# ITS323 – Assignment 1

Semester 1, 2010

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ITS323Y10S1A01, Steve/Courses/ITS323/Assessment/Assignment1.tex, r1359

## 1 Aims

The aims of this assignment are:

1. Learn about current wireless communication technologies.

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

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

## 2 Tasks

Compare the following wireless technologies: ZigBee; Bluetooth; Wireless LAN; and WiMax. For each technology try to identify the key algorithms and techniques they use related to the topics covered in the course, including:

**Protocol Architectures** layered stacks, protocols, standards, standard organisations

**Data Transmission** spectrum, frequency, bandwidth, data rates

**Transmission Media** transmit power, receive thresholds, antennas, distance

**Signal Encoding Techniques** analog/digital data/signals

**Errors** error detection, error correction, ARQ

In addition, compare practical aspects of the technologies, including:

**Applications** what scenarios/applications are they intended for? how would the technology be used by a typical user? what types of devices are required?

**Usage** are they being used extensively in Thailand? Other countries? Why not?

**Cost** what is the approximate cost of the equipment? what other costs are associated with using the technology?

# 3   Group Work

This is a group assignment. You must form a group of 3 students and inform me of the group members before 4pm Wednesday 11 August 2010. I will then assign numbers to each group. If you haven't informed me of your group by 4pm, 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.

   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 sections is in Table 1.

Table 1: Example table of participation

| Section | Student1 | Student2 | Student3 |
|---------|----------|----------|----------|
| 1 | 50 | 40 | 10 |
| 2 | 33 | 33 | 33 |
| 3.1 | 100 | - | - |
| 3.2 | - | 100 | - |
| 3.3 | 20 | 40 | 40 |

# 4   Report

You must deliver a single report per group, in electronic format (PDF). No other formats are accepted.

   The report should contain:

1. Title page

2. Table of contents

3. Table of participation (see Section 3)

4. Main body

5. References

   The main body, which contains the comparison of the technologies, should be divided into multiple sections. It is your choice as to how to do this. For example, you could have separate sections for each technology, or instead separate sections for different tasks/techniques (and cover all technologies in each section).

   When describing and comparing the technologies you should make use of:

**Tables:** For example, to give a summary of features or numerical data.

**Figures:** To explain how the technology works, show layered protocol stacks or network diagrams. You may use colour.

**Lists:** To present features, advantages/disadvantages, etc.

Of course, text (paragraphs) is necessary as well (do not include tables and lists without any explanation).

As a guide of the level of detail necessary, consider the following.

A "comparison" requires both listing of the features, as well as discussing the advantages and disadvantages. For example, it is easy to find the frequencies used by each technology. You should list the frequencies, as well as comment on the advantages/disadvantages, e.g. *"The frequency of 2.4GHz has the advantages that it is ...,whereas using a frequency of 5GHz is better for ...".*

If there is a algorithm/technique that a technology uses but you do not understand it, then learn about it and try to briefly explain it. For example, if the signal encoding technique is called *ABCD*, don't just list it—also explain it, e.g. *"ABCD is a variation of Binary Phase Shift Keying but it uses ....*

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  Information Sources

Where do you get started? There are many websites that will provide explanations of the technologies (Wikipedia being the obvious example; a search for the technologies will reveal others, including sites that give tables comparing the technologies). Use them. In addition, textbooks will also give the information you are looking for. For some tasks, you may need to look further than the obvious websites and textbooks (e.g. costs, technical specifications). Manufacturer websites are other good sources of information (e.g. Cisco Systems, D-Link, Motorola).

It should be easy for you to find the information. The challenge is for you to *understand* the information, and relate it to what you have learnt in the course. And then explaining in your own words.

# 6  Submission

The report must be submitted, in PDF format, by email. The email should contain the following information:

**To:** `steve@siit.tu.ac.th`

**Cc:** other members of your group

**Subject:** `ITS323 Assignment 1 Group` *XX* where *XX* is your group number

**Attachment:** `Assignment1-Group`*XX*`.pdf` where *XX* is your group number

**Body:** nothing

The deadline is 12noon Wednesday 8 September 2010. Late submissions will be penalised by 10 marks for each hour. For example: 1 minute late you lose 10 marks; 61 minutes late you lose 20 marks; and so on.

# 7  Marking Scheme

For each of the four technologies you will get marks for the following (20 marks per technology):

**Correctness.** The information you provide is correct. For example, if you say the operating frequency is 20MHz, when in fact its the bandwidth that is 20MHz and the operating frequency is 2GHz, than you are incorrect.

**Coverage.** You provide relevant information related to the tasks. For example, if you don't give any information about the data rates and frequencies, then you have not covered all the tasks.

**Clarity.** The data and explanations you provide are clear. For example, can be understood by another ITS323 student.

In addition, presentation is with 20 marks. This includes the layout of the report, sections, clear tables and figures and formatting. Up to 25 bonus marks may given for exceptional reports.

# 8  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.