# Decision support system for OLAP of Myanmar Lottery function

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## Abstract

*The World Wide Web provides information professionals with many opportunities while and at the same time requiring them to confront issues that does not have occasion to explore previously. Online Analytical Processing (OLAP) using data warehouse technology, especially when it conforms to international standards, offers the tools that information professionals need to exploit these opportunities. Data warehousing technology has made a huge impact in the world of business, where with its help data turned to information that early adopters could leverage for enormous advantages. So, this system intended to develop the decision support system for Myanmar Lottery functions. It is focus on main lottery ledger management, drawing list and organizational aspects of lottery shops, record drawing lists by monthly, check win or not status requested for any user and generates monthly winning result percent by each enterprise*.

## 1. Introduction

Data warehousing concept is mainly used to develop decision support systems (DSS). Data warehousing is a collection of decision support technologies, aimed at enabling the knowledge worker (executive, manager, and analyst) to make better and faster decisions [2]. Many organizations are committing considerable human, technical, and financial resources to building and using data warehouses. The primary purpose of these efforts is to provide easy access to specially prepared data that can be used with decision support applications, such as management reporting, queries, decision support systems, and executive information systems.

So, this system is intended to develop the Decision Support System for OLAP of Myanmar Lottery Function. Data warehouses in a lottery functional context have traditionally been administrative in nature, focusing on main lottery ledger management, drawing list, organizational aspects of lottery shops that were optimized using data warehouse technology not much different than cotemporary enterprises. Technology, however, evolved quickly and more complex areas of lottery functional management could be tackled and then make decision for winning result percent. The information technology supported collection process of drawing list data has a long history.

## 2. Background of the system

This system is only for Myanmar lottery and is an information retrieval system of a lottery shop. Myanmar lottery was started from 1st June 1938. In 1938, each ticked was delivered by two kyat and honored the minimum prize for 500 kyats to the maximum prize 100,000 kyats. “Aung-ba-lay” State Lottery, the only official lottery in Myanmar, was first introduced in 1938 and held bimonthly two months up to March 1989. Thereafter, it is being drawn monthly. The State Lottery Directorate of the Internal Revenue department is the only authorized organization to hold lotteries and to collect tax from the sale of lottery tickets. Under the Gambling Law (1986) all other lotteries are prohibited. The ministry of Finance and Revenue distribute the tickets of lottery from 1st of every month. They declare the reward 1st for the previous month. But they pay the reward from 6th of that month.

## 3. Decision support system

Decision Support Systems (DSS) is a specific class of computerized information system that supports business and organizational decision making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions [1]. The types of DSS are communications driven, data-driven, document-driven, knowledge-driven, spreadsheet-based and web-based. This system is based on web-based DSS [4]. Any type of DSS can be web-based. The term simply describes any decision support system that is operated through the interface of a web browser, even if the data used for decision support remains confined to a legacy system such as a data warehouse.

### 3.1 Online analytical processing (OLAP) systems for decision support

OLAP (Online Analytical Processing) is a methodology to provide end users with access to large amounts of data in an intuitive and rapid manner to assist with deductions based on investigative reasoning[2][3][5][6]. These decision support systems are referred to as Online Analytical Processing (OLAP) systems, and they allow knowledgeable workers to intuitively, quickly, and flexibly manipulate operational data using familiar business terms, in order to provide analytical insight. OLAP systems need to:

- Support the complex analytical requirement of decision-makers,
- Analyze the data from a number of different perspective (business dimensions), and
- Support complex analysis against large input (atomic-level) data sets.

## 4. Multidimensional data model

Data warehouses and OLAP tools are based on a multidimensional data model. This model views data in the form of a data cube. In this system, learn about how data cubes model n-dimensional data. And also learn about concept hierarchies and how can be used in a basic OLAP operations to allow interactive mining at multiple levels of abstraction.

This is a critical part of designing a data warehouse. The entity-relationship data model is commonly used in the design of relational database, where a database schema consists of a set of entities and the relationships between them. Such a data model is appropriate for on-line transaction processing. However, a data warehouse requires a concise, subject-oriented schema that facilitates on-line analysis. A schema is a collection of database objects. The schema consists of star schema, snowflake schema and fact constellation schema. This system is developed by using star schema [2].

### 4.1. Star schema

It contains a large central table (fact table) and dimension tables. The fact table contains the names of the facts, or measures as well as keys to each of the related dimension tables.

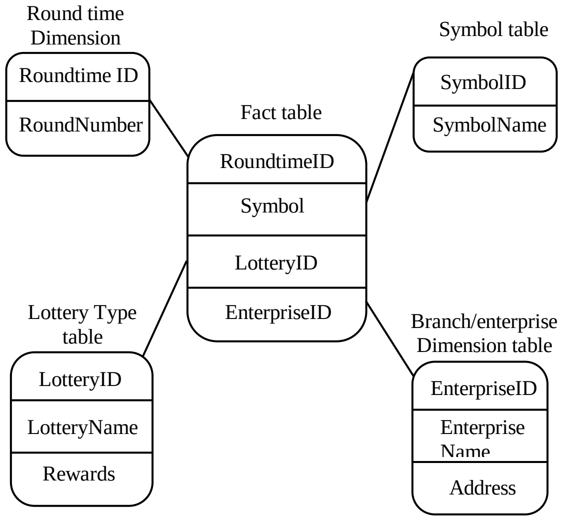


**Figure 1. Star schema**

It is organized with tables that contains the most of the data at the "center "of the model and other tables with data useful to qualify (narrow) the central data in tables radiating out from the center. This is generally called a "star schema". The tables with most of the data at the center are called "fact" tables. The tables radiating out from the center are called "dimension" tables. This system used star schema for data warehouse design. These are organized into a "star" schema. There are one fact table of "Main Ledges" and four dimension tables such as "Round Time", "Branch/enterprise", and "Drawing list". The cardinalities of the system between fact table and dimension tables are one-to-many occurrences.

**Table 1. Lucky drawing fact table**

| Fields Name | Data Type | Description |
|---|---|---|
| RoundtimeID | Number | Id of round time |
| SymbolID | Number | Id of symbol |
| EnterpriseID | Number | Id of enterprise |
| LotteryID | Number | Id of Lottery type |
| Reward | Text | |

**Table 2. Symbol dimension table**

| Fields Name | Data Type | Description |
|---|---|---|
| SymbolID | Number | Id of symbol |
| SymbolName | Text | Name of Symbol |

**Table 3. Enterprise dimension table**

| Fields Name | Data Type | Description |
|---|---|---|
| EnterpriseID | Number | Id of enterprise |
| EnterpriseName | Text | Name of enterprise |
| Address | Text | |

**Table 4. Round time dimension table**

| Fields Name | Data Type | Description |
|---|---|---|
| RoundtimeID | Number | Id of round time |
| RoundNumber | Text | Number of round |

**Table 5. Lottery type dimension table**

| Fields Name | Data Type | Description |
|---|---|---|
| LotteryID | Number | Id of lottery type |
| LotteryTypeName | Text | Name of lottery type |

## 4.2. OLAP operations in multidimensional data model

In the multidimensional data model, data are organized into multiple dimensions, and each dimension contains multiple levels of abstraction defined by concepts hierarchies. A number of OLAP data cube operation exist to materialize these different views. OLAP provides a user-friendly environment for interactive data analysis. The OLAP operations described as follows:

### 4.2.1. Roll-up

The roll-up operation (also called the drill –up operation by some vendors) performs aggregation on a data cube, either by climbing up a concept hierarchy for a dimension or by dimension reduction. The roll-up operation shown aggregates the data by ascending the hierarchy from the level. When roll-up is performed by dimension reduction, one or more dimensions are removed from the given cube [2].

### 4.2.2. Drill-down

Drill-down is the reverse of roll-up. It navigates from less detailed data to more detailed data. Drill-down can be realized by either stepping down a concept hierarchy for a dimension or introducing additional dimension. A drill-down adds more detail to the given data; it can also be performed by adding new dimensions to a cube [2].

### 4.2.3. Slice and dice

The slice operation performs a selection on one dimension of the given cube, resulting in a sub cube. The dice operation defines a sub cube by performing a selection on two or more dimensions [2].

### 4.2.4. Pivot (rotate)

Pivot (also called rotate) is a visualization operation that rotates the data axes in view in order to provide an alternatives presentation of the data. Other functions of rotating the axes are in a 3-D cube, or transforming a 3-D cube into a series of 2-D planes [2].

### 4.2.5. Other OLAP operations

Some OLAP systems offer additional drilling operations. Drill-across executes queries involves more than one fact tables. The drill-through operation makes use of relational SQL facilities to drill through the bottom level of a data cube down to its back-end relation tables. Other OLAP operation include ranking the top N or bottom N items in lists, as well as computing moving average, growth rates, interests, internal rates of return, depredation, currency conversions, and statistical functions.

OLAP offers analytical modeling capabilities, including a calculation engine for deriving ratios, variance, and so on, and for computing measures across multiple dimensions. It can generate summarization, aggregation, and hierarchies at each granularity level and at every dimension intersection. OLAP also supports functional model for forecasting, trend analysis, and statistical analysis. So, OLAP engine is a powerful data analysis tool [2].

## 5. Related work

D.J.Power and H.K.Bhargava presented World-Wide Web technology had rapidly transformed the entire design, development and implementation process for all types of Decision Support System (DSS). In patricular, Web technologies had provided a new mdia for sharing imformation about decision support and a new means of delivering decision support capabilities. For DSS developers, the big leap forwards is to use the Web as computer. The partice of building DSS could benefit in many ways from the availability of Web technologies. Those technologies provided platform-independent, remote ,and distributed computation and the exchange of complex multimedia information. While there was significant promise in the idea of Web-Based DSS, those were also some important challenges that must be overcome. They needed to resolve technological, economic and social and behavioral challenges to realize the benefits the Web could provide as a platform for building DSSs [7].

## 6. System design

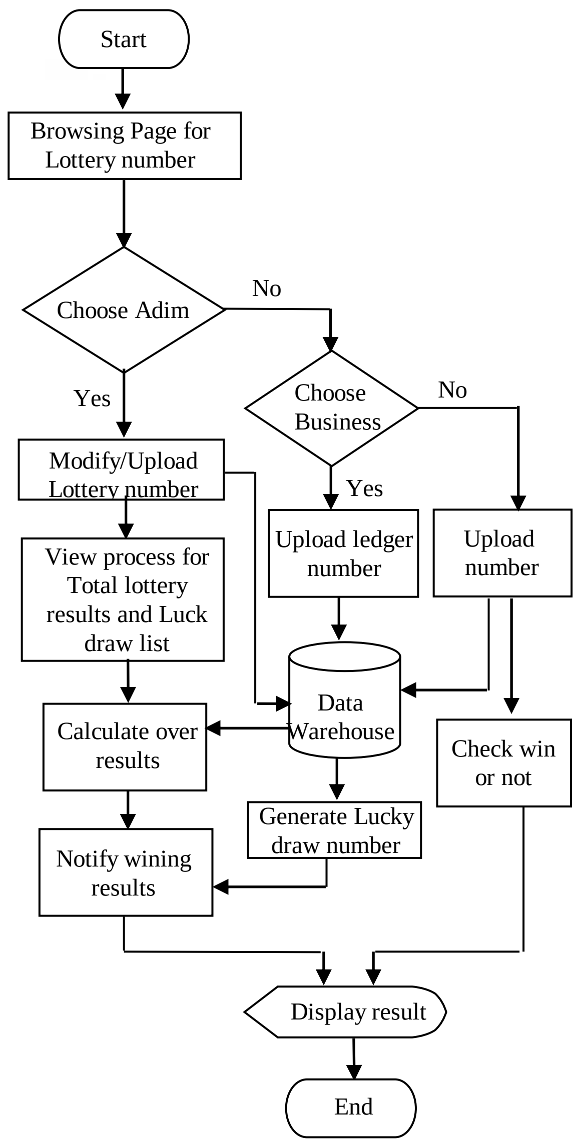


**Figure 2. System flow diagram**

There are three main actors in the system. They are administrator, business and individual. Administrator need to login process and then update drawing list to the system. Business person can upload the lager number to the system and the system will calculate the overall result. The individual or user can win or not. User need to enter the lottery number to the system. So, the system will generate lucky draw number and notify winning results.

## 7. Implementation

This system is developed by using Java language and My SQL database. In this system, Glassfish Application sever is developed for the "Decision Support System for OLAP of Myanmar Lottery Function".

As soon as the users open the system, the title and home page will appear as shown in Figure 3. If a user wants to use this web site, the user must be login to the web site. If the user is new user, he/she must fill the detail information in the registration form about the user. If the user enters the web site without register or login, the user can just see the information of information.

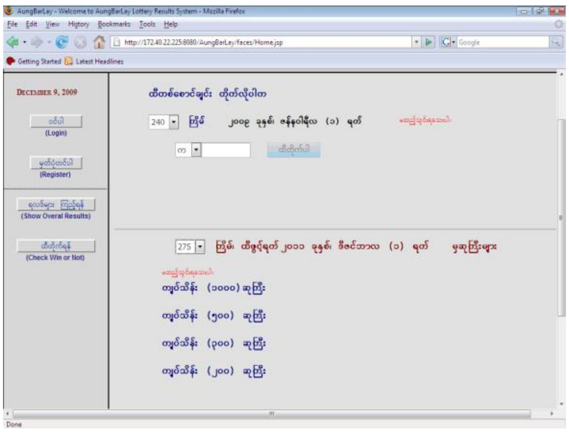

**Figure 3. Home page**

There are generally four categories for the Online Myanmar Lottery Results System. They are:

1. Login
2. Registration
3. View Results
4. Match Lottery Number

In home page, any user can check the lottery number whether if is winning or not. In this page, user can check by the alphabetical order of lottery number to the system and then click the "Check" button. If it is winning, the system will display lottery result to the user. If it is not success, the system will display about the unsuccessful message to the user. User can also check the individual lottery number. In this system, there are three main user types such as Administrator, Business and Individual.

All member users can process login function. User can type user name and password to the system and then press “LOGIN” button. So, the system will check the user profile database. If it is successful, the user can process the related operations of the system. If it is not successful, the system does not allow the user for any operation. Administrative user type can modify drawing list to the system. Business user type can upload ledger number to the system and checks notify wining results. Individual user types can upload lottery number and check whether if win or not.

In registration page, new user can fill name, system’s user name, password, confirm password, address, email and choose user type (individual or business). After that, user needs to press “Sign Up”. The system will save user profile to the existing database.

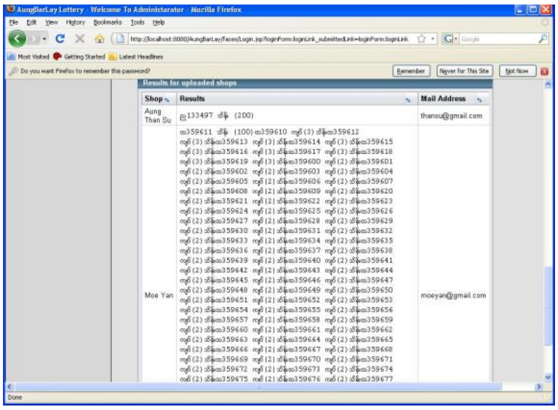


**Figure 4. Results of lottery shop**

## 8. Conclusion

This system is intended to support decision maker during the process of arriving at a decision. In this system, the user can record the lottery number, symbol, lottery type, round time and sale branch records in related time. It has briefly described decision support system, OLAP operation using data warehouse architecture. And then the system process this data and it consolidates and reports the information that can support decision making. Data warehouse are created for seed up queries by reducing the volume of data to be scanned. In this system, user can review all records of historical data for monthly or yearly as user’s desired item from each dimension. This system is developed to easy access for frequently needed data, to improve end-user respond time.

It may also provide performance of query facilities and make data processing facilities faster. So it can reduce searching time. This system supports knowledge of lottery. This system can produce various kinds of reports timely and precisely, which can support management level in planning, decision making and control the whole function of Myanmar Lottery System. The computer based information system for lottery shop can be intended for using the distributed development processing environment in the future.

## 9. References

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