:**
- ✓ Wireless 802.15.4
- Wireless 802.11

**Routing Protocol:**
- DSDV
- ✓ AODV
- DSR

**Agent + Application:**
- ✓ UDP + Exponential Traffic
- UDP + CBR Traffic
- TCP Reno + FTP
- TCP Tahoe + Telnet,

**Node Positioning:**
- Random (Randomly place nodes anywhere with area)
- ✓ Grid (Place nodes in a grid. You can choose the number of rows and columns yourself)

**Flow:**
- Random Source Destination (For each flow, choose a random source and a destination. Careful not to choose same node as source and destination)
- 1 Source, Random Sink (except source itself) (Choose a random source X, then for each flow choose X as source, and any other node as destination)
- 1 Sink, Random Source (Choose a random sink X, then for each flow choose X as destination, and any other node as source)

**Parameters:**

Queue: Droptail, max size 50 *(Using Queue/DropTail/PriQueue with DSR may cause segmentation fault. In that case you can use CMUPriQueue instead.)*

Antenna: Omni Directional

Speed of nodes: Uniform random between 1m/s and 5m/s for each node.

Propagation Model: Two Ray Ground Propagation Model

With your personalised parameters and global parameters fixed, vary the parameters below.

**Baseline Parameters:** (while varying one parameter, keep other parameters fixed like below)

- Area Size: 500m x 500m
- Number of Nodes: 40
- Number of flows: 20

**Vary parameters:**

- Area Size: 250m x 250m, 500m x 500m, 750m x 750m, 1000m x 1000m, 1250m x 1250m
- Number of Nodes: 20, 40, 60, 80, 100
- Number of flows: 10, 20, 30, 40, 50

**Metrics:**

For each of the varying parameters, plot 4 graph showing,

- Network throughput
- End-to-end delay
- Packet delivery ratio (total # of packets delivered to end destination / total # of packets sent)
- Packet drop ratio (total # of packets dropped / total # of packets sent)

**For example:**

Say, for varying area sizes, keep other params fixed as mentioned in baseline. Find 4 metrics for each of the values of area size. Plot each metric in a separate graph. You will get 4 graphs for varying area size. One of them is the Delivery ratio. It may look like this. **Clearly mention the x-axis, y-axis, x-ticks and y-ticks.**
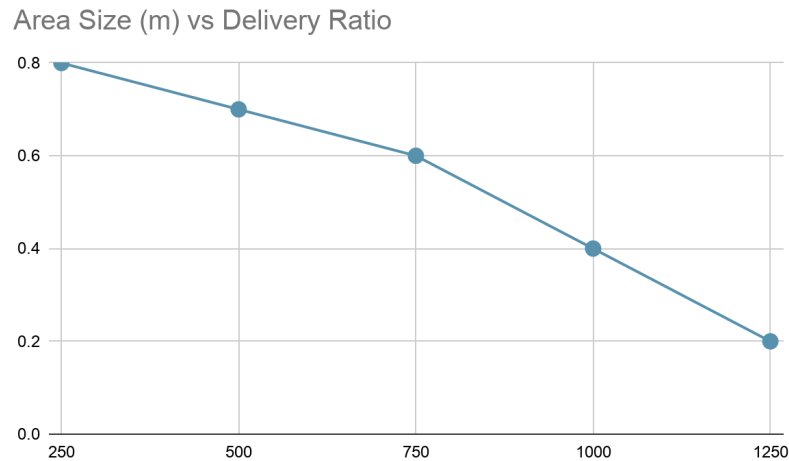


The total number of graphs will be 3 x 4 = 12.

**Report:**
- Write short descriptions of your MAC type, Routing protocol, Agent Type, Application.
- Include all the 12 graphs.
- Write short observations on the results you got.

**Submission:**
- Code (exclude the trace files, nam files). Include only the source files (.tcl, .sh, .awk, .py, .ipynb or others)
- Report as pdf.
- Put all of these in a zip file
- Name it as your student id (1805xxx.zip)
- Submit

**Marks Distribution:**

| Basic Simulation and configs | 4 |
|---|---|
| Vary area size + graph | 4 |
| Vary number of nodes + graph | 4 |
| Vary number of flows + graph | 4 |
| Report | 4 |
| **Total** | **20** |

## Appendix A: List of graphs

| Graph No. | x-axis | y-axis | Fixed Param Values | | |
| --- | --- | --- | --- | --- | --- |
| | | | Area-size | Number of nodes | Number of flows |
| 1 | Area Size <br> ● 250m x 250m <br> ● 500m x 500m <br> ● 750m x 750m <br> ● 1000m x 1000m <br> ● 1250m x 1250m | Network throughput | - | 40 | 20 |
| 2 | | End-to-end Delay | - | 40 | 20 |
| 3 | | Packet delivery ratio | - | 40 | 20 |
| 4 | | Packet drop ratio | - | 40 | 20 |
| 5 | Number of nodes <br> ● 20 <br> ● 40 <br> ● 60 <br> ● 80 <br> ● 100 | Network throughput | 500m x 500m | - | 20 |
| 6 | | End-to-end Delay | 500m x 500m | - | 20 |
| 7 | | Packet delivery ratio | 500m x 500m | - | 20 |
| 8 | | Packet drop ratio | 500m x 500m | - | 20 |
| 9 | Number of flows <br> ● 10 <br> ● 20 <br> ● 30 <br> ● 40 <br> ● 50 | Network throughput | 500m x 500m | 40 | - |
| 10 | | End-to-end Delay | 500m x 500m | 40 | - |
| 11 | | Packet delivery ratio | 500m x 500m | 40 | - |
| 12 | | Packet drop ratio | 500m x 500m | 40 | - |