Estima
Software Requirements Specification

Version <1.0>

Revision History

Date	Version	Description	Author
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1. Introduction

1.1 Purpose

Purpose of this SRS is to fully describe the external behavior off the Software system, "Estima". This document describes the functional requirements, nonfunctional requirements, design constraints and other factors necessary to provide a complete and comprehensive description of the requirements for the system.

1.2 Scope

"Estima" is a piece of software that automates the process of making bills of quantities (BOQ's) in building construction projects. The system shall work with a local database and once the relevant quantities for the items are fed into the system, the system shall calculate the relevant unit rates, using the standard item rates stored in the database and formulae related to unit rate calculations, and create the BOQ for the project. This reduces lot of man hours spent by civil engineers and quantity surveyors in BOQ creating process.

1.3 Definitions, Acronyms, and Abbreviations

BOQ:	Bill of Quantities
Taking off:	Process of extracting details from the drawings and specifications.
TDS:	Time dimension sheets (A method of taking off)
SLS 573:	Sri Lanka Standard 573: 1999 [UDC 69(083.74)] : Method of Measurement of Building Works (first revision)
BEE:	Bill of embodied energy
Item	Building construction activity. (eg: concreting, site clearance).
Unit	Standard unit of measurement of an item (eg: meters, kg, nos (discrete units in numbers)).
Quantity	Amount of work required for an item in standard units.
Rate	Cost of a unit of item. (may also be referred to as unit rates)
Unit rate	Rate
Amount	Total cost of an item.
Description	Explanation of work carried out under an item.

1.4 References

Sri Lanka Standard 573: 1999 [UDC 69(083.74)] : Method of Measurement of Building Works (first revision)

1.5 Overview

This document explains the requirements of the system "Estima" in details without the use of use-cases. Document is organized in such a manner that it initially gives an overall description of the scenario in which this piece of software is used. After that the functional requirements or activities or the processes the system must perform are described. Then usability, reliability, performance, supportability requirements are described in detail. Then the design constraints and interfacing mechanisms the system has to undergo in achieving the requirements mentioned under different categories is described. Finally the licensing requirements and the standards to be adhered by the software is mentioned.

2. Overall Description

In building construction projects initially project related drawings are created. After that "taking off" is done (eg: TDS). From the quantities obtained from that process civil engineers and quantity surveyors create a BOQ for the project. This process of creating BOQ's from the obtain quantities involve lot of error prone standard calculations and unit rate calculation of items.
Using software based tools this process can be automated. The software solution will require quantities of

material to be fed into the system by the user. Then the system will do the necessary calculations and BOQ items relevant to the material will be added to the tentative BOQ. The software solutions need to store standard rates for building construction material and shall be able to be updated as the market rates for material changes. The BOQ shall be created according to the standard units of measurements and the user shall be able to print the final BOQ into a viewable format (eg: pdf).

3. Specific Requirements

3.1 Functionality

3.1.1 Automation of calculations

When relevant quantities for a needed material are fed into the system the system shall be able to get the standard description of the item, the unit rate calculated from the rates in the database and provide the final output. The description taken from the database shall be editable and the user shall be able to do small adjustments to it. (System shall give a warning when the user edits an auto generated description).

3.1.2 Save and Load

User shall be able to save a currently working copy of a BOQ project to secondary storage and retrieve it later for reworking. This should be an editable copy of the project. The user shall be able to save the working copy to any location in the secondary storage he prefers.

3.1.3 Format and print a BOQ

"Estima" shall be able to format the created BOQ items in accordance with the format provided in "SLS 573". This means that the items shall be categorized in to sections as per the SLS 573 and a summary of the BOQ shall be provided at the end. Each section shall contain a sub total figure and the grand total shall be provided at the end, before the summary. And the user shall be able to port the copy of BOQ into a non-editable printable format, preferably "PDF".

3.1.4 Adjust BOQ to different markups

User shall be able to set a mark-up for the BOQ. This value shall be reflected in the sub totals.

3.1.5 Add wastage percentages to material

User shall be able to add wastage values in percentages (quantity wise) for individual items. Some items may contain a wastage value and some may not. (eg; Materials like cement are not allowed to be wasted, editing this shall give a warning).

3.1.6 Get material cost breakdown

In addition to the BOQ, a material cost breakdown of the material used in the project shall be provided. Since this piece of information is vital in planning the budgets and doing price adjustments to specific items.

3.1.7 Warning mechanism

When the user tries to edit automatically generated data user shall be issued a warning. And the warning shall be visible to the user but not too disturbing. Notification to the side of the screen is preferred.

3.1.8 Manipulate material prices and labour charges in database

User shall be able to edit rates (prices) of items if needed. And the relevant unit rate calculations shall be adjusted according to the changes in the unit rates. And the user shall be able to add remove new item to the database. User warning system shall be used and no redundant items shall be allowed.

3.1.9 Edit unit rate calculation formulae

User shall be able to edit the method of unit rate calculation. This shall involve adding / removing material, Changing quantities involved.

3.1.10 Add / Remove new items

User shall be able to add / remove items from the database. Adequate warning shall be given prior to

executing the request.

3.2 Usability

3.2.1 Self-explanatory user interface

User shall be able to look at the GUI and figure out the data to be inserted; positioning related data in close proximity and using domain specific terms will help this.

3.2.2 Training time

There shall be no formal training required to use this software. And the pro uses shall be able to do tasks using short keys.

3.3 Reliability

3.3.1 Accuracy of calculations

The calculations of unit rates shall be precise to a cent.

3.3.2 Mean time between failures

System shall be able to restart after a failure within 2 minutes.

3.3.3 Availability

System shall be highly responsive. User interfaces shall respond to user interactions. Even in time consuming calculations the user shall be informed that the system is doing calculations.

3.4 Performance

3.4.1 Response time for calculations

Unit rate calculations using unit rate calculation formulae shall be done within 2 seconds. (one second is preferred)

3.4.2 Degradation mode

When the system not working properly or came across a critical error user shall be able to save his current work or the system shall provide facilities to recover the work after restarting.

3.4.3 Throughput of the system

System shall be able to accommodate one user at a time. This shall be a single user application.

3.4.4 Memory utilization

System shall not take more than 250 MB of memory at its highest memory consuming scenario. A memory usage of less than 100MB is preferred. A fast, lightweight application is preferred.

3.5 Supportability

3.5.1 Coding standards

System shall be coded in Qt style of coding. Since the coding is done using Qt framework to achieve cross platform support and to accommodate future contribution from the community. [coding standards mentioned in the VLMC project is suited]

3.5.2 Maintenance and class libraries

Coding shall be done whenever possible using standard Qt libraries provided in the default framework over C++ STL libraries. In case of a critical performance issue coding shall be done using the libraries which perform faster overruling above guideline.

3.5.3 Object oriented programming

Design of the system shall adhere to best practices in object oriented programming. Design patterns and object oriented concept shall be used.

3.6 Design Constraints

3.6.1 Design Process

Rational unified process (RUP) shall be the underlying project management framework used to plan and design the software.

3.6.2 Tooling

In design process and in requirement elicitation tooling related to RUP framework shall be used (eg: use-cases. Context diagrams, UML)

3.6.3 Documentation

Documentation of the project shall be done using RUP templates, unless there is no RUP template available to address the matter in consideration.

3.6.4 Licensing

Since the "Estima" is intended to become an open source project at the end of the project all the third party libraries used in "Estima" shall be thoroughly checked for any licensing issues.

3.7 Interfaces

3.7.1 User Interfaces

User interfaces shall contain forms that use domain specific terms, so that the domain experts who use the software can understand the user interfaces better.

3.7.2 Hardware Interfaces

No Hardware interfacing needed.

3.7.3 Software Interfaces

System shall provide an interface to connect to external databases and update its local database. Since there is no standard available in interfacing with third party remote databases the system shall provide a methodology so that the user can implement a method himself to make the system interact with the remote database (this may require coding).

3.8 Licensing Requirements

The software shall be licensed under GNU General Public License Version 3, 29 June 2007.

3.9 Applicable Standards

The system shall adhere to SLS 573: Method of Measurement of Building Works (first revision) in preparation of BOQ's.