



IT6104 - INDIVIDUAL PROJECT GUIDELINES

PROJECT EXAMINATION BOARD (PEB)

2011/ 2012



**Degree of Bachelor of Information Technology of the
University of Colombo School of Computing**



These guidelines were prepared over a period of time and the following (members of the PEB) continued in preparing this documentation using two previous versions (IT6102 [Wikramanayake, 2005] and IT6103 [Caldera, 2009])

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Note that these guidelines could be improved during the academic year and hence the candidates are strongly advised to monitor the web sites for any updates of this document and use the latest version available under “Information” on the BIT web site (<http://www.bit.lk/>) or the virtual learning environment (<http://vle.bit.lk>).

Abstract

This is a document that provides guidelines for you in order to successfully finish your BIT individual project. Thus it provides information on project selection, supervisor selection, project registration, project schedule, the details of the submissions that you have to make, and also the method that will be used to assess your project. It also provides information on the structure of your dissertation as well as some hints on good report writing and good project management. If you carefully follow the instructions in this document, you will be on a path leading to successful project grade.

Acknowledgements

There are many people who have helped us in preparing this document. This include those identified on page (ii), those who have contributed for the previous version and others who have given feedback. We remember with gratitude the vision, the initiative and the advice of the founder Director of UCSC late Prof. V.K. Samaranayake. In addition to his innumerable contributions for computing in Sri Lanka, he also initiated the BIT degree program and was closely involved in formulating the project course for this degree program. We also thank the former Director of the UCSC, Dr. Ruvan Weerasinghe for his initiatives and advices. We also thank Prof. Athula Ginige for his advice. Last but not least, we would like to thank all the past students of the BIT programme who took this course and helped us fine tune this document based on our experience with evaluating their work.

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List of Acronyms

- BIT – Bachelor of Information Technology
- CD – Compact Disk
- EDC – External Degrees Centre
- PEB – Project Examination Board
- UCSC – University of Colombo School of Computing
- VLE – Virtual Learning Environment (www.bit.lk)

Chapter 1 - Introduction

The individual project is by far the most important single piece of work in the BIT degree programme. It provides the opportunity for a candidate to demonstrate independence and originality, to plan and organize a large project over a long period, and to put into practice some of the techniques that have been taught throughout the course. Individual Project also aims to assess a candidate's ability to communicate his ideas and work. Whatever your level of academic achievement is so far, you can show your individuality and inspiration in this project. It should be the most satisfying piece of work in your degree. It is equivalent to three courses in the BIT degree programme and is an extended piece of individual work, occupying a candidate's time from the end of the second year through to the end of the third year covering over 300 hours of work.

A candidate will select a supervisor and a project. A project is selected from a workplace or an organization. Candidate may also select a topic on his own to address an existing problem. Candidate will have to develop a prototype and demonstrate that the requirements are met through the system. Candidate will have regular meetings with the supervisor to discuss project work and produce a formal dissertation (report) in a structured way along the suggested guidelines. It should demonstrate that the relevant work has been carried out under proper supervision.

The rest of this document is organized as follows. In Chapter 2 we give an overview of the project. In Chapter 3 we describe the various submissions you have to make to fulfil the partial requirements of the project. In Chapter 4 we give the schedule for the project. Chapter 5 gives guidelines on writing your dissertation. Chapter 6 describes how the Project Examination Board (PEB) assesses your project. Finally, in Chapter 7 we describe the pitfalls you should be aware of to ensure the success of your project.

Chapter 2 -Project Overview

2.1 Registration

Project can be done only by students registered for the third year of the BIT degree programme. Project fee is Rs. 5000/= and it is paid in two stages as indicated in Table 2.1. The payment vouchers can be downloaded from the BIT website [WWW1]. All payments can be made at any branch of the People's Bank. In addition, payments also can be done using a Credit Card through the BIT website. The payment receipts (EDC copy-1) should reach the External Degrees Centre (EDC) at 221/2A, Dharmapala Mawatha, Colombo 7, before the respective deadlines given in Chapter 4.

Description	Fee
Project Registration - to be paid at the time of submitting the project proposal	Rs. 1000/=
Project Evaluation - to be paid at the time of submitting the draft dissertation	RS. 3500/=
TOTAL	Rs. 5000/=

Table 2.1: Project fee

2.2 Duration

The candidate is expected to spend, on an average, at least 12 hours per week amounting to a minimum total of 300 hours, excluding the time taken for report writing and preparation of presentation material. Effective time management is the candidate's responsibility. Devoting a regular time slot for the project work consistently throughout the year will help. Always keep track on the project submission deadlines and plan on what has to be done to meet them.

2.3 Project Selection

It is the responsibility of the candidate to identify a suitable project. The project should comprise a substantial amount of individual work to satisfy the PEB that the project objectives have been met as well as the time spent on the project is justified.

The candidate will work on a topic of interest which may have originated from his work place or may be based on an organization's requirement or may be based on a candidate's idea that an organization would like to try out. The candidate should verify from the client whether they had previously given such a project to any other students, as implementing a similar project for the same client is not allowed. Candidate should note that the project would be evaluated based what would be demonstrated at UCSC and not by the features that is supposed to be there but cannot be demonstrated at UCSC for some reason.

A good project involves a combination of sound background research, a solid implementation with substantial system functionality and a thorough evaluation of the project's output in both absolute and relative terms. Good projects invariably cover some new ground. For example, the project may involve developing a complex application which does not already exist, or it may involve enhancing some existing application or method to improve its functionality, performance, etc. A good criterion to select a project is its usefulness to mankind: a system developed by your project should improve the work of the people even in a small way. It should never be a system that only uses computers with no real gain for its users.

We hope that you would be able to find a good project topic. The candidate is expected to look at some of the project reports kept for reference at the EDC and get an idea of the type of work that has to be done. A list of example project topics to help you make your decision is provided in Appendix A.

The project should involve the main activities associated with the design and implementation of a software engineering system: requirement analysis, specification, design, implementation, testing, evaluation, documentation and maintenance. At the end

of the project the candidate must be able to certify that all the requirements of the project were met. For this, a letter from the client indicating the satisfactory completion of your system (Client Certification) should be attached to the appendix of the dissertation.

2.4 Scope

Although the project is done for a client, a candidate should remember that the purpose of the project is to fulfil an examination requirement of the BIT degree programme. Hence satisfying a client does not guarantee that the project is successful as the client's expectation could be well below the expectation of the PEB. Also some clients may expect more than what is expected by the PEB and hence the candidate may fail to fulfil all the requirements of the PEB within the allocated time. Thus the candidate should consult his supervisor and agree on a suitable scope for the project that will satisfy the PEB scope requirements. You will find several examples of projects and scope in the VLE.

2.5 Objectives

The project encourages and rewards individual inventiveness and application of effort. The project will develop a candidate's ability to:

- construct a project from initial ideas, via a thorough analysis of the problem;
- plan, schedule, monitor, and control own work;
- work independently;
- defend ideas in discussions and presentations;
- use references, libraries and other information sources;
- apply theories, tools and techniques from taught courses;
- demonstrate the solution to the problem through developed software;
- formal report writing.

2.6 Supervisor/Advisor

A candidate should have a project supervisor/advisor. He should be able to guide the candidate throughout the project. He should have appropriate knowledge in the application area and be an information technology (IT) graduate, a professionally qualified person in IT or a senior user of IT. A person who has successfully done / supervised / advised an IT project at a similar level will be usually familiar with all stages of a project and hence be suitable to supervisor/advisor you and the PEB strongly recommends such a person as your supervisor/advisor. The candidate should ensure that the supervisor/advisor will not be away for very long periods and he is willing to spend the expected time with you. The supervisor/advisor should also be able to go through your project proposal and dissertation and provide feedback. The chosen supervisor/advisor sometimes may not be familiar with the client domain and may not be able to guide you in that aspect. In such cases you are advised to have a second supervisor/advisor. This person need not be familiar with IT and preferably should be from the client domain. Note that members of the PEB are prohibited from being project supervisor/advisor. The candidate should obtain the consent of the supervisor(s)/advisor(s) to supervise/advise the project and his consent should be indicated in the Supervisor/Advisor Agreement Form available in the VLE and that form should be submitted to the EDC. Any change of project supervisor/advisor should be notified to the EDC in writing with reasons given. Also, a fresh Supervisor/Advisor Agreement Form should be submitted to the EDC.

It is a formal requirement that the candidate regularly meets the project supervisor/advisor during the duration of the project. The candidate should work independently but report the progress and seek guidance from the supervisor/advisor to ensure the correctness of the work. The candidate should agree on a timetable with information about methods of contact with the supervisor/advisor at the start of the project. Typically, a candidate should expect to meet the supervisor/advisor once every two weeks. You may meet the second supervisor/advisor on a monthly basis or as and when required. During the entire project a supervisor/advisor should have typically spent around 10 hours with the candidate for discussions in addition to the time spent to read and correct the proposal and dissertation to be submitted to the EDC. Some supervisors/advisors would want to meet the candidate

more often than this. A record of the meetings with the supervisor/advisor should be formally recorded through the VLE Progress Report. When you go to see your supervisor/advisor you should have prepared a written list of points you wish to discuss. Take notes during the meeting so that you do not forget the advice you were given or the conclusions that were reached. Candidate should obtain the supervisor's/advisor's approval before the project proposal, and the dissertation submissions to ensure that the documentation meet the PEB requirements.

Chapter 3 - Submissions

3.1 Project Proposal

Prior to commencing the project work, the candidate should register for the project and submit through VLE a project proposal that summarizes the intended work. The candidate should discuss the proposed project with the chosen project supervisor, prior to submission of this proposal. The candidate should keep a copy of the project proposal for later reference. The project proposal should be uploaded to the VLE by mid January (Exact date is available in the Table 4.1). The project work starts from the time you commence to prepare the project proposal. Note that the PEB is not in a position to give any feedback for the proposed project. The candidate should also ask his supervisor(s) to sign the Supervisor Agreement Form (which is available in the VLE) and to post/submit same to reach the EDC not later than the end January (Exact date is available in the Table 4.1).

3.2 Progress Reports

The candidate should submit a progress report every fortnight through the VLE. These reports should indicate the progress the candidate is making with his project, details of meetings with supervisor(s), decisions taken, problems encountered etc. The schedule for progress report submissions are given in the Table 4.1.

3.3 Interim Report

The candidate should also submit an interim report to VLE by mid April of the relevant academic year. This report should include the Introduction, Analysis and Design chapters of the dissertation along with relevant references and design diagrams. Those who failed to make the proper submission will not be called for the evaluation. (Exact date for submission is given in the Table 4.1).

3.4 Dissertation

A project dissertation describing your project is a major submission. The candidate should plan properly so that he can finish the dissertation writing by its deadline. Details on writing the dissertation are provided in Chapter 5.

Candidate has to register for the project evaluation before submitting the dissertation. It is initially uploaded to VLE as a softcopy (refer Table 4.1 for the submission date).

3.5 Final Dissertation

Based on the outcome of the project evaluation some candidate will be asked to complete the project. These candidates should do any improvements to the submitted draft dissertation as suggested by the PEB and submit the final dissertation (hard bound) by the specified deadline to the Project Coordinator at UCSC. Softcopy of the final dissertation should also be submitted using VLE. It is a single file in pdf format containing from cover page to appendices. Candidate need to submit only one copy to UCSC. However they prepare extra copies for personal use.

The final dissertation shall be sewn, trimmed and bound and covered with dark cloth, leather or rexine, in navy blue. On the spine of the dissertation, the initials and surname of the candidate (at top of the spine), the title of the project (abbreviated if necessary at the centre of the spine including dropping the client information) and year (at the bottom of the spine) shall be given in gold lettering of suitable size. Figure 3.1 gives an example of a spine of the dissertation.



Figure 3.1: Spine of the dissertation

3.6 Read-only CD

Once your final dissertation is approved for hard bound by the PEB, an ISO 9660 Read Only CD (most common file format for CD-ROM) consisting the system should be prepared to fulfil the information in Table 3.1. Candidate need **not** include the software packages used such as the database management system. CD should be submitted by the specified date. The CD should be labelled indicating the candidate's index number, name and year. A printout of the directory contents showing the file names should be attached with appropriate comments to the cover of the CD so that the PEB can identify the contents of the CD.

Description
Developed software
Source code files
Databases (if applicable)
Test Results
Manuals
README file (describe how to install the software)
Dissertation (pdf document)
Manuals
Other reports

Table 3.1: Contents in the CD-ROM

Chapter 4 – Schedule

The project schedule is given in Table 4.1. Refer VLE for details and forms. All submissions have to either reach the EDC or uploaded to VLE on or before the specified deadlines. If the deadline falls on a holiday, then its immediate previous working day should be considered as the deadline. No postal submissions will be entertained. Late submissions will not be accepted.

<i>Date/Month</i>	<i>Description</i>
01 st October, 2011	Beginning of the academic year
13 th January, 2012	Registration for project (pay Rs.1,500) and submit payment voucher before 10th January 2012 to EDC Submission of the Project Proposal to the VLE
31 st January, 2012	Submission of the signed Supervisor/Advisor Agreement Form at EDC
(1) 01 st February 2012 (2) 15 th February 2012 (3) 01 st March 2012 (4) 15 th March 2012 (5) 01 st April 2012 (6) 15 th May 2012 (7) 01 st June 2012 (8) 15 th June 2012 (9) 01 st July 2012 (10) 15 th July 2012	Submission of 10 Progress Reports to VLE
30 th April 2012	Interim Report submission to VLE
03 rd August 2012	Registration for project evaluation (Rs.3,500) and Upload the soft copy of the project dissertation to VLE
August	Publication of project evaluation schedule on the BIT web site
August /September	Project evaluation at UCSC (Candidates should bring their own computers with all software installed and data entered)
September/October	Feedback for dissertation corrections (through the BIT web site)
November/December	Approval for dissertation corrections (payment of Rs. 1000/= for resubmission, if applicable)
November/December	Submission of Final Dissertation (One hard bound copy of the dissertation prepared according to guidelines described under Section 3.5) and one CD with a printout of its directory contents to the UCSC (see section 3.6)

Table 4.1: Project schedule

Chapter 5 -Dissertation

5.1 General

- (1) The project dissertation is a formal document and the structure and the general content requirements are described in Section 5.2. This includes advice on how to organize the work into chapters, what should be covered in the main body of the work and what should go in the appendices.
- (2) Candidates are strongly advised, while writing is in progress, to show each chapter to their supervisors for necessary feedback especially on technical content. Please follow the instructions given in this chapter to minimize correction time.
- (3) The format requirements are not overly restrictive (e.g., there is no requirement to use a particular font style for some parts of the dissertation). However, do not use too many different typefaces in the dissertation, or in general, too much time developing an elaborate visual presentation. It is better to keep the look of the dissertation simple and straightforward. (Note that an elaborate presentation can in fact create a negative impression.)
- (4) The candidate is recommended to use table and figures, if they aid in the explanation of information in the text. Use of plotting/drawing packages to create figures is recommended as hand-drawn figures will not be accepted. Please note that all tables and figures should be numbered and suitable captions given to them. The table/figure number and the caption should be placed immediately below the table/figure. Note also that all of the tables and figures must be referenced in the text of the dissertation. e.g., The data flow diagram of the system is given in fig. 1.1.
- (5) With regard to the number of pages, the opinion of the PEB is that the quality of the dissertation is very much more important than its number of pages. Keeping text simple and concise is a good strategy to follow for any form of writing. Thus, the candidate must carefully read through his written dissertation and refine it by

removing all repeating and unnecessary text. The PEB notes with regret that some candidates tend to inflate their dissertations by repeating the same text at separate places in the dissertation. This has to be avoided. Remember: keep it simple.

- (6) The dissertation text (defined as everything except title page, table of contents, references and appendices) should be around 50 A4 pages. The total length (dissertation text together with appendices) of the dissertation could be around 75 pages.
- (7) The candidates are advised to follow the typing recommendations given in Table 5.1 to typeset their dissertations. Note that in order to save paper, we recommend single spaced text with double-sided printing. A typeface less than 10 points should not be used under any circumstance.

Description	Draft Report	Hard Bound
dissertation text Times New Roman	12pt	12pt
text in tables and code listing	11pt	11pt
line spacing (preface and main text)	1.5	1.5
line spacing appendices	1.0	1.0
left margin	37mm	37mm
top/bottom/right margins	25mm	25mm
chapter heading	24pt bold	24pt bold
section headings	16pt	16pt
subsection headings	14pt	14pt
other headings	12pt bold	12pt bold
tables headings font	11pt bold	11pt bold
printing	on both sides of paper use mirror image option	Single sides of paper

Table 5.1: Typesetting recommendations

- (8) All pages should be numbered with Chapter 1 beginning on page 1. Use roman numerals for pages before that as used in this guidelines document.
- (9) Any piece of writing should be directed to a specific reader. The readers of your dissertation will be the members of the PEB and any interested future users/modifiers of your system. Thus you are advised to tailor your writing with them in mind.

- (10) Report writing style should be of the passive form. It is considered very bad style in a formal report to make explicit references to what the candidate himself did as in for example “I decided...”. Scientific papers never use the first person in this way. The passive form as in “it was decided...” is strongly preferred. In the dissertation, the first person could be used judiciously in the introduction and conclusions, but the use of “we” is recommended over “I”. The use of first person writing should be avoided everywhere else in the dissertation.
- (11) The suggested chapter structure for the dissertation is given in section 5.2.2. If needed, the candidate should carefully decide on suitable sections and sub-sections for each chapter. Section and sub-section headings should be short, meaningful, and similar intone. It is not recommended to divide the sub-sections further, unless it is absolutely necessary. Note that when a section of text is sub-divided, there should ordinarily be at least two sub-sections (e.g., If there is no Section 1.2, you should never number a section as Section 1.1 as then a reader would look for a non-existent Section 1.2)
- (12) The candidate should carefully decide on the paragraphs to include for each section/subsection. Each paragraph should consist of the development of a single idea through a collection of sentences. It is suggested in writing literature to compare a good paragraph to a train. The engine gives the direction to a train and the cars follow it. The topic sentence of a paragraph can be considered the engine and the other sentences of the paragraph, the cars of the train. The topic sentence should give the “direction” to where the paragraph is going. In other words, it should give the gist of the paragraph and set its tone. As such, it usually occurs at the beginning of the paragraph although it could come in at the middle or at the end. Each sentence in the paragraph should be relevant to the topic sentence. Following is an example [Hoffer, 2002] of a good paragraph with topic sentence in bold for illustration:
- Researchers have also compared decision tables to decision trees.*** *The pioneers of structured analysis and design thought decision tables were best for portraying*

complex logic while decision trees were better for simpler problems. Others have found decision trees to be better for guiding decision making in practice, but decision tables have the advantage of being more compact than decision trees and easier to manipulate. If more conditions are added to a situation, a decision table can easily accommodate more conditions, actions, and rules. If the table becomes too large, it can easily be divided into sub-tables, without the inconvenience of using flowchart-like tree connections used with decision trees. Creating and maintaining complex decision tables can be made easier with computer support.

- (13) Please note that in writing, only the first letter of a proper noun should be capitalized at the middle of a sentence. All the others should be written in lower-case. If you are not sure whether to capitalize or not, use lower-case.
- (14) Note also that you should not use shortened word forms in writing. Thus for example, have not should be used instead of haven't, is not instead of isn't, do not instead of don't and so on.
- (15) If you have to write numbers below ten in a statement, use words instead of digits. Two correct examples are: We performed seven tests with our new system and there were 20 cases of error.
- (16) Plagiarism is the presentation of another person's thoughts or words as though they were candidate's own. The candidate should avoid this when writing his dissertation. All sentences or passages quoted in his report from other people's work have to be specially acknowledged by clear cross-referencing to author, work and page(s). Direct quotations from published or unpublished work of others should always be clearly identified as such by being placed inside quotation marks, and full reference to their source should be provided in the proper form. Equally, if another person's ideas or judgements are summarized, the candidate should refer to that person in the main text of the dissertation, and include the work referred to in the references section of the dissertation. Failure to observe these rules may result in an allegation of cheating. All suspected cheating will be reported as examination

offenses. Any illustrations, which are not the work of the candidate can be used only with the explicit permission of the originator and should be specially acknowledged. The project is an important component of the degree and plagiarism in project work is taken very seriously, and when discovered will imply severe penalties and consequences for the culprit's degree and possibly for his entire future career. Such a candidate will fail the project and the degree examination as a whole when plagiarism in project work is discovered. Candidate will not be allowed to repeat the project and other degree components for a specified number of years. Therefore, it is important to give credit where it is due and acknowledge all work borrowed, and emphasize what the candidate's distinct contribution has been in the project.

(17) You may follow the formatting used in this guidelines document as your guide to format your own dissertation.

(18) A suggested schedule that will help you to complete dissertation writing on time is given in Table 5.2.

Academic Year	Description
By 12 th week	Upload project proposal
By 16 th week	Finish writing introduction Chapter
By 22 th week	Finish analysis and finish writing analysis chapter
By 28 th week	Finish design and finish writing design chapter
By 35 nd week	Finish implementation and finish writing implementation chapter
By 37 th week	Finish evaluation and finish writing evaluation chapter
By 38 th week	Finish writing conclusion chapter
By 40 th week	Finish writing appendices and the preface material in the dissertation and handover your completed dissertation to your supervisor for his feedback
By 44 th week	Go through your completed dissertation for any errors, improve it if needed and submit a spiral bound copy of the dissertation to the EDC.

Table 5.2: Recommended work schedule

Note: The references section in the dissertation should be updated as necessary when writing the dissertation.

5.2 Contents

5.2.1 Preface

This is the material that comes before the first chapter. This consists of a title page, declaration page, abstract, acknowledgement page, contents, list of figures, list of tables, and list of acronyms. These pages are numbered using roman numbers.

Title Page

This comprises the title of the dissertation, candidate's name, BIT registration number, index number, the name(s) of the supervisor(s), the date of submission (month and year), and the following statement "This dissertation is submitted in partial fulfilment of the requirement of the Degree of Bachelor of Information Technology of the University of Colombo School of Computing". The title of the dissertation should be clear and should describe the main area of work and will identify the name of the client. Refer the sample template for further details.

Declaration

The second page should contain the following signed declaration.

"I certify that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and abstract to be made available to outside organizations.

Signature of Candidate:

Date:../../....

Name of Candidate:

Countersigned by:

Signature of Supervisor(s)/Advisor(s):

Date:../../....

Name(s) of Supervisor(s)/Advisor(s):"

You may submit a photocopy of this page along with the draft dissertation and use the original for the final submission.

Abstract

The abstract should help a prospective reader decide whether to read the entire dissertation or not. A good abstract could be written using just a few paragraphs. For example, a four paragraph abstract could contain the following. The problem that you have solved can be given as the first paragraph. The second paragraph can elaborate on the first paragraph for example by giving the scope of your project and functionalities of the developed system. The third paragraph can contain the methodologies, technologies, tools, languages and databases that you used in the design and implementation of the solution and the last paragraph can contain the status of your project like for example whether it achieved the anticipated benefits.

Acknowledgements

It is mandatory that a candidate thanks whoever has helped him technically or otherwise, during the project. Your supervisor and your client will obviously be pleased to be acknowledged as they would have invested a quite a lot of time overseeing your progress. Acknowledgements should be brief and to the point and should not exceed one page.

Contents

Contents identify all sections of the dissertation under the given preface, chapter and appendix headings along with their page numbers. It is recommended that sections are numbered up to three levels e.g., 5.2.1. Chapter 1 begins on page 1. Use roman numerals for all previous pages excepting the title page. That is, the numbering should start with the declaration page with page number ii. The overall structure of dissertation content should show a clear progression of logical thought. Choose self-explanatory section and sub-section titles relevant to the topic under consideration.

List of Figures

All figures in the dissertation should be numbered and named using an appropriate caption. Numbering is done using chapter number and a sequence number (e.g. Figure 3.2 for second figure in Chapter 3). Figures in the appendices are numbered using the Appendix letter (e.g. Figure C.2 for second figure in Appendix C). List of figures consists of figure number, captions and page numbers. List can be generated using features of a word processing package. All figures used in the main chapters must be described in text prior to its use and must be referred to using its figure number. In section 3.5 of this document figure 3.1 is referred to in text in the paragraph before the figure.

List of Tables

All tables in the dissertation should be numbered and named using an appropriate caption. Numbering is done using chapter number and a sequence number (e.g. Table 3.2 for second table in Chapter 3). Tables in the appendices are numbered using the Appendix letter (e.g. Table C.2 for second table in Appendix C). List of tables consists of table number, captions and page numbers. List can be generated using features of a word processing package. All tables used in the main chapters must be described in text prior to its use and must be referred to using its table number. In section 5.1 of this document table 5.2 is referred to in text in the paragraph numbered as (18).

List of Acronyms

Provides the meanings of all abbreviations used in the dissertation in alphabetical order. Refer page (ix) for an example.

5.2.2 Main chapters

Chapter 1 – Introduction

This is one of the most important components of the report. The motivation for the project should be argued here. Then a brief introduction to the project should be provided indicating its objectives and scope. Finally, a paragraph containing an outline of the remaining chapters (starting with Chapter 2) is recommended.

Chapter 2 – Analysis

An analysis of the requirements should be provided in this chapter. For example the requirements of the system could be listed. A specification of the number of users, the frequency of use, and the jobs of the users could be provided. Functional requirements covering system functionality expected by the users and non-functional requirements covering reliability, portability, and response and processing times should be addressed with detailed justification. Description of the prerequisites that must apply for the system to be used (called success factors) should be given.

In this chapter, information on the existing system could be provided through appropriate structures like *Data Flow Diagrams* (DFD) if applicable. The logic inside processes in a DFD could be given for example through *structured English*, *decision tables*, or *decision trees* (whichever is appropriate). Data modelling (if appropriate) could be done through *ER diagrams*. *Functional Hierarchy Diagrams* (could be drawn by listing the tasks that each user would like to perform using your system) can also be used if appropriate. *Use case diagrams* could also be used if applicable. **Note:** The above is just a guideline of the different items that could be provided in this chapter of your dissertation. From that list, you should pick **only what is appropriate** for your project. You should also be judicious in picking the right amount of detail that your reader will appreciate and relegate detailed diagrams to the appendix B.

You may also review existing software that are similar to your proposed system. Your review must be comprehensive and up-to-date. It may be appropriate to incorporate criticisms of these systems where needed (and to justify the criticisms). This review will

also help you identify the ideas from these software that are useful and can be applied to your project and those that are not. Also note that everything used should be cited by reference to the "References" section at the end of the dissertation.

Chapter 3 – Design

In this chapter you could consider different competing design strategies for your system. The different strategies may involve the way of development (developing from scratch, using open-source components, etc.), the hardware environment (stand alone personal computer, client-server environment, etc.), choice of system software (Windows, Linux, etc.). You could compare how the project requirements are satisfied through each alternative as well as the costs involved in each and select with justification a single design strategy for implementation.

The design of your system should be given in this chapter. The structure of the system should be clear to the reader after reading this chapter. There should be evidence of a methodical approach to the design of the system. In this chapter, you may provide for example *data flow diagrams*, *decision tables*, *entity relationship diagrams*, *database table structures*, *backup strategy design*, *design of any audit trails*, *security scheme design*, *structure charts*, *class diagrams* (for OO design), *state diagrams* (for OO design), *sequence diagrams* (for OO design), etc., (**whichever is appropriate for your project**).

User interface design could also be discussed in this chapter.

Chapter 4 – Implementation

This chapter should describe the implementation of the system. For example, it should identify and explain all major code and module structures. Also, the implementation environment (hardware and software), any existing code that was reused by you, development tools used, and any platform dependence must be discussed. When re-using existing code, your contribution in the implementation must be closely indicated, and the original authors/sources must be appropriately acknowledged. Appropriate technical

documentation may be included as appendices to the dissertation if they are expected to be useful for the reader. Note that a list of selected code will appear in appendix and the code used in this chapter should be presented for the purpose of explaining the implementation aspects of selected important code. This code should be presented as a code segment that is usually visible within the same page (i.e. should avoid spanning the code into multiple pages).

Chapter 5 – Evaluation

This chapter should prove that proper testing of system was done. For example, a comprehensive test plan that was used to verify and validate the system should be provided. Evidence should be provided of using a wide range of test data. Evidence should be produced to show that all aspects of the system have been tested and specification has been met. Description of the effects of various kinds of errors and the required system behaviour upon occurrence of an error should be included. You may include detailed actual test results in the appendices of the dissertation.

The evaluation of your project by potential users may also be provided here. You may use a questionnaire to obtain user feedback. Any documents related to client's evaluation of your system and also a client certification letter indicating the level of achievement of the set objectives and usefulness of the system should be provided in the appendix.

Chapter 6 – Conclusion

This chapter will conclude the dissertation with a critical evaluation of the system and suggestions for any future work.

The evaluation should include a critical discussion and assessment of results of project. This chapter should discuss whether the project objectives were satisfied and if not, the reasons for them. Lessons learnt during the course of the project should also be expanded upon. It is important that any failures to achieve given objectives should be discussed and analyzed. This does not mean that the candidate will be penalized. Problems beyond the control of the candidate (e.g., client requests, obtaining necessary hardware/software) that

have affected the progress of the work may be mentioned here. However, avoid labouing these points too strongly, as this may sound too much as if the candidate is seeking excuses for poor results, and may leave the reader with a negative impression of the work. Be positive and upbeat, even if the candidate feels that he has had a tough time.

This chapter should also identify any deficiencies in the final product and highlight how improvements could be made, perhaps by another candidate next year.

References

It is very important to acknowledge any of the work of others that the candidate used or adapted in the project, or that provided the essential background or context to the dissertation. The details of these references are provided in this section of the dissertation. You should include any web links too.

This is how the referencing should be done. In the main body of text, external work may be referred for example in the following ways:

Example 1:

Whitten [Whitten, 2007, WWW1] emphasizes systems analysis and design techniques for developing client/server and web-centric applications.

Example 2:

Software testing [Sommerville, 2006] is an iterative process.

In the **References** section, each citation should be listed in the relevant format in alphabetical order of the main author. For example, the reference section entries for the above two examples would be:

[Sommerville, 2006] I. Sommerville, *Software Engineering*, 8th edition, Addison-Wesley, 2006.

[Whitten, 2007] J.L. Whitten and L.D. Bentley, *Systems Analysis and Design Methods. 7th edition (Indian Edition)*, Tata McGraw-Hill, 2007.

[WWW1] *Virtual Learning Environment for the BIT Students*, <http://vle.bit.lk> [01.10.2009]

Please note that every item included in the references should be referenced from within the text of the dissertation. More examples are available in the VLE.

5.2.3 Appendices

The appendices include further information that is not essential to be included in the main text, but nevertheless could be useful to interested readers. The following appendices could be included in the dissertation:

Appendix A - System Documentation

Technical documentation is included here. These details should guide candidates who wish to continue or use the candidate's project work and allow amendments and extensions to the code. Provide program installation, compilation and execution details. Documentation should point to locations where DLL's and reusable code can be found, if they are publicly available.

Appendix B - Design Documentation

Any design documentation that is not critical to be included in the main text (Chapter 3) but could still be of interest to a reader can be added to the appendices. These could be for example design diagrams (e.g., data flow, entity relationship, database schema and UML) that have not been included in the main text.

Appendix C - User Documentation

May include a thorough and comprehensive documentation at a level, which is appropriate to the identified users. User documentation may cover all aspects of the system, with appropriate screen shots and explanations. Failing to include such documents means that the candidate had failed to implement a critical component of his system and it could result in not calling for project evaluation.

Appendix D - Management Reports

In addition to producing day to day transaction reports (e.g. a payroll system should produce an individual pay sheet, coin analysis to make cash payments, EPF report etc.) a system must produce summarised reports for the management (e.g. monthly, quarterly

payments made by organisation, employees, overtime hours by employee, etc.). These reports will be included here. Usefulness of the system will be judged using these reports. Failing to include such reports means that the candidate had failed to achieve his objectives and it could result in not calling for project evaluation. Ensure that the reports contain meaning information and obtained through your system using sufficient amount of data.

Appendix E – Test Results

The test plan should be thorough and comprehensive to verify and validate the system. It has to be used to generate a wide range of test data. Test results should be included in a tabulated form. Evidence should be produced to show that all aspects of the system have been tested and specification has been met.

Appendix F - Code Listing

All code should be well structured, readable and should contain appropriate comments. If there is a great deal of code, and including all of it would exceed the page limit, the candidate should include only an overview of his code listing in the dissertation and refer to the CD-ROM. Note that the implementation chapter will consists of code segments used for explanation as part of the main text, while in this appendix will consists of the entire code modules as used for the development of the system.

Appendix G - Client Certificate

Client certificate should indicate the suitability of the developed software for the organisation and the level of fulfilment of the software with respect to client's original requirements. It should be printed on an official letterhead signed by at least a sectional head.

5.3 Glossary and Index

This will consist of Glossary of terms and an extensive index. This will appear as the end of the dissertation.

Chapter 6 - Assessment

The project work is assessed based on the progress reports submitted to the VLE and the evaluation. The evaluation will include a viva and a code modification test described below. Through all stages of the project the PEB should be satisfied that the candidate has submitted his own work and the project objectives have been met as well as the outcome has justified the time spent on the project. To pass the project, the candidate must satisfy the PEB in all of the above aspects of the project in the same academic year.

6.1 Evaluation

After the dissertation is submitted, a project evaluation will be held at the UCSC. The importance of this is the demonstration that the work belongs to the candidate except where acknowledgements have been made and that the dissertation merits the award of the degree. It also assesses the candidate's ability to communicate his ideas and work. Candidate should be able to convince the PEB that they have undertaken a project that is acceptable at the degree level (e.g., 300 hours of work) and have implemented a substantial software component by him. The evaluation of projects will be done only once during an academic year. The evaluation consists of a Presentation, Demonstration, Viva, Code modification and Dissertation feedback as described below.

6.1.1 Presentation

A presentation of the project should be done in about five minutes. Candidate should bear in mind that the majority of the PEB will not be familiar with the project and thus the presentation should indicate what the project is about, the motivation for the work, and the scope of project. It should be clear, understandable and well structured. And the style and content should be appropriate for an academic audience. Visual material should be of high standard. Contingency arrangements should be made to ensure the availability of presentation material.

6.1.2 Demonstration

Demonstration of the software should be done at the UCSC and should be limited to a maximum of 20 minutes. Candidate should take necessary action to ensure that this part is tested prior to the viva date using the same equipment/environment you intend to use at the evaluation. Candidate is responsible to bring his own equipment and not more than 10 minutes will be given to set up the equipment. The candidate should confidently demonstrate the operations of the system. The candidate should plan so that the demonstration includes the main aspects of the system. The PEB will be judging the quality of your project by what you demonstrate at UCSC and not by the features that your system supposedly contains but cannot be demonstrated at UCSC for some reason. Candidate should ensure that all aspects of the systems have been pre tested and all such data should be brought for the demonstration. Typically for example, for database based projects, each database table must have a minimum of 10-15 records. Note that you may also be asked questions during the demonstration.

6.1.3 Viva

The candidate will be asked questions (approximately 10 minutes) based on the presentation and demonstration. Candidate should provide confident and sufficient responses to questions.

6.1.4 Code modification

The candidate will be required to explain any part of the system code and also perform modifications such as changes to the database structures and reflecting them in the program interfaces; reports etc. and demonstrate the changes. Such changes should be demonstrated within a specified time period of 30 minutes duration. Note that the code modification is a very important item in the grading process. Based on the performance of the candidate, the PEB panel will assess your competency in coding and authenticity of the demonstrated code. The candidate is subjected to further evaluations described below, only if he passes this code modification component. If he failed this component, the candidate will receive a FAIL grade for the project and may be reported for plagiarism.

When the project evaluation is done, your work will be evaluated by the PEB and feedback given to you (later through the web site) on the result of your project. You will be given feedback on your submitted dissertation also, to improve it for the final dissertation submission.

6.1.5 Dissertation feedback

At the project dissertation feedback will be given for the originally submitted draft dissertation. The items that we look for in the dissertation are given in Table 6.1. The total mark obtained through the marking scheme (Table 6.2) will be adjusted (reduced) based on the quality of the candidate's dissertation.

Preface
Cover page, Title, Declaration, Abstract, Acknowledgement, Contents, Structuring of content, Lists of Figures, List of Tables, List of Acronyms (if applicable)
Introduction
Motivation, Objectives and scope
Analysis
Description of current system, Outline of existing similar solutions with references, Requirements, Relevant diagrams for the selected methodology
Design
Alternate solution evaluation, Selected solution description/justification, User interface design, Relevant diagrams
Implementation
Implementation environment (hardware/software), Code and module structure description, Acknowledgement of any reused existing code
Evaluation
Test plan and results, User evaluation
Conclusion
Critical assessment of project, Future work
References
Format, All references cited in text
Appendices
System documentation, Design documentation, User documentation, Management Reports, Test Results, Code listing, Client Certificate
General
Spelling, Grammar, Writing, All figures and All tables referenced in text, Page numbering, Adherence to page limit

Table 6.1: Dissertation check list

6.2 Marking Scheme

The marking scheme for the project is as shown in Table 6.2.

Description	Marks (%)
Project evaluation	90
Progress report submission	05
Interim report submission	05

Table 6.2: Project marking scheme

6.2.1 Evaluation

The items that will be checked at the evaluation are given in Table 6.3.

Description
Scope (e.g., work involved, usefulness)
Design (entire system)
User interface (e.g., look, error messages, validation)
Evidence of testing
Code readability (e.g., comments, indentation)
Quality of presentation
Response to questions
Explaining any part of the system code
Making changes to the system

Table 6.3: Project evaluation check list

6.2.2 Progress reports

The candidate should submit progress reports to the VLE according to the schedule given in Table 4.1. The progress report submissions will be rewarded with a maximum of 5% marks.

6.2.3 Interim Report

The candidate should submit an interim report to VLE by mid April of the relevant academic year. A maximum of 5% marks will be given to interim report submissions. (Exact date for submission is given in the Table 4.1).

6.3 Grade

A project grade (Pass: A+,A,A-,B+,B,B-,C+,C; Fail: C-,D, E) will be given only to those who submit the dissertation and appear for the evaluation. Submissions of other registered candidates will not be marked and a grade NC would be given for them. Such a grade will not be counted as an attempt.

Chapter 7 - Pitfalls

Some of the most useful things to know about individual projects are the common pitfalls. Why do some projects go wrong? Here are some of the common causes of failure [WWW2]:

- Choosing/Starting the project too late. Submit your project proposal on time and start the project as soon as you can. The longer you leave it the harder it is to get motivated, especially when all your friends seem to be flying ahead. You should aim to submit all project components as listed under the submission schedule.
- Failing to meet your supervisor regularly. If you arrange a meeting with your supervisor, turn up at the agreed time. You gain no sympathy from anyone if you lose contact with your supervisor and produce a poor project as a result. Your supervisor will be happy to help you but they can do nothing if they are unaware that you are having trouble.
- Failing to plan a fall-back position if the planned work is not completed on time. Try to plan your project in stages so that if things go wrong in a later stage you have an alternative plan to fall back on.
- Trying to satisfy an external customer at the expense of your grades. Do not let any outside interests interfere with your work. The guidance for your project should come from your supervisor, not your prospective employer or client. While it is important to satisfy the client you should remember that the project is evaluated to meet the degree requirements. Sometimes client's expectations may be far beyond or far below a degree level project.
- Over/Under Ambition. Try to be realistic about what you can achieve in the time available. A good project requires a lot of input from you and should prove to be technically challenging throughout. At the same time, however, it is better to do a small job well than failing to do a complex job at all. Your supervisor will advise you on his expectations of the project and this will help you to set your sights accordingly.

References

- [Caldera, 2009] A. Caldera, et al., *IT6103 Third (Final) Year Project Guidelines*, University of Colombo School of Computing, Sri Lanka [Online], http://www.bit.lk/IT6103/IT6103_Guidelines.pdf, 2009.
- [Hoffer, 2002] J.A.Hoffer, J.F.George and J.S.Valacich, *Modern System Analysis and Design (Third Edition)*, Pearson Education, 2002.
- [Wikramanayake, 2005] G.N. Wikramanayake and G.I. Gamage, *IT6102 Third (Final) Year Project Guidelines*, University of Colombo School of Computing, Sri Lanka [Online], <http://www.bit.lk/images/stories/information/2004/IT6102guide.pdf>, 2005.
- [WWW1] *BIT (Bachelor of Information Technology) web site*, University of Colombo, Sri Lanka, <http://www.bit.lk>, 2009.
- [WWW2] *Guide to Individual Projects*, Imperial College, London, UK [Online], <http://www3.imperial.ac.uk/pls/portallive/docs/1/35073696.PDF>, 2009.

Appendix A - Examples of Project Topics

A comprehensive list of past completed project titles are available in the BIT web site [WWW1].

- (i) Student Management System for P&E Institute of Computer Studies
- (ii) Hotel Management System for Hotel Janaki.
- (iii) Document Management System for Sampath Bank Ltd
- (iv) Container Freight Station Management system with On-line inquiry facilities for Sri Lanka Ports Authority, Container Freight Station 1
- (v) Inventory & Stock Management System for Sri Lanka Survey Department
- (vi) Stock Maintenance, Distribution and Control System for McLarens International Ltd.
- (vii) Payroll System for New Order International
- (viii) Online Course Evaluation System for the “Theeducation ” Learning Management System (VLE)
- (ix) Online Human Resource Management System for D H Wijewardena Associates
- (x) Web Based Vehicle Yard Planning Computer System for Sri Lanka Ports Authority
- (xi) Automated Income & Expenditure Classification System for Institute of Technology, University of Moratuwa
- (xii) Office Automation System for Advanced Technical Institute – Galle

Appendix B - Project Proposal

Full project proposal is available online on VLE. Here we only identify some of the content in the project proposal.

<p style="text-align: center;">Project Proposal</p> <p style="text-align: center;">Academic Year 2011/2012</p> <p><u>Candidate Details</u></p> <p>Index No:</p> <p>Name of candidate:</p> <p>Contact telephone numbers:</p> <p>Email:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>Title of Project:</p> <p>.....</p> <p>.....</p> <p>Repeat Student Only</p> <p>Number of Attempts:</p> <p>Earlier Project Title:</p> <p>.....</p> <p>.....</p>

Appendix C- Supervisor/Advisor Agreement Form

Obtain the supervisor/advisor agreement form from the VLE. Here we only identify some of the content in the supervisor/advisor agreement form.

Supervisor/Advisor Agreement Form Academic Year 2011/2012

I understand that the Final Individual Project is a key component of the Bachelor of Information Technology degree programme of the University of Colombo, and have read the guidelines concerning it given to me by the following student whom I hereby agree to supervise.

.....
.....

Cognizant of the seriousness of this assignment, I hereby agree to adhere to the following.

- To be available for meeting the student on a regular basis (generally fortnightly)
- To help the student to scope the project to meet the requirements set out in the guidelines
- To assist the student in resolving any problems encountered in conducting the project
- To monitor the progress of the project and intervene in case of slippage in the time line
- To give constructive feedback to enrich the project experience of the student
- To help the student in the writing up of the dissertation and planning the final evaluation

I understand that the project grade of the student I supervised/advised will be published by the UCSC, and the student's performance will finally be judged by the IT industry.

.....
.....

Work Experience:

(Tick appropriate)

- 3 years experience in Software Development
- 3 years experience in supervising/advising projects at tertiary level
- 1 year experience as team leader or project manager
- 5 years experience in implementing IT projects
- Other – Specify:

.....
.....

I agree to adhere above conditions.

Signature:

Date:

.....
.....