MOBILE INVENTORY SYSTEM APPLICATION

CPET 565 Final Project

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PROJECT PLAN

Start Wed 10/10/12	Today	November	December	January	Finish Tue 1/29/13

Phase 1 - Strategic Plan 10/10/12 - 11/12/12

Phase 3 - Plan for 11/27/12 - 12/12/12

Confirm decision to 10/16/12 - 11/6/12

Phase 2 - Define 11/12/12 - 11/27/12

Phase 4 - Proceed 12/5/12 - 12/21/12

Confirm decision to proceed 10/12/12

Confirm decision to proceed 12/5/12

Start up the business 1/29/13

More detail on Project File

EXECUTIVE SUMMARY

- Currently the company
  - Has a simple database which is manually managed by the staff
  - They have section wise tagging of equipment
  - No centralized tracking system
  - No secure work order system

- Our solution will encompass and cater for all kind of mobile devices inside and outside the warehouse through a cloud structure.

EXECUTIVE SUMMARY

- A tracking inventory management mobile application will be developed which would access a centralized database with inputs from a scanner that would help track and structure the companies' inventory.

- Query could be made easily to check any equipment when needed and order placed when required.

- It is being assumed that the company currently has an internal communication network for all office and warehouse locations.

EXECUTIVE SUMMARY

o Used Cases

o The main server room will consist of a middleware server, application server and a firewall among other machines

o The central class is the itemSupplier and WorkOrders. Associated with it are the employees

o Equipment classes and workorder uses the location and department name

EXECUTIVE SUMMARY

o Data collection/transformation
  - Allows us to see which equipment has been rented and how many times
  - Allows us to see which equipment is due for upgrade or PM
  - Allows us to see how long the equipment is rented and when it is to return
o Mobile Web Portal
  - We would use this so the workers on the floor would be able to quickly and easily access the inventory through the use of their mobile devices.

How does the current system look like?

- A simple database which is manually managed by the staff.
- Sections are available in the warehouse for different department
- Warehouse in one city has no clue what other warehouse have in their stock.
- Paper based Work order sheet is used to issue or deliver equipment into or from the warehouse.

What the mobile app will need to do?

- Track inventories and work histories

- Manage work orders and device failures

HOW CAN THE MOBILE APP HELP?

- They have a growing system with many thousand servers and parts in the network
- Failures by location
- Check current status of a part from app
- Failures by Device

HOW CAN THE MOBILE APP HELP?

- Work orders can be created electronically
- All employees have feel phone services
- Digital cameras can now be used for inventory and inspection records

WHAT ARE THE APPLICATION REQUIREMENTS?

- Cost
- Usability
- Interoperability
- Security
- Performance
- Legacy systems

LIMITATION OF DESIGNING A MOBILE APP?

- Limited processing speed
- Very limited memory for application memory
- Users may feel some difficulties to operate the keypad.
- Small screen size
- Cost of mobile phone
- Issues in Data Security
- It might not be very user friendly

WHICH MOBILE APP???

What are the strategic drivers in the telecom industry?

- Cost competitiveness
- Process efficiency
- Customer service
- Organizational agility

WHICH MOBILE APP???

- Inventory management
- Equipment management and maintenance
- Site level performance tracking
- Frontline staff
- Management staff
- Reporting systems

INVENTORY MANAGEMENT SYSTEM

TASKS UNDER THE INVENTORY DEPARTMENT

- Store, Manage and document all new equipment
- Use a Work order system that accepts requests from technical departments
- Manage the delivery of equipment and parts
- To manage and synchronize parts and equipment between warehouses

JUST-IN-TIME STUDY

Device type

- Controller
- Memory module
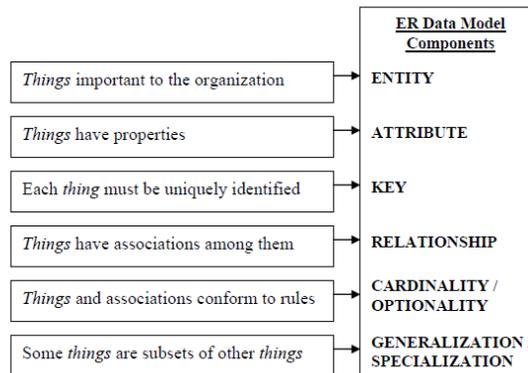- Motherboard
- Interface cards
- Cabinets
- Routers etc

DATA STRUCTURES

Way of storing and organizing data
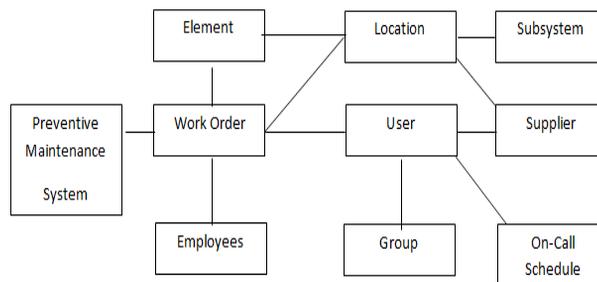
DATA MODELING

- Data modeling is the formalization and documentation of existing processes and events that occur during application software design and develop

	ER Data Model Components
Things important to the organization	→ ENTITY
Things have properties	→ ATTRIBUTE
Each thing must be uniquely identified	→ KEY
Things have associations among them	→ RELATIONSHIP
Things and associations conform to rules	→ CARDINALITY / OPTIONALITY
Some things are subsets of other things	→ GENERALIZATION / SPECIALIZATION

DATA MODELING

Entity:

Employee

Attribute:

Employee
Emp #
Name
Telephone #
Department

DATA MODELING

- **Candidate key**

Each Machine entity has a unique Machine ID, and there will never be more than one machine with the same Machine ID

- **Primary key**

- **Composite key**

For example, consider the entity called Transaction with the following attributes: Transaction ID, Date, No., Spare Parts ID and Quantity. Many transactions can be made on the same date.
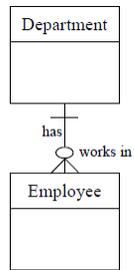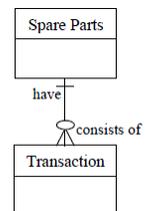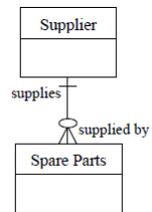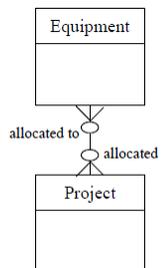
DATA MODELING

Relationship:

A SUPPLIER has a set of SUPPLIER SPECIALIZATION
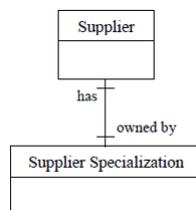
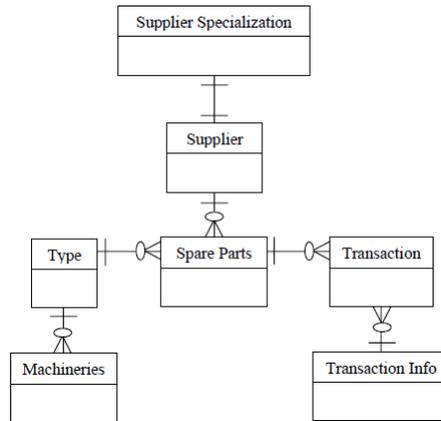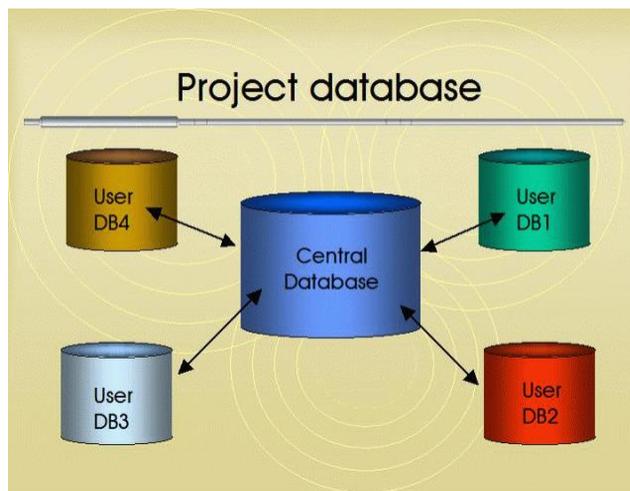# DATA MODELING

DATA MODELING

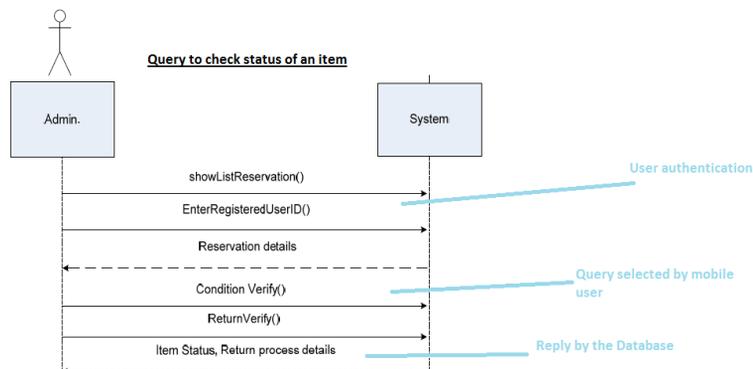# DATA MODELING

DATA STORES

DATA ACCESS & QUERY PROCESSING

Data Access:

You need a way to track the status and whereabouts of each and every mobile device on your network

Query processing

- Product ID
- Supplier ID
- User ID
- Transaction
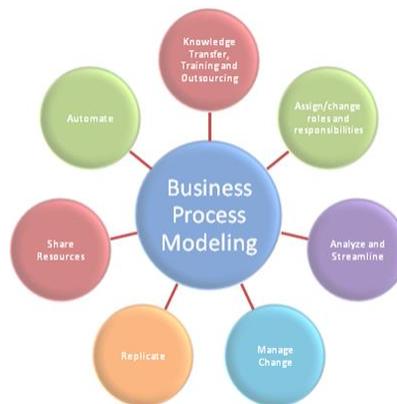- Spare parts
- Location, etc

QUERY PROCESSING

Data Presentation

- Tabular

- Graphical

- Pictorial

Business process modeling

WEB SERVICES

SERVICE ORIENTED ARCHITECTURE

A service-oriented architecture (SOA) is a set of
principles and methodologies for designing and
developing software in the form of interoperable
services.

- Platform: Integration with exisiting systems and
databases
- Software: Off the shelf or tailored solution?
- Device: Single device with multiple apps
- Connectivity: Constant connectivity or offline
mode?, GPRS, 3G or WiFi

CLOUD COMPUTING

o Seamlessly switch back and forth between desktops, laptops, tablets and smartphones over the course of the day
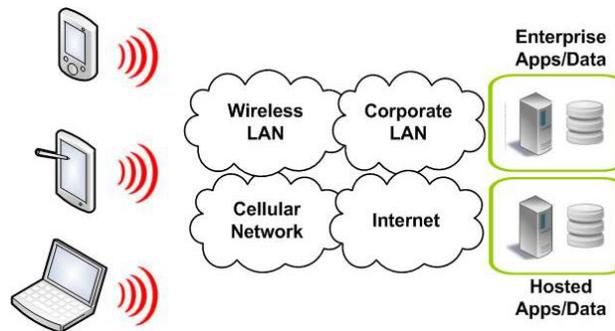
COMPANIES

IBM

IBM mobile inventory management software has the following features;

o Perform physical cycle counts.

o Perform issues, returns and transfers.

o Perform receiving processes, including receipt inspections and asset serialization.

o Utilize bar code and RFID capabilities for mobile inventory tracking and management

COMPANIES

Syclo

- Accelerate physical and cycle counts using drop-downs, wizards, keypad entry and more
- Track materials by number, work order/service request, location, bin, etc.
- Built-in support for leading peripherals, including barcode, RFID, voice and more
- Keep materials properly organized, tagged and recorded for just-in-time inventory

COMPANIES

SCOUT Topshelf

- Web-based platform
- Dynamic Reporting
- Integrates with existing accounting and CRM Systems
- Works with any Mobile Barcode Scanner or Smartphone
- Work Order Management

COMPANIES

Intel

COMPANIES

SAP

- SAP ERP procurement and logistics execution mobile solution is available
- This is a whole supply chain management system

WHICH COMPANY SHOULD I CHOOSE?

- We choose **SCOUT Topshelf**

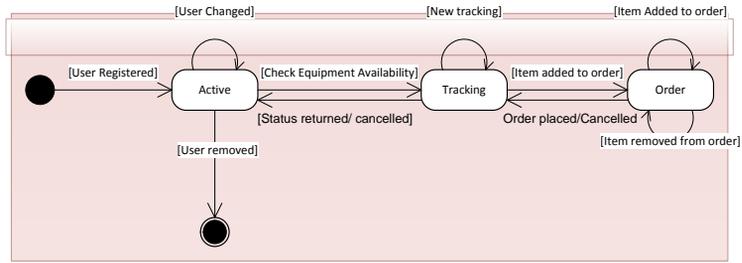| Company name	Advantage	Disadvantage
IBM	Reputed company	• Not the exact solution required • Do not support customization
Syclo		• Huge customization is required
SCOUT Topshelf	• Exactly match our needs • Experience with inventory systems	• Not as well-known as some other companies
Intel	Reputed company	• Has no inventory solution available
SAP	Reputed company	• Inventory system is part of a whole supply change system

RISK MANAGEMENT

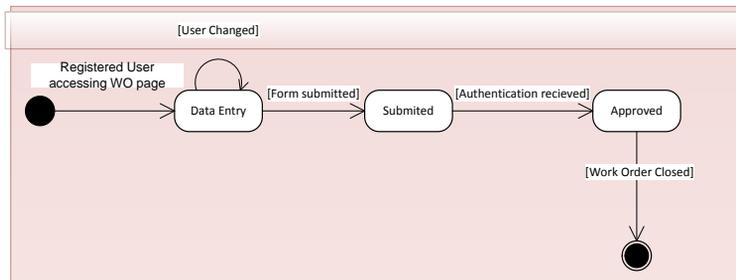|	Negligible	Marginal	Critical	Catastrophic
Certain		6	1	
Likely	8	3	4	10
Possible	7	9	11	5
Unlikely		2		
Rare				

1.) Interception of data over the air
2.) Baseband layer attacks
3.) Defects in kernel code or vendor supplied system code
4.) Apps with vulnerabilities and malicious code have access to your data and device sensors
5.) Sensitive data leakage
6.) App Crashes – Inventory must be done by hand
7.) Data Redundancy and Inconsistent Data
8.) Difficult to update and maintain
9.) Difficult to backup
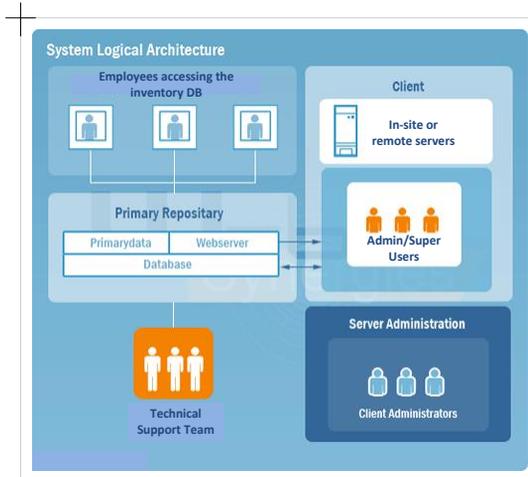10.) Inaccuracy data
11.) Restricted access

STATE CHART DIAGRAM

User

[User Changed]   [New tracking]   [Item Added to order]

[User Registered]   **Active**   [Check Equipment Availability]   **Tracking**   [Item added to order]   **Order**

[Status returned/ cancelled]   Order placed/Cancelled

[Item removed from order]

[User removed]

WORK ORDER

[User Changed]

Registered User accessing WO page

    Data Entry   [Form submitted]   **Submited**   [Authentication recieved]   **Approved**

[Work Order Closed]

UML C

Figure1: UML Class Diagrams

ItemCategory
-ItemCategoryCode
-ItemCategoryDescription
+UpdateItemCat()

Project
-ProjectCode
-ProjectName
-DepartmentID
-ProjectVendor
-ProjectOtherDetails
+GetProjectName()

Supplier
-SupplierID
-SupplierName
-SupplierEmail
-SupplierPhone
-OtherSupplierDetails
+UpdateSuppID()

DeviceType
-DeviceID
-BrandCode#
-BrandName
+RemoveDevID()

0..1

CategoryDetails
1..1

0..*
DepartmentProjects

1..1

1

SupplierDetails

StockDetails

Department
-DepartmentID
-AuthorizerID
-HeadOfDepartment
-DepartmentName
-Division
-DepartmentOtherDetails
+GetAuth()+RecordParNe()

1..*

ItemSupplier
-ItemID
-SupplierID
-TotalQuantitySuppliedToDate
-FirstItemSuppliedDate
-LastItemSUppliedDate
-DeliveryLeadTime
-StandardPrice
-MinOrderQuantity
-MaxOrderQuantity
-OtherItemSuppliersDetails
+GetSupplier()
+AddItem()
+RemoveItem()

Equipment
-ItemID
-DeviceID
-ItemCategoryCode
-ItemDescription
-ReorderLevel
-ReorderQuantit
-OtherItemDetails
+PlaceReq()+ChangeStat()

EquipSupplierDetails

1..*   0..*

Location
-LocationID
-LocationName
-LocationAddress
-LocationOtherDetails
+UpdateLocation()

1..1

*   *

RequestorDepartment
1..1

RequestorLocation

1..1
WorkOrderTracking

StockLevelsDetails

1..*

1..*   1..*

WorkOrders
-WorkOrderID
-AuthorizerID
-Emp#
-ItemID
-RequestType
-Activity
-ProblemDetails
-ProblemResolution
-DateAndTime
-WorkOrderOtherDetails
+CreateWorkOrder()+UpdateItemID()

*

1..*

ItemStockLevels
-ItemID
-StockCriticalLevel
-QuantityInStock
+CreateInventoryReport()
+UpdateInventoryReport()

RequesterInfo
-Emp#
-LocationID
-DepartmentID
-Name
-Mobile#
+GetLoc()+UpdateEmpID()

WorkOrderInitiator

1..1   1..*

System Logical Architecture

Employees accessing the inventory DB

Client

In-site or remote servers

Primary Repositary

Primarydata | Webserver
Database

Admin/Super Users

Server Administration

Technical Support Team

Client Administrators
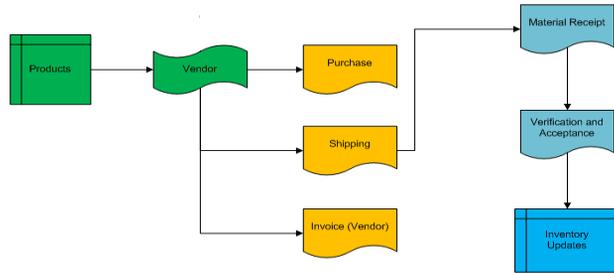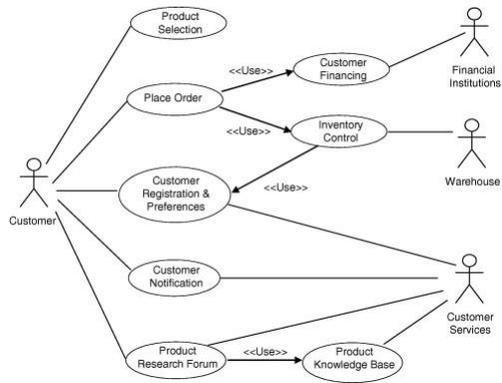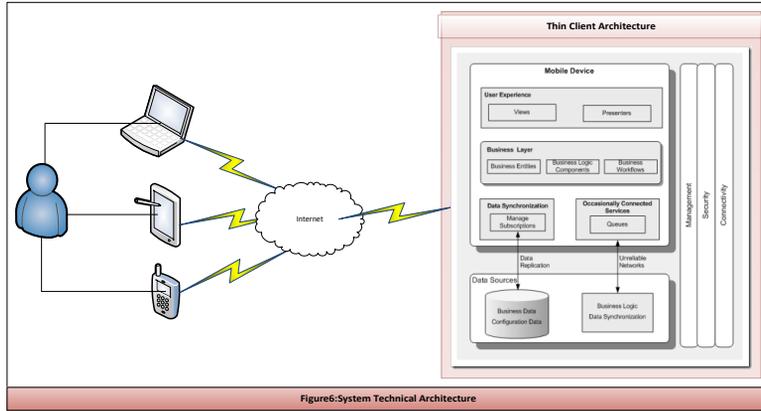
BUSINESS PROCESS

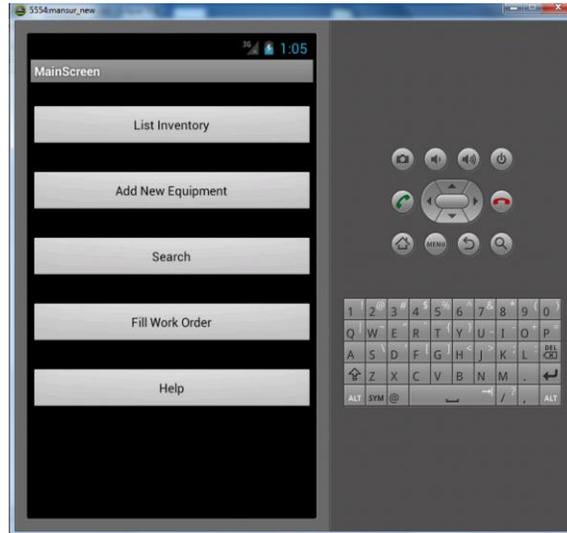# USE CASE DIAGRAM

Figure6:System Technical Architecture

Figure7: Hardware Architecture

APP DEVELOPMENT UPDATE

MYSQL TABLE STRUCTURE

INITIAL INTERFACE DESIGN
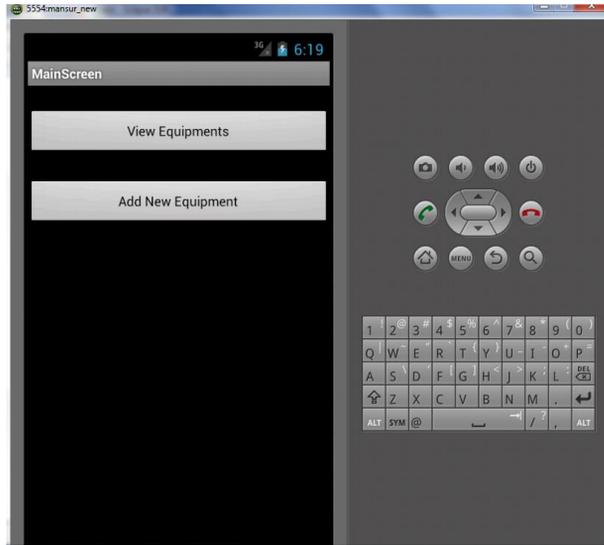

ADD NEW EQUIPMENT LAYOUT
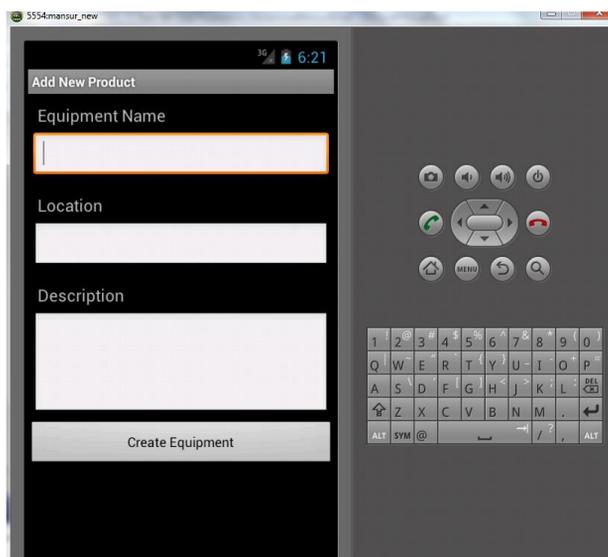
DATABASE OUTPUT WITH PHP

{"equipment":[{"Item_ID":"1","Item_Name":"Chips","location":"Islamabad","description":"testing","Date_Recieved":"2012-11-08 00:00:00","updated_at":"0000-00-00 00:00:00"}, {"Item_ID":"2","Item_Name":"Chips","location":"Islamabad","description":"testing","Date_Recieved":"2012-11-08 00:00:00","updated_at":"2012-11-08 00:00:00"}],"success":1}

+ Options

←T→				Item_ID	Item_Name	location	description	Date_Recieved	updated_at
☐	🖊 Edit	🗐 Copy	⊖ Delete	1	Chips	Islamabad	testing	2012-11-08 00:00:00	0000-00-00 00:00:00
☐	🖊 Edit	🗐 Copy	⊖ Delete	2	Chips	Islamabad	testing	2012-11-08 00:00:00	2012-11-08 00:00:00

CURRENT TROUBLESHOOTING

Linking MYSQL database with Android APP!

REFERENCES

- http://lirneasia.net/wp content/uploads/2009/06/srs_mobile_application_rtbp_v20.pdf
- http://www.microtrak.org/assets/SEGv1.1.pdf
- http://webpub.allegheny.edu/dept/chem/labcommon/Lab.DataFormat.pdf
- http://eprints.utm.my/4604/1/SyahidaAripinKPFKA2006TTT.pdf
- http://www-01.ibm.com/software/tivoli/products/maximo-mobile-inventory-mng/features.html?S_CMP=wspace
- http://www.syclo.com/node/266
- http://www.scoutsft.com/
- http://www.sap.com/solutions/bp/enterprise-resource-planning/procurement-and-logistics-execution/index.epx