

# CARLETON UNIVERSITY

Department of Systems and Computer Engineering  
SYSC4700 Telecommunications Engineering

2007

## TERM PROJECT

### **Facilitating Internet Access for \$100 Laptops in Under-Developed Regions**

**SUBMIT TWO HARD COPIES OF THE REPORT IN THE ASSIGNMENT BOX BY 4:00 PM, TUESDAY, APRIL 3.**

#### **Background**

According to recent statistics, most of the children in the under-developed regions of the world don't receive an adequate education, and a significant portion of these children don't complete the fifth grade mainly because of poverty. To improve children education in such countries, the non-profit association, **One Laptop Per Child (OLPC)**, initiated the \$100 laptop project. As the name implies, the main objective is to build new generation of laptops that can be afforded by children with less fortune. The official website for the OLPC initiative is <http://www.laptop.org/>; more information can be obtained through internet.

Assume that you are a team of consultants participating in this project. The task is to advice on facilitating internet access with such \$100 laptops.

First, choose an under-developed region (such as Chad or rural communities in Chili). Keep in mind the followings:

- This is a non-profit project.
- The resources are extremely limited.
- The modems in these new laptops have limited functionality and limited transmit power.

You can assume that at present, the under-developed region you are focusing on has a relatively poor telecommunications infrastructure. A relatively small fraction of the population has convenient access to a telephone, the existing transmission, signaling and switching facilities are concentrated in the larger towns, and in any case are considered inadequate. Citizens wishing to get fixed telephone service must wait several years for it to be installed. There is a cellular phone service, but it is expensive and mainly restricted to the big cities. Internet access is available in only a few places. All telecommunications

services are managed by the government's Ministry of Posts and Telecommunications. There is limited or no competition.

Note that this project is not about \$100 laptops (the assumption is that such laptop are available for distribution through humanitarian projects). Rather, this project is about wireless/wireline infrastructure to facilitate internet access for these laptops in under-developed regions.

## Requirements

You will work in a group of three or four students to do a consulting study; the outcome is a written report. The report will address the followings, in separate sections if possible, in addition to addressing other issues at your discretion:

- Briefly describe the under-developed region you focus on socially, economically, and culturally; also describe the existing telecommunication facilities and infrastructure (you may use some imagination here).
- Describe the modem features and transmit power levels in the current first generation \$100 laptops.
- Present your proposal for the internet access with \$100 laptops (example: a WLAN access point connected to internet through a satellite channel). Justify why you chose this particular technology in term of
  - cost,
  - efficiency,
  - transmit power and coverage area, and
  - transmission rates.
- Present a (rough) cost analysis.
- Discuss the scalability of your design (example: if the proposed system is for enabling internet access to a village, can this system be scaled easily to a territory covering many villages?).
- Discuss how easily your design can be upgraded, if necessary.
- Comment on the future of the OLPC initiative in years
  - 2017, and
  - 2027.

(Example: one may argue that there will not be any under-developed region in 2027, and therefore, there is no need for such an initiative; or, one may also argue that by 2027 \$10 laptops will be available.)

## **The Report**

It is your responsibility to establish a group of three or four students; two-student or five-student groups will not be accepted. Each group will write **one report**, and submit it in two hard copies. **All group members will get the same mark**. It is up to your group to organize the work and allocate tasks to group members. Your group output will be a report which addresses the above issues. Include references (papers, books, internet, etc.), with enough information that they can be looked up by readers.

**Do not copy from other sources (especially from internet) or use others' ideas, unless they are acknowledged and properly referenced.** Violating this rule amounts to plagiarism, which is a serious instructional offence (see "instructional offences" in the undergraduate calendar, and [www.plagiarism.org/articles.html](http://www.plagiarism.org/articles.html) for definitions and examples of plagiarism.). Reference to "other sources" also includes any overlap of your own work in other courses, such as fourth year projects, for example.

The report itself should be no more than 10-15 pages of double-spaced text, plus figures. Your marks will be based on the correct knowledge and persuasiveness revealed in your report, its organization, coherence and clarity, and use of references.