
Software Requirements Specification

for

LOCATIONS TRACKER APPLICATION (LTA)

Version 1.0

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Revision History

Name	Date	Reason for Changes	Version
Sayed T. Muhammad	27/2/2019	First release.	1.0



1. Introduction

1.1 Purpose

Location Tracker Application (LTA) is a desktop / web-based application specialized in locations routing for lectures, exercise class, labs or any other specified purposes. *LTA* would handle the smart locations allocator based on the different departments schedule prepared by each departments' specialists. The term locations demote lecture halls, classes, labs, drawing halls, in addition to any room in the faculty different buildings.

1.2 Document Conventions

This document follows the following writing styles: -

- Data examples come in *italic blue font*.
- Critical business needs/scenarios come in *italic red font*.

1.3 Intended Audience and Reading Suggestions

This document is intended for vice-dean of society and environment affairs review and sign-off. Vice-dean is to signoff the SRS in order to proceed in implementation process.

1.4 Product Scope

Smart, well-designed and organized application is required with the following objectives: -

- The system allows the authorized users to create/decode location with the attributes which will be declared later.
- The locations are either assigned manually to a special purpose *i.e. Control room* or allocated automatically to teaching purpose based on the departments schedule.
- The user is to be able to upload the schedules in a pre-defined Excel sheet format.
- The user could export and print out the schedules tables with the locations assigned to each end every location/lab/exercise activity.
- The user could view and print certain location weekly occupation.

1.5 References

This document is created based on a business meeting with the Vice-dean (Prof. Dr. Sherif Al-Attar) as well as the locations codes documents.



2. Overall Description

2.1 Product Perspective

The new system is a new system to handle both manual and auto-location routing operations. LTA also comes up with a build-in reporting tool to keep the users aware of academic schedule as well as locations occupation overall the academic year. LTA is a self-contained product. Since certain academic schedule preparation tool is supposed to be developed, LTA could either integrate with that tool or accepts the schedule in XLSX format. Major components of LTA are illustrated in Figure (1). Main system components are mainly: -

- 1- Front End: this is the user seen component of LTA. CSE will develop two version of LTA; desktop client and web-based interface.
- 2- Business Layer: - this component holds the system’s business logic and composed of the following sub-components: -
 - a. Security Manager: responsible of users’ creation and roles management as well as passwords handling.
 - b. Locations Manager: basically, responsible of location data management.
 - c. Schedule Manager: basically, imports and exports the academic schedule.
 - d. Reporting Manager (for desktop client version ONLY).
 - e. Basic Data Manager: maintains list of values (LOV) such as buildings creation/editing/deletion etc.
 - f. Smart search engine: - enables the users to make a global search in the application such as searching for location, staff, building etc.

In addition, back-end interfaces/communicates with some external Application Program Interfaces (APIs) such as Email API to send any needed reports via email to the desired persons.

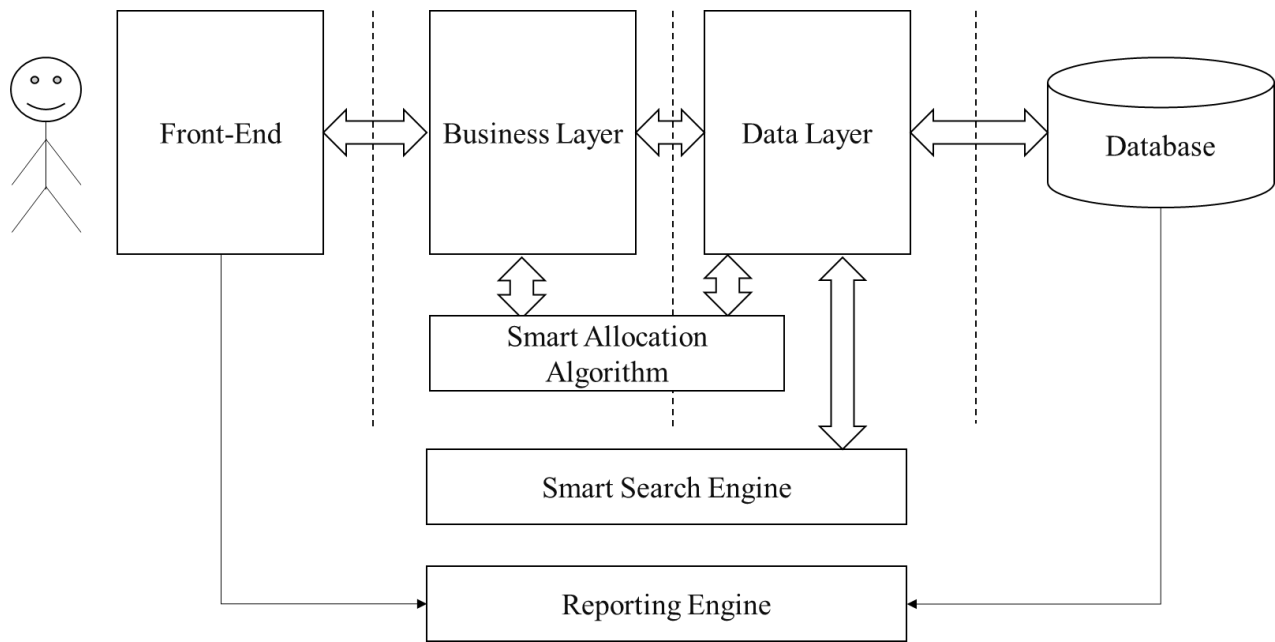


Figure (1): C-Bidding Components.



2.2 Product Functions

The desired software would be basically performing the following functionality: -

- 1- Provide separate module for user's management.
- 2- Locations management module.
- 3- Provides a smart search engine which allows search for any data across the database via search keywords include location, academic year, ... etc.
- 4- Accurate locations allocation based on the selection criterions stated later on in this document.
- 5- System MUST be easily integrable with scheduling tool which is to be developed later.

2.3 User Classes and Characteristics

Generally, users' classes and their privileges would be created dynamically. Here the common and expected LTA users are just listed as follows: -

- LTA admin.
- LTA employees such as the higher studies affairs responsible whom could allocate locations for post-graduates scheduling.

2.4 Operating Environment

LTA will be implemented using Java programming language which works properly on any operating system such as MS windows XP, 7, 8,10 and Linux OS as well. Oracle database will be used since it is ranked as the world wide first database. For Web client apache tomcat server will be used for the application as well as the reporting unit hosting.

2.5 Design and Implementation Constraints

LTA will offer better performance depending on **hardware specification** recommended by the used server and **database providers (e.g. Oracle)**. The new system may be constrained to utilizing some external APIs which are discussed later in the SRS (refer to section 2.7).

2.6 User Documentation

The following set of documentation will be prepared and delivered and versioned with each version delivery of LTA: -

- User manual (PDF format).
- Build-in help in the application.

2.7 Assumptions and Dependencies

As illustrated in Figure (1), the system will depend strongly on some external APIs/tools and services provided by third parties. These external interfaces could affect the requirements stated in the SRS.

- Email API.
- Reporting unit (Web-Client ONLY).



3. External Interface Requirements

3.1 User Interfaces

3.1.1 Basic Data Management

This module is responsible of insert/update/delete of application's basic data. System is basically composed of the following set of screens: -

- A- Building: - maintains the faculty building via storing the following information: -
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Code: - unique string that identifies the building *i.e. A, B, C ...*
 - ✓ Description: - string describes the building *i.e. Civil Eng Dept*
- B- Building-Floor: - maintains the faculty building floors via storing the following information:
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Code: - unique string that identifies the sub-building *i.e. A-1, A-2 ...*
 - ✓ Description: - string describes the building *i.e. 1st floor, 2nd floor*
- C- Space/location Type: - maintains the faculty location/halls via storing the following information:
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Code: - unique string that identifies the location *i.e. LAB ...*
 - ✓ Description: - string describes the location *i.e. Computer Lab*
 - ✓ Color: - code that discriminate that space among other spaces.

Typical locations list is as follows

اللون الفردي	اللون المجمع	الكود	اسم الفراغ
	1	TMG	الإدارة العليا
	2	DRH	صالة رسم
	2	CLS	فصل دراسي
	2	LEC	مدرج
	3	CNT	غرفة كمنترول
	3	LAB	معمل
	3	STF	مكتب اعضاء هيئة تدريس
	3	LIB	مكتبة
	4	CON	قاعة مؤتمرات / مجلس الكلية
	4	EMP	مكاتب العاملين
	4	SUO	مكتب اتحاد الطلبة
	4	ITU	IT وحدة تكنولوجيا المعلومات
	4	QAU	وحدة ضبط وتوكيد الجودة
	5	SVC	خدمات (مخازن , اوفيس , ...)
	5	WC	دورة مياه
	5	GYM	صالة رياضية (جمانزيم)
	5	MSQ	مسجد

- D- Departments: - maintains the following information for the department: -
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Code: - unique string that identifies the department *i.e. CVL, ELEC ...*



- ✓ Name: - Department name *i.e. architectural Engineering*
- ✓ Home Building: - the department's home building which is to be selected from list of buildings (Screen A section 3.1.1).
- E- Staff: - enables the user to add staff with the following data set: -
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Name: - Staff member's name.
 - ✓ Department: - staff member department which is to be selected from list of departments (Screen D section 3.1.1).
 - ✓ Position: - one position would be selected from a dropdown list contains the valid positions typically: -
 - *Professor*
 - *Associate Professor*
 - *Assistant Professor*
 - *Assistant lecturer*
 - *Demonstrator*

Staff definition from the staff screen is not must. Whenever the user uploading the academic schedule the supplication fetches the staff and automatically add them to the staff list IFF they are not yet added to the system.

- F- Subjects: - enables the user to add courses with the following data set: -
 - ✓ Id: Sequential number *i.e. 1,2,3...*
 - ✓ Code: - course code.
 - ✓ Name: - Subject name.
 - ✓ Lecture Time: - lecture time slot in Hours unit *i.e. 1,2,3*
 - ✓ Department: - staff member department which is to be selected from list of departments (Screen D section 3.1.1).
 - ✓ preferred location type: one or many types would be selected from the list defined in subsection 3.1.1.C. *i.e. CCE-108 course needs computer Lab so that we need to define such information right here.*

Subjects definition from the subject screen is not must. Whenever the user uploading the academic schedule the supplication fetches the subjects and automatically add them to the staff list IFF they are not yet added to the system.

3.1.2 Locations'/spaces management module: -

This module is composed of two master screens: - locations master screen and location manual assignment screen.

A- Locations master screen

Locations master screen is used for locations definition with the following properties: -

- ✓ Id: Sequential number *i.e. 1,2,3...*
- ✓ Code: location code *i.e. EMP-01, LAB-2, SVC-3...*
- ✓ Name: - Space / location name.
- ✓ Type: - location type which is to be selected from list of locations categories list (Screen C section 3.1.1).
- ✓ Building: - Building code which is to be selected from the list defined in screen A section 3.1.1
- ✓ Floor: - Floor code which is to be selected from the list defined in screen B section 3.1.1
- ✓ Capacity: number of students that the building could host concurrently.



- ✓ Status description: - textual description for the location status.
- ✓ Contains AC (air condition): check box.
- ✓ Contains Data show: check box.
- ✓
- ✓

Typical location list for civil engineering department building is as follows: -

كود المبنى	كود الدور	الكود	اسم الفراغ	مسلسل
A	0	EMP-01	قسم رعاية الشباب	.1
A	0	EMP-10	الخزنة	.2
A	0	EMP-11	قسم الشؤون الادارية	.3
A	0	EMP-02	ادارة المشتريات	.4
A	0	EMP-03	فاضة بجوار المشتريات	.5
A	0	EMP-04	شئون طلاب 1	.6
A	0	EMP-05	شئون طلاب 2	.7
A	0	EMP-07	شئون مالية 1	.8
A	0	EMP-09	مدير ادارة الكلية	.9
A	0	EMP-12	ادارة معمل الري والهيدروليك	.10
A	0	GYM	صالة رياضية (جمنزيوم)	.11
A	0	LAB-1	معمل الري والهيدروليك	.12
A	0	LAB-2	معمل حاسب الى (ا)	.13
A	0	LAB-4	معمل حاسب الى (ب)	.14
A	0	LAB-5	معمل هندسة الطرق والمرور	.15
A	0	LAB-6	معمل المساحة والصحية 1	.16
A	0	LEC-1	مدرج 1	.17
A	0	LEC-2	مدرج 2	.18
A	0	MSQ-1	مسجد	.19
A	0	STF-01	مكتب اعضاء هيئة تدريس	.20
A	0	STF-04	ادارة معمل هندسة الطرق والمرور	.21
A	0	SVC-1	السنترال والامن	.22
A	0	SVC-2	خدمات عامة	.23
A	0	SVC-3	غرفة كهرباء	.24
A	0	WC-01	دورة مياه حريمى	.25

Screen allows creation / edition and deletion of location.

B- Location Manual Assignment: -

This master screen allows the administrator to manually assign the available spaces to any activity. Whenever the location is being busy it couldn't be selected by the schedule automatic



assignment algorithm. The screen would contain the list of all locations filtered by the location type and the hosting building so that the user just selects the type and building code from dropdown lists and accordingly the locations under this type would be listed in a tabular format. An editable cell would be available for the user to enter description for the location occupation purpose *i.e. vice-dean office,*

C- Location Automatic Assignment: -

This master screen allows the administrator to brows and upload the academic schedule tables in a certain format (**Will prepare it with Prof. Dr, Sherif later**). Once the user uploaded the xlsx file the following business procedure would be executed: -

- Staff members, and subjects are to be added if they are not added before.
- Locations are assigned to the subjects' lectures/labs/exercise based on the following criterions:
 - ✓ Locations assigned to the department home building first *i.e. electrical subjects are to be assigned for electrical engineering building locations/spaces.*
 - ✓ Within department location assignment is subjected to number of students per course and the location capacity.
NUMBER OF STUDENT PER COURSE WOULD BE INCLUDED IN THE SCHEDULE XLSX FILE
 - ✓ Number of students per course would be accumulated if the subject with the same code is repeated in the schedule file *i.e. in first year electrical engineering communication, power, and computers sections student study MATH course in the same time with the same code and same instructor.*
 - ✓ After routing the building location among department schedule subjects, the algorithm would search for locations in other building suits the subjects according to the subject *preferred location type* attribute.
 - ✓ During the locations assignment it is better (if it is possible) to assign ONE location for the academic stage *i.e. 3rd year computer students are hosted in Class 4 almost all the time.*
 - ✓ During the assignment it is preferred to assign the better locations (in good status) located at lower floor based on the academic position *i.e. if Lecture Hall 1 status is good and located at the first floor it would be assigned to Prof. Dr. Amr refaat rather than Dr. Sayed since the 1st is a professor and the second is an assistant professor.*
 - ✓

3.1.3 Authentication and Authorization module: -

This module is takes care users and roles creation. This module is composed of the following screens

- A- **Role:** - this screen creates a role for user describing its job *i.e. admin, employee...* The screen maintains the following info. about the role: -
 - ✓ **Id:** Serial
 - ✓ **Name:** role name.
 - ✓ **Description:** role description.
- B- **Users:** - this screen maintains users' information in insert/update/delete manner with the following attributes: -
 - ✓ **Id:** serial
 - ✓ **Name:** user login name
 - ✓ **Full name:** user full name as four tokens first, middle, last and family name.
 - ✓ **Email:** to be used later to send required document to the user.



- ✓ password
- ✓ **Role:** - dropdown list to assign a role to the user.
- ✓

C- **Role-Screens:** - this screen gives access to the user on system screens. The access is given as view/insert/update/delete option. For example, *the role employee will have ONLY view access to the locations screen. Whereas, the admin have full access to the same screen (view/insert/update/delete).*

3.1.4 Program Outputs Module-

The system delivers two kinds of outputs via two screens: -

A- **Location/Space Occupancy:** through this screen the user could search for any location and view its occupation overall the week in the following format: -

Location Type	< - - List - - >		Building	< - - List - - >		Location Name	< - - List - - >	
Time Slot	1 st Slot		2 nd Slot		3 rd Slot		4 th Slot	
Sunday								
Monday	CSE308 – Dr. Ahmed				CSE301 – Dr. Ali			
Tuesday			CSE302 – Dr. Omar					
Wednesday								
Thursday			CSE204 – Dr. Karem					

Notes: -

- The three list are not MUST so the user could view all locations in all buildings at once.
- User can print it out.

B- Schedule: -

This screen is used to view/print the academic schedules tables with the locations added in the same XLSX format provided in schedule upload. The screen would contain filtration dropdown lists for department/stage as follows: -

Department	< - - List - - >		Stage	< - - List - - >	

3.2 Hardware Interfaces

System is to be integrate with the following devices: -



- Printers.
-

3.3 Software Interfaces

System would integrate with the following systems: -

- Schedule preparation tools.

4. Other Nonfunctional Requirements

4.1 Security Requirements

In addition to the System authentication and authorization module and as a security complementary need, password and critical data would be encrypted in the database. Backups would be taken automatically from the system and moved to a safe storage.

5. Other Requirements

In addition to the features listed in this SRS, LTA would contain the following features: -

- Support Arabic and English languages.
- Works smoothly with other relational databases typically MS SQL Server.

Appendix A: Glossary

LTA	Location Tracker Application
SRS	Software Requirements Specifications.