

# The Realization of Math Score Query on the Wireless Internet

Guang Yang

Department of Basic Courses Teaching The Armed Police Academy Langfang City

Hebei Province, China

E-mail: yg\_sun1981@sina.com

**Abstract**—Wireless internet is gaining wide spread usage in teaching affairs, especially in score query system development. This paper explores how simple Math score query system can be developed for mobile devices and introduces general framework for designing such score query applications. Using the framework, based on Microsoft database software SQL Server 2000, T-SQL clause is employed to program one stored procedure for Math score query. The framework utilizes mobile phones simulator software, Nokia WAP Toolkit, which interacts with a server-side ASP (Active Server Pages) in conjunction with the associated SQL Server database. The design and implementation of the management information system are discussed in the paper, and test results are presented.

**Keywords:** Score Query System; T-SQL; WAP Toolkit; ASP; SQL Server; Framework

## I. INTRODUCTION

Management information systems[1] are becoming more and more popular in the information age[1] and the wireless Internet[2] is a new revolution upon us, one that will affect the world on a scale similar to that of the wired Internet. This paper demonstrates the general framework for designing online score query management information system on the wireless internet. In the teaching affairs system [3], test score query is very popular for the students; for the purpose of demonstration of the framework, Math score query application on the wireless network [4] is developed. This framework utilizes Microsoft Active Server Pages (ASP)[5][6] in conjunction with the associated SQL Server[7] database to create a truly dynamic application using WML (Wireless Markup Language)[8] to develop application on the mobile phones.

## II. DATABASE DESIGN AND IMPLEMENTATION

### A. Design the Database

SQL Server 2000[7] is used as the database to provide the solution for Math score query. At first, we design one database: MathTestScore and then we design the related tables in this database to save the students' basic information, their learning semester information and their Math test score information, they are stud\_basic\_info, semester\_info and testscore\_info. The design of these three tables are shown in TABLE1, TABLE2 and TABLE3.

TABLE I. DESIGN OF THE DATA TABLE: STUD\_BASIC\_INFO

ColumnName	Data Type	Remarks
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StudID	Varchar(30)	Student Number
StudName	Varchar(30)	Name of the Student
Gender	bit	1 stands for male and 0 stands for female
Birthdate	Datetime	Birthdate of the Student

TABLE II. DESIGN OF THE DATA TABLE: SEMESTER\_INFO

ColumnName	Data Type	Remarks
SemesterID	int	Identity of the semester, Automatic Increase by 1
SemesterYear	int	Semester Year
Semester	tinyint	First Semester or the Second Semester

TABLE III. DESIGN OF THE DATA TABLE : TESTSCORE\_INFO

ColumnName	Data Type	Remarks
ScoreID	int	Automatic Increase by 1
StudID	int	Reference the StudID column of table Stud_Basic_Info
SemesterID	int	Reference the SemesterID column of table Semester_Info
CourseName	Varchar(50)	Name of the Course, Linear Algebra or tohers
TestType	Varchar(10)	Test Type, Quiz or Final
TestObjective	Varchar(20)	Theory or Application
TestScore	Varchar(10)	A, A+, 95 or other types of score
TestDate	Datetime	Test Date

### B. Program the Stored Procedure for the Query

In respect to the three tables: Stud\_Basic\_Info, Term\_Info and Testscore\_Info, we design one view[7] VW\_TestScore for the convenience of query, and the source codes are shown as follows.

```
Create View VW_TestScore As
SELECT      stud_basic_info.StudID, stud_basic_info.StudName,
stud_basic_info.Gender, stud_basic_info.Birthdate, semester_info.semestery
ear, semester_info.semester AS Semester,
testscore_info.coursename,      testscore_info.testtype,
```

```

testscore_info.testobjective,      testscore_info.testscore,
testscore_info.testdate FROM stud_basic_info
INNER JOIN      testscore_info ON
      stud_basic_info.StudID =testscore_info.studid INNER JOIN
semester_info ON testscore_info.semesterid =semester_info.semesterid

```

In order to simplify the query clause, which is called by ASP web files, we use the processing tool----Query Analyzer[1] on the platform of SQL Server 2000 to program one stored procedure[10][11] SP\_TestscoreQuery with T-SQL[1] and the source codes are shown as follows.

```

CREATE PROC SP_TestscoreQuery
@StudID varchar(30),
@StudName varchar(50)
AS
BEGIN
Select * from VW_ TestScore where studid=@StudID and
studname=@StudName
END

```

**C. Program the Stored Procedure for the Query**

We assume there are 3 students and they have finished 2 term years Math learning, i.e. 4 semesters. The sample data are shown in TABLE 4,5,6.

TABLE4. SAMPLE DATA OF TABL: STUD\_BASIC\_INFO

StudID	StudName	Gender	Birthdate
20095082107	LIU Tao	1	1991-4-30
20084083219	WANG Zhi	1	1989-7-13
20103092238	ZHAO Yong	0	1992-10-25

TABLE5. SAMPLE DATA OF TABLE : TERM\_INFO

SemesterID	SemesterYear	Semester
1	2009	1
2	2009	2
3	2010	1
4	2010	2

TABLE6. SAMPLE DATA OF TABLE : TESTSCORE\_INFO

Score ID	StudID	Semeste rID	CourseN ame	TestT ype	TestObje ctive	TestSc ore	Test Date
1	20095082107	2	Linear Algebra	Quiz	Matrix	B+	2010-4-21
2	20084083219	1	Probability	Final	Statistics	79	2010-1-9
3	20084083219	2	Linear Algebra	Quiz	Matrix	A	2010-2-29
4	20095082107	4	Calculus	Quiz	Definitive Calculus	88	2011-2-28

The above sample data are inserted into the database and test the stored procedure on Query Analyzer[1]. The testing result is shown in Figure 1.

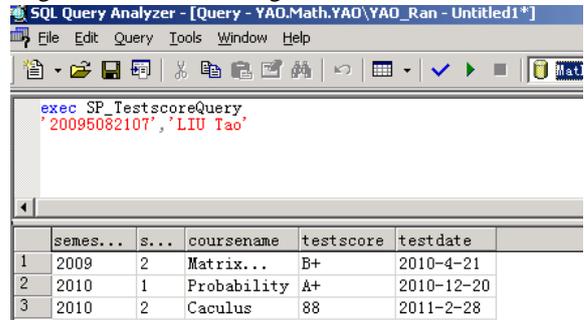


Figure 1. Test of the stored procedure

**III SOFTWARE ARCHITECTURE FOR SCORE QUERY APPLICATION**

Dynamic applications[9] are applications that build content “on the fly” in response to request made. They can reflect the latest traffic information from the database. Microsoft Active Server Pages (ASP)[6] in conjunction with the associated SQL Server[7] database to create a truly dynamic Math test score query application. The conceptual software architecture is shown in Figure 2 and the architecture contains the following components:

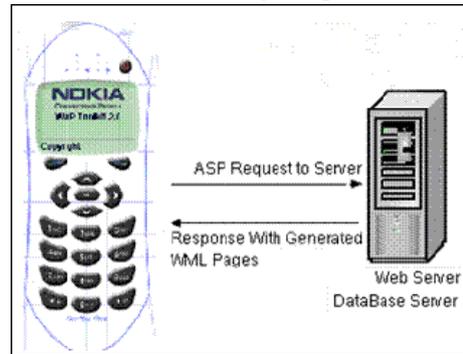


Figure 2. Architecture of the dynamic application

**A.WEB Server**

IIS (Internet Information Service)[12] is configured to create one virtual directory(Figure 3) containing one file: query.asp, which connects the database server, gets the query results from the database server and responds with generated WML pages.

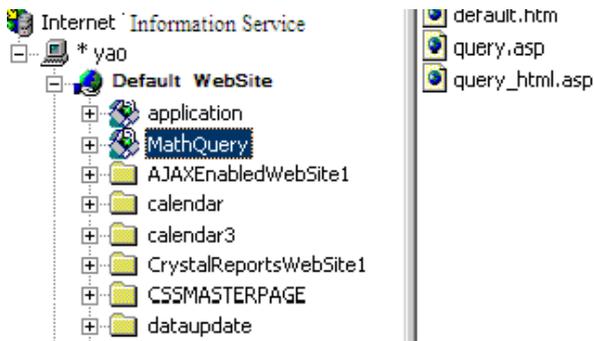


Figure 3. Configuration of IIS to create virtual directory

**B. DataBase Server(Shown in Part II)**  
**C. Application Design**

The client software was developed using Nokia Wap Toolkit[2] 2.0. This kit enables developers to create applications on the mobile phone based on the WAP (Wireless Application Protocol)[2]. Wireless Markup Language (WML) is used to implement the Wireless Application Protocol (WAP) specification and creates pages that can be displayed in a WAP browser. WMLScript [8], a client-side scripting language, is used for developing tasks such as user input validation, generation of error message and other Dialog boxes etc. on the mobile phone. The Toolkit contains tools for editing both WML and WMLScript, and it can display the resulting code on a mobile service simulator[13] (Figure 4). Figure 5 and Figure 6 illustrate the desired outcome of the score query application.

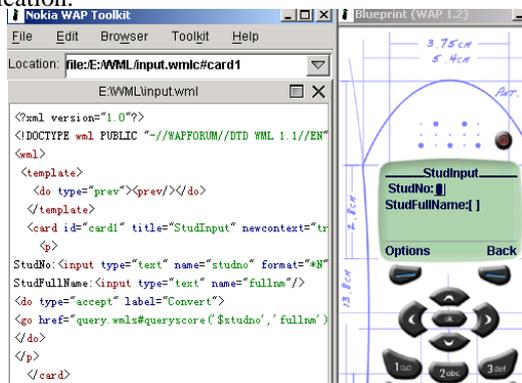


Figure 4. Nokia wap toolkit for editing wml or wmlscript and displaying the resulting code on a mobile service simulator

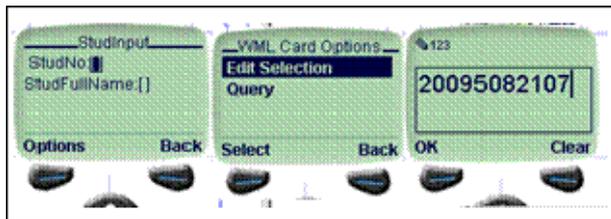


Figure 5. Keying the student number and fullname to query

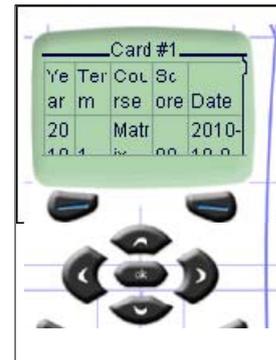


Figure 6. Viewing the Result of the Math Test Score Query

The application consists of the following source files:

- 1) *input.wml*: this file is stored on the client mobile phone and is responsible for displaying the user interface and calls the query function defined in *query.wmls* script to display the Math score query result.
- 2) *query.wmls*: this file is stored on the client mobile phone and is invoked by *input.wml* when the client wants to query the Math score of one student. It sends ASP[6][9] request to the *query.asp* file stored in Web server.
- 3) *query.asp*: this file is stored in the Web server[12] and is automatically invoked when *query.wmls* script is executed in the client mobile phone. It connects to the database which is stored in Database server, gets the query results from the database server and responds with generated WML pages[8].

**IV. TESTING OF THE PROGRAMS**

In order to test programs, Nokia Wap Toolkit[2] is installed to the Web Server whose system software is Window 2000 Server[12]. If we want to query the Math score of this student, whose full name and student number are 20095082107 and LIU Tao. Figure 7, Figure 8, Figure 9 and Figure 10 show the resulting screens on the WAP Toolkit.

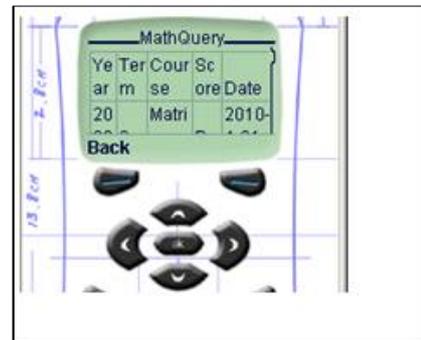


Figure 7. Results for math score query of liu tao

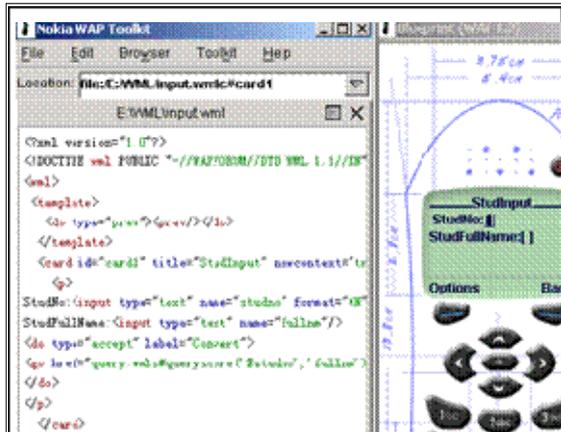


Figure 8. Results for math score query of liu tao

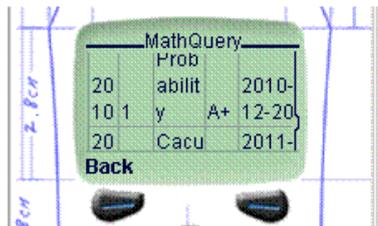


Figure 9. Results for math score query of liu tao

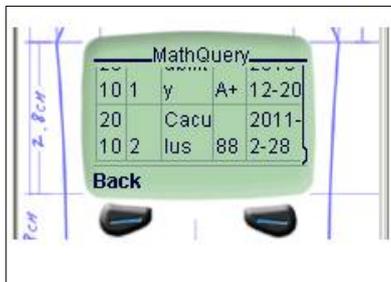


Figure 10. Results for math score query of liu tao (continued)

V. CONCLUSION

With the help of the T-SQL clause, the stored procedure of Math test score query is created and tested successfully on the platform of the SQL Server 2000 database; With the application of WAP Toolkit, the WML and WMLScript web files are designed to send the users' request to the Web server, the corresponding dynamic ASP programs[14] are developed to process the request and acquire the score query result from the database server and finally the Math test score query result is shown on the mobile phones with the dynamically generated wml files and the testing result is satisfactory.

This conceptual design framework can easily be used for any learning and teaching score query applications, such as English score query, entrance exam query and employee appraisal query applications. As more and more test score query applications are conducted using mobile phones, this design framework is flexible enough to be used on the wireless internet.

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Appendix. Source codes for Math Test Score Query

File: input.wml

```
<wml> <template> <do type="prev"><prev/></do>
</template> <card id="card1" title="StdInput" newcontext="true">
<p> StudNo:<input type="text" name="studno" format="*N" />
StudFullName:<input type="text" name="fullnm"/>
<do type="accept" label="Convert">
<go href="query.wmls#queryscore('$studno','fullnm')"/>
</do></p> </card> </wml>
```

File: query.wmls

```
extern function queryscore(studno,fullnm)
{var
str="http://localhost/MathQuery/query.asp?studno="+studno+"&fullnm="+fullnm;
WMLBrowser.go(str);}
```

**File: query.asp**

```

<%response.ContentType="text/vnd.wap.wml"%>
<?xml version="1.0"?> <wml> <template> <do type="accept"
label="Back"> <go href="input.wml#card1"></go> </do>
</template> <card id="card1" title="MathQuery"
newcontext="true"> <p> <%Set
Conn=Server.CreateObject("Adodb.Connection")
Conn.Open
set rs2=createobject("ADODB.RecordSet")
str="exec SP_TestscoreQuery
"&request("studno")&""&request("fullnm")&""
rs2.open str, Conn %>
<table align="left" columns="5" title="MathScore">
<tr><td>Year</td><td>Term</td><td>Course</td><td>Score</td><td>Date</td></tr> <% do while not rs2.eof%>
<tr><td><%=rs2("semesteryear")%></td><td><%=rs2("semester")%></td>
<td><%=rs2("coursename")%></td><td><%=rs2("testscore")%></td>
<td><%=rs2("testdate")%></td></tr><% rs2.movenext
Loop rs2=nothing%> </table></p> </card> </wml>

```