

# TELE303 Mobile Systems

## Assignment Cover Sheet

We hereby certify that this assignment is our own work and that we have not copied, in part or whole, or otherwise plagiarized the work of others.

Student name: \_\_\_\_\_

Signature: \_\_\_\_\_

Student name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

# TELE303 Assignment 2 - MANET TCP Performance Study

(10 Marks)

## Resources

This assignment is based on the material we used in Lab 3:

- The *NS2 Tutorial* and *NS2 Manual* (especially Section 16.1)
- The example script ('simple.tcl')

This is a group assignment - you may choose to team with **one** fellow student to work on this assignment, or to work alone.

## Setup

Using the same **IEEE 802.11** configuration as in Lab 3, we have a **six-node ad hoc network** with an initial topology shown in Fig.1. The horizontal distance between two neighbours is **200m**, while the vertical distance is **300m**. **Node 0's coordinates are (100,100)**. There is a **TCP** flow (with traffic generated by an **FTP** application) from **Node 0 to Node 5**. The flow **starts at 1.0 second and terminates at 11.0 second**.

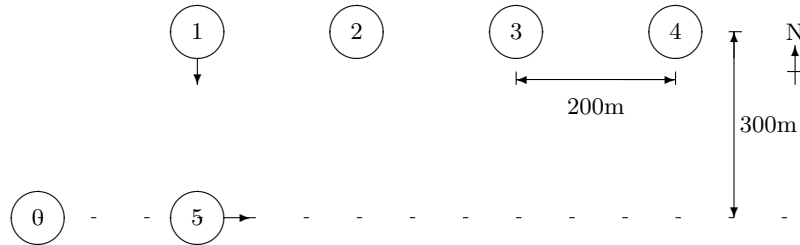


Figure 1: Topology of the MANET

The MANET topology undergoes the following changes:

- At 3.0 / 5.0 / 7.0 / 9.0 second respectively, Node 5 will begin to move for 200m to the east at a speed of 200m/s.
- At 3.0 / 5.0 / 7.0 / 9.0 second, Node 1 / 2 / 3 / 4, respectively, will move 300m to the south, at a speed of 200m/s. So, eventually they will be all aligned with Node 0 and Node 5 one after another.

## Tasks

### Part A. Simulation (3 marks)

Write an NS-2 simulation for the above-mentioned setup and generate trace for TCP performance analysis. Terminate the simulation at 12.0 second to allow remaining TCP packets to get delivered across the chain.

## Part B. Performance Analysis Report (7 marks)

Complete the following tasks and report your findings:

1. From the simulation trace, work out the TCP throughput (how many TCP packets are received at Node 5) over time (per second). [2]
2. Similarly, work out how many TCP packets are dropped over time. [1]
3. Analyze the causes for packet droppings as indicated by the trace. [1]
4. Analyze how the motions of the nodes affect the TCP performance. Conduct extra simulations if necessary. [2]

You need to include the AWK commands for trace analysis, present the findings using tables or graphs. You shall also summarize the findings and identify the relevant factors that affect the TCP performance in this MANET. The presentational quality of your report is worth up to 1.0 marks.

## Submission

The deadline is **10am WED 6/4**. Submission, made per group, shall contain two parts:

- Simulation scripts for Part A should be sent to jeremiah.deng@otago.ac.nz as attachment using the subject line “TELE303 Assignment 2 submission”. Please do **NOT** include the trace files in the attachment.
- The report for Part B must be type-set, printed and handed in to Jeremiah (CO10.13). Please use the provided cover page with the names and signatures of *all* group members. Unsigned reports will NOT be marked.

For Part B, you may explain in the report what NS-2 script lines are amended or added for the additional simulations. There is no need to submit the source code.