ITS323 – Assignment 1

1　Aims

The aims of this assignment are:

1. Learn the concepts of wireless LANs.

2. Gain experience with using common network monitoring software.

3. Relate real-world technologies with the concepts covered in ITS323.

4. Gain experience in technical writing, in particular describing communication networks and technologies.

5. Gain experience in creating a simple web site.

2　Tasks

Your tasks involve studying how IEEE 802.11 wireless LANs work by performing common network tests and experiments in a real wireless LAN. The tasks are categorised as follows.

2.1　Explain Wireless LANs

Your task is to give a written explanation of how wireless LANs work. You should include technical descriptions (text, figures, tables) of:

A.1 Typical topology of a wireless LAN

A.2 Steps and/or methods for clients to discover, join and transfer data in wireless LANs

A.3 Protocol stacks in wireless LAN stations

A.4 Standards and standard development organisations relevant to wireless LANs

A.5 Characteristics of wireless LAN physical layers, e.g. data rates, distance, frequency, encoding, . . .

A.6 Operation of wireless LAN MAC layer protocols, in particular CSMA/CA

2.2　Capture Wireless LAN Traffic

Your task is to capture and inspect packets communicated across a wireless LAN when a web browser on a client accesses a web site. You should include in your report:

B.1 Description of the experiment setup, e.g. the make/model/standard of client and access point, software and method used to capture, web site visited.

B.2 Time sequence diagram showing all the packets related to the web page transfer.

B.3 Printout (or screencapture) of all the packets related to the web page transfer (only packet summaries, not the detailed information or packet bytes).

B.4 Diagrams of the packet formats for all the packets related to the web page transfer.

B.5 Brief explanation of what is happening in the web page transfer.

2.3   Measure Wireless LAN Throughput

Your task is to measure the throughput of a wireless LAN. You should include in your report:

C.1 Description of the experiment setup, e.g. the make/model/standard of client and access point, software and method for performing the experiments.

C.2 Results of the experiments in table or plots.

C.3 Explanation of the results, that is, why the results are as you measured.

3   Group Work

This is a group assignment. You must form a group of 3 students and inform me of the group members by email before 12noon Thursday 9 August 2012. I will use the first student in your list for the designated website (see Section 4). I will then assign numbers to each group. If you haven't informed me of your group by the deadline, I will randomly assign you to a group. You may mix between the CS and IT sections.

Each student is required to participate in the assignment. That includes particpation in the research (reading about the technologies and discussion with the other group members) and the writing of the report. If a student is not helping in the assignment, then you should let me know early in the assignment so I can discuss with that student.

In your report you must include a table that identifies who was involved in the research and writing of each section. An example of such a table which shows the percentage that each student contributed to tasks is in Table 1.

Table 1: Example table of participation

Task	Student1	Student2	Student3
A.1	50	40	10
A.2	33	33	33
B.1	100	-	-
B.2	-	100	-
...	20	40	40

4   Report

You must deliver a single report per group, as a website. The website is to be available via a designated students IT server account. For example, if student with ID 5222123456 is the designated student, the URL of the group report must be:

`http://it.siit.tu.ac.th/~u5222123456/its323/`

That is, if student 5222123456 logs in to the IT server, they must store their report in the directory: `/home/students/u5222123456/public_html/its323/`.

You are free to create the website however you wish so long as you use common web standards (e.g. HTML, PNG/JPG, CSS, JavaScript; *no Flash*). Your web site must not be a link to a PDF (or other format) report. You should make appropriate use of links, especially for references.

The website must contain: information identifying the course, project title, group members; table of participation (see Section 3); and answers for each of the tasks.

The report should be written such that a student that has studied (and passed!) ITS323 would understand it. For example, you can assume the reader knows about what we have covered in the lectures—you don't have to explain what bandwidth, PCM or stop-and-wait are.

As with all reports, define an acronym when you first use it, e.g. *"This technology uses Phase Shift Keying (PSK) ..."*.

5 Submission

You must create your report on the IT server during the assignment. I recommend uploading to and editing on the IT server as you go (rather than uploading all of your website just before the deadline).

The deadline is 12noon Tuesday 18 September 2012. At this time, I will execute a script on the IT server that prohibits all students from editing their `its323` website directories. For example, after 12noon student 5222123456 will not be able to add, edit or delete any files in the directory: `/home/students/u5222123456/public_html/its323/`. There will be no opportunities for changes or submissions after the deadline.

6 Marking Scheme

Tasks A and C will be allocated a maximum of 30 marks, while task B a maximum of 25 marks. You will be evaluated on the completeness of the tasks, correctness of the information and results, and coverage, i.e. suitable detail. In addition, presentation is worth 15 marks. This includes the structure of the web site, sections, clear tables and figures, formatting and clarity of explanations. Up to 25 bonus marks may given for exceptional reports.

7 Plagiarism

There are three types of "copying" that are common and which are not allowed in this assignment:

1. Copying text either directly or with slight modifications from other sources such as websites and textbooks. This is **not** allowed. Instead, read the text, understand what it is saying, discuss with the other group members, and then write your report

in your own words. (A good way to assist is to make sure you don't have a web browser or textbook open when you are writing the report).

2. Copying pictures and tables from other sources. This is **not** allowed. Instead, for a picture think about what it is showing and re-draw it to suit your report. Often the pictures you find will be too complex or use difficult terminology for what you need to explain—hence re-draw showing the main point that you intend to make. For tables, you may re-use the data found in websites and textbooks, but again create your own table showing only the relevant data.

3. Copying from other groups (again, either directly or with some modifications). This is **not** allowed. This is a group assignment. You may discuss with other groups but you must not show other groups your report.

If evidence of the first two items is found in a report, then *all* group members will be penalised. Similarly, if evidence of the third item is found in reports, then all groups will be penalised.