# REPORTING STUDENTS' MARK LIST USING DATA WAREHOUSE

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## Abstract

*Data Warehousing has emerged as an effective mechanism for converting data into useful information. Data warehouse system allows for the integration of a variety of application systems. This system is intended to support the management's decision making process, especially for the mark list system of Computer University by constructing data warehouse. This system is created that is a relational design with fact tables and dimension tables. Based on the data warehousing theory, the user can retrieve the required summary information using the concept of snowflake schema, which is the database schema of multidimensional data model.*

## 1. Introduction

A data warehouse is a repository of information collected forms multiple sources, stored under a unified schema, and which usually resides at a single site. Data warehouses are constructed via a process of data cleaning, data transformation, data integration, data loading, and periodic data refreshing [2].

This system is intended to construct the consistent data store that serves as the information on which enterprise needs to make decisions making process, to retrieve student's marks lists as user need using warehouse theory and to study the warehouse theory.

The data warehousing approach solves the problem by integrating data from the operational systems into one common data store: the data warehouse. The primary concept of data warehousing is that the data stored for business analysis can most efficiently be accessed by separating the data from the operational systems.

The reasons to separate the operational data from analysis data have not significantly changed with the evolution of the data warehousing systems. Advances in technologies and changes in the nature of business have made many of the business analysis processes much more complex and sophisticated. In addition to producing standard reports data warehousing systems support very sophisticated online analysis including multi dimensional analysis.

## 2. Data Warehouse Concept

Data warehouses integrate information from various distributed and autonomous data sources that can change in the course of time. Therefore a data warehouse has to be adaptable to any changes that can happen in underlying data sources [2].

Data warehousing is performed by using a multi-step process that includes collection data, cleaning data, and storing data for use in analysis and reporting applications. The data can originate from a variety of different sources, including different database systems and even different operating systems.

### 2.1. Major Processes

Data Warehouses are never static. They are built to support large volumes cost-effectively. Therefore, they require a different approach to the design and development.

The major processes are:

1. Extract and load the data.
2. Clean and transform the data into a form that can cope with large data volumes, and provide good query performance.
3. Back up and archive data.

Manage queries, and direct them to the appropriate data sources [2].

### 2.2. Data Warehouses Manager

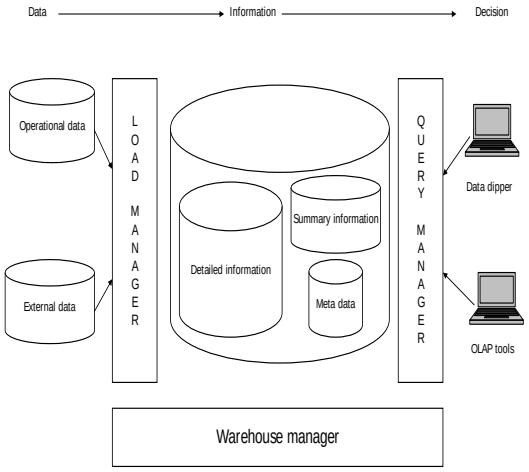
The data warehouse process managers are pieces of software responsible for the flow, maintenance and upkeep of the data, both into and out of the data warehouse database.

There are three different data warehouse process managers:

1. Load manager

2. Warehouse manager
3. Query manager

Each process manager has its own responsibilities and complexities, and there are potential overlaps between the responsibilities of each process [1].




**"Figure 1. Data warehouse architecture"**

## 3. Data Warehouse Architecture

The data warehouse view includes fact tables and dimension tables. It represents the information that is stored inside the data warehouse, including precalculated totals and counts, as well as information regarding the source, date, and time of origin, added to provide historical context.

The smallest information unit of a data warehouse system is a *fact*, which puts one *reference object*—representing a single reference object or a combination of more than one reference object—and one *ratio* into relation. *Dimension groupings* aggregate reference objects with similar properties (i.e. customer, store, and product) [3].

### 3.1. Snowflake Schema for the System

The snowflake schema is a variant of the star schema model, where some dimensions are normalized, thereby further splitting the data into additional tables.

The dimension tables of the snowflake model may be kept in normalized form reduce redundancies. Such a table is easy to maintain and saves storage space because a large dimension table can become enormous when the dimension structure is included as columns. Furthermore, the snowflake structure can reduce the effectiveness of browsing since more joins will be needed to execute a query. Consequently, the system performance may be adversely impacted [4].

## 4. System Design

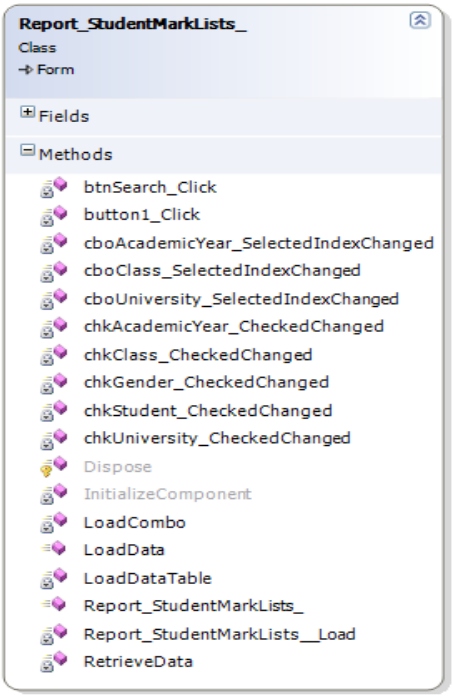
This system is implemented by using C# programming language and Microsoft SQL server 2005.

### 4.1. System Overview

This system aims to print the student mark list report for Computer University by using the data warehouse. In this system, the individual database for each University is created. The user can quickly search the necessary mark lists of the students with this system and can retrieve the required information from the data warehouse and the report can be printed as he like.

### 4.2. Class Diagram

This class diagram is used to process for students' mark lists report which includes the selection of University, Academic year, class, gender and student, the search method, the load method, the report function and the load function.




**"Figure 2. Class Diagram"**

### 4.3. Database Design

There are five dimension tables and one Fact table. Dimension Tables are:

1. Student Dimension
2. Subject Dimension
3. AcademicYear Dimension
4. Grade Dimension

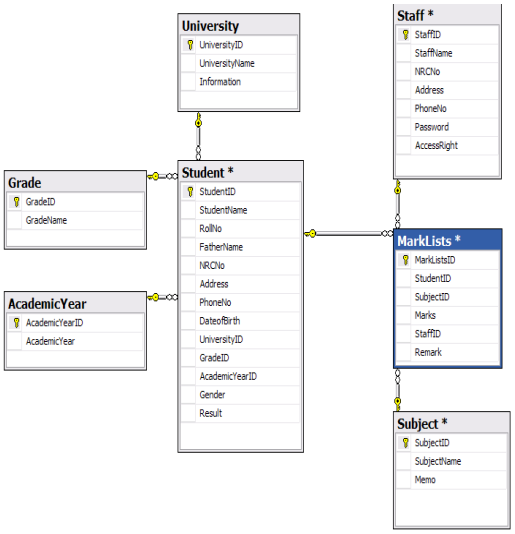
5. University Dimension

Fact Table is:

1. Mark lists Fact Table

The Student dimension table contains the attributes StudentID, StudentName, RollNo, FatherName, NRCNo, Address, PhoneNo, DateOfBirth, UniversityID, GradeID, AcademicYearID, Gender and Result where UniversityID is linked to the University dimension table containing UniversityID, UniversityName and Information. Similarly, the GradeID is linked to Grade dimension table and AcademicYearID is lined to AcademicYear dimension table.

In this system, administrators can entry University information and then entry for Academic Year, Grade, Student and Subject corresponding to University. After that he can entry for Mark lists Fact table. Administrator and User can view information according to dimensions and fact table.



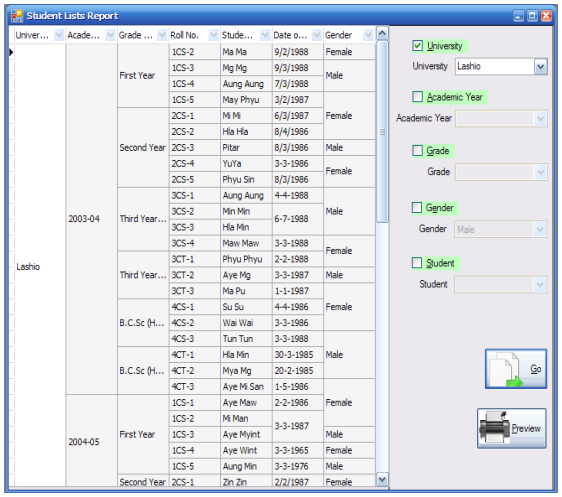

**"Figure 3. Database design"**

## 5. Implementation

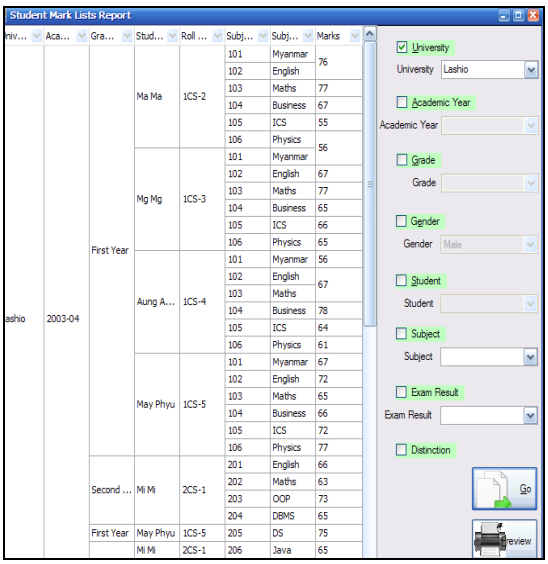
This system is implemented to print report for students' personal profiles and students' mark lists who attended in the Computer University of Myanmar with the data warehouse concept.

### 5.1. Implementation Results

The students' personal information (University Name, Academic Year, Grade Name, Roll No., Student Name, Date of Birth, and Gender) of the computer universities can be seen as shown in figure. Students' information is viewed according to choosing University, AcademicYear, Grade, Gender and Student. If the user chooses nothing, all students' information in warehouse will be shown.




**"Figure 4. Student's personal information form"**



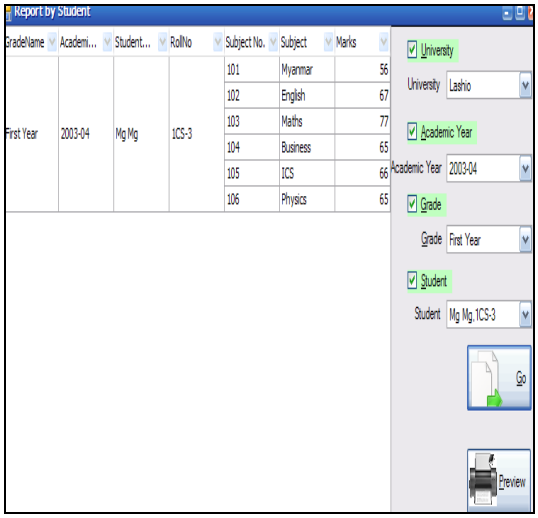

**"Figure 5. Student mark lists form"**

The students' mark lists information (University Name, Academic Year, Grade Name, Student Name, Roll No., Subject No., Subject Name and Marks) of the computer universities can be seen as shown in Figure 6 according to choosing University, Academic Year, Grade, Student, Subject, Exam Result and Distinction. If the user does not choose any check box, all students' mark lists information in the warehouse will be shown.

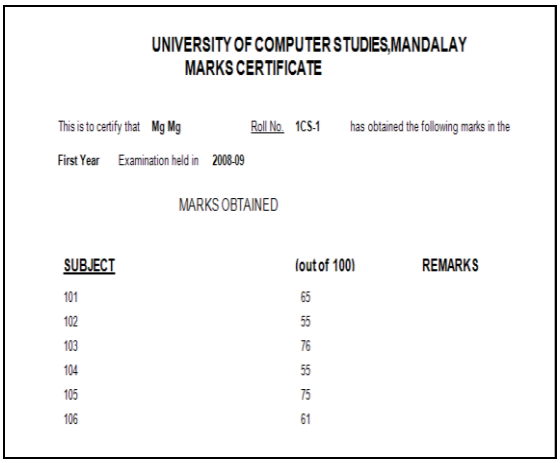
If the user wants to print report view of students' mark lists information, user can see print report form and then he can print the report.

The students' mark lists information (Grade Name, Academic Year, Student Name, Roll No., Subject No., Subject and Marks) of the computer universities can be seen as shown in Figure 7 according to choosing university, academic year, grade and student. In this report, the individual student's mark list of each university can be printed by using print report form.

If the user wants to print report view of student's mark lists information, user can see print report form as shown in Figure 8.




**"Figure 6. Individual student's mark list form"**



UNIVERSITY OF COMPUTER STUDIES,MANDALAY
MARKS CERTIFICATE

This is to certify that **Mg Mg** Roll No. **1CS-1** has obtained the following marks in the **First Year** Examination held in **2008-09**

MARKS OBTAINED

| SUBJECT | (out of 100) | REMARKS |
|---|---|---|
| 101 | 65 | |
| 102 | 55 | |
| 103 | 76 | |
| 104 | 55 | |
| 105 | 75 | |
| 106 | 61 | |

**"Figure 7. Individual student's mark list print report form"**

## 6. Advantages of the system

The historical data of Computer Universities in the whole Myanmar could be easily viewed. In this system, dimension and fact tables are dynamically created and dynamically dropped by using the concept of snowflake schema, which is the database schema of multidimensional data model. This system provides the personal information and mark lists of the students per universities, academic year, grade, gender and exam result (pass or fail).

The report of student information is provided as print form. This summary information is very useful and important for management level of computer universities. By using this system, summarized information can get more precise, concise and timely. Moreover, the user can get the overview of the concept of data warehousing from this system.

## 7. Conclusion

Data can now be stored in many different types of databases. The data warehouse is a repository of multiple heterogeneous data sources, organized under a snowflake schema at a single site in order to facilitate management decision making.

All of the sources are in that DBMS. In this system, the user can retrieve the required students' personal information and mark lists information using the concept of snowflake schema based on the data warehousing theory. This system can support the management decision making process of Computer Universities.

This system is intended to be used by the authorized user of Computer Universities. Unauthorized person cannot use this software as the system is being protected by password.

## 8. References

[1] D.Solodovnikova, "Data Warehouse Evolution Framework," Department of Computer Science, University of Latvia.

[2] K.M.Cho, "Querying Summarized Information using Star Schema", July 2006.

[3] J.Becker, R.Knackstedt, T.Serries, "Architectures for Enterprise Information Portals: An Approach to Integrate Data Warehousing and Content Management", Department of Information Systems, University of Muenster.

[4] J.Han and M.Kamber, Data Mining Concepts and Techniques, Second Edition.