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Compile & Run:
Use "make" command to compile and run the program(the driver is in the zip file).

Description:
User interact with program using terminal. During input data, the program will ask what the user to input. If user input 'exit', the terminal will terminate.

<SOURCE CODE>

```
import java.sql.*;
import java.util.*;
import java.lang.String;
import java.lang.Integer;

class Main{
   static final String JDBC_DRIVER = "com.ibm.db2.jcc.DB2Driver";
   static final String DB_URL = "jdbc:db2://linux.student.cs.uwaterloo.ca:50002/cs348";

   static final String USR = "db2guest";
   static final String PSW = "upKellynoisylair";

   //Main function
   public static void main(String[] args) {
      Connection conn = null;
      PreparedStatement stmt = null;
      ResultSet rs = null;
      //try
      try {
         //STEP 2: Register the JDBC driver
         Class.forName(JDBC_DRIVER);

         //STEP 3: Open a connection
         System.out.println("Connecting to database");
         conn = DriverManager.getConnection(DB_URL, USR, PSW);
         Statement s = conn.createStatement();
         s.executeUpdate("SET SCHEMA enrollment");
         s.close();
         System.out.println("Connected");
         Scanner sc = new Scanner(System.in);

         //While loop
         while(true) {
            ////////////////////////////////////////////////
            //Get the usr input
            System.out.println("Please enter the DEPARTMENT NAME: ");
            String Dept = sc.next();
            if (Dept.equals("exit")) break;
            System.out.println("The DEPARTMENT NAME -> " + Dept);

            System.out.println("Please enter the BEGINNING YEAR: ");
            String begin = sc.next();
            if (begin.equals("exit")) break;
            //System.out.println("The BEGINNING YEAR -> " + begin.substring(2,4));
            String yr_begin = "F" + begin.substring(2,4);

            System.out.println("Please enter the ENDDING YEAR: ");
            String end = sc.next();
            if (end.equals("exit")) break;
            String yr_end = "S" + end.substring(2,4);

            ////////////////////////////////////////////////

            //STEP 4: Excecute a query
            String sql;
```

```
            sql = "SELECT t.cno, t.term, t.mark1, t.mark2, t.mark3, t.num_s,c.cname, en2.num_e " +
                  "FROM (SELECT  t3.cno, t3.term, MAX(t3.avg_mark1) AS mark1, MIN(t3.avg_mark1) AS mark2,
COUNT(t3.num_s) AS num_s, " +
                  "               AVG(t3.avg_mark2) AS mark3 " +
                  "      FROM    (SELECT  t1.cno, t1.term, t1.section, t1.avg_mark1, t2.avg_mark2, num_s
" +
                  "                FROM    (SELECT  temp.cno, temp.term, temp.section,  avg_mark1 " +
                  "                         FROM    (SELECT        cno, term, section, AVG(mark) AS
avg_mark1 " +
                   "                                  FROM          enrollment " +
                   "                                  WHERE         ? < term AND term < ? " + // 1 2
                   "                                  GROUP BY      cno, term, section) temp, " +
                   "                                  class c, professor p " +
                   "                         WHERE   temp.cno = c.cno AND temp.term = c.term AND
temp.section = c.section " +
                   "                                 AND c.instructor = p.eid AND p.dept = ? " +  // 3
                   "                         ORDER BY temp.term) t1, " +

                                            // Calculate the average mark for every class
                   "                        (SELECT     cno, term, AVG(mark) AS avg_mark2 " +
                   "                         FROM       enrollment " +
                   "                         WHERE ? < term AND term < ? " +    //4 5
                   "                         GROUP BY      cno, term) t2, " +

                                            // Count how many sections for a course, Since in ISQL "GROUP
BY"
                                            // is different from MYSQL
                   "                        (SELECT tt.cno, tt.term, COUNT(*) AS num_s " +
                   "                         FROM     (SELECT    cno, term, section, AVG(mark) AS avg_mark1
" +
                   "                                   FROM         enrollment " +
                   "                                   WHERE ? < term AND term < ? " + // 6 7
                   "                                   GROUP BY     cno, term, section) tt " +
                   "                         GROUP BY tt.term, tt.cno) tt1 " +

                   "       WHERE  t1.cno = t2.cno AND t1.term = t2.term AND tt1.term = t1.term AND
tt1.cno = t1.cno) t3 " +
                   "       GROUP BY t3.cno, t3.term )t, " +

                        // Count how many students enroll in a certain class
                   "    (SELECT     COUNT(sno) AS num_e, cno, term " +
                   "     FROM       enrollment " +
                   "     GROUP BY   cno, term) en2, " +
                   "    course c " +
                   "WHERE  c.cno = t.cno AND t.cno = en2.cno AND t.term = en2.term " +
                   "ORDER BY t.term ";
            // inserting the input data
            stmt = conn.prepareStatement(sql);
            stmt.setString(1, yr_begin);
            stmt.setString(2, yr_end);
            stmt.setString(3, Dept);
            stmt.setString(4, yr_begin);
            stmt.setString(5, yr_end);
            stmt.setString(6, yr_begin);
            stmt.setString(7, yr_end);

            //execute the query
            rs = stmt.executeQuery();

            System.out.println("Year " + begin);

            System.out.printf("%-6s %-18s %-12s %-12s %-12s %-12s %s\n","C#","NAME","Enrollment",
"#Section",
                                                                        "CourseAve", "MaxClassAve",
"MinClassAve");
            //Printing the result of the query
            while(rs.next()) {
```

```
               String cno = rs.getString("cno");
               String cname = rs.getString("cname");
               String term = rs.getString("term");
               String avg_mark1 = rs.getString("mark1");
               String avg_mark2 = rs.getString("mark2");
               String avg_mark3 = rs.getString("mark3");
               String num_e = rs.getString("num_e");
               String num_s = rs.getString("num_s");
               System.out.printf("%-6s %.17s    %-12s %-12s %-12s %-12s %s\n",cno,cname,num_e, num_s,
                                                                    avg_mark3,avg_mark1 ,avg_mark2);
            }

            System.out.println( "Year " + end );
         }  // end while
            rs.close();
            stmt.close();
      }catch(SQLException se) {
         se.printStackTrace();
      }catch(Exception e) {
         e.printStackTrace();
      }// end try
   }//end main function

} //end with Main class



<OUTPUT>
Connecting to database
Connected
Please enter the DEPARTMENT NAME:
The DEPARTMENT NAME -> CS
Please enter the BEGINNING YEAR:
Please enter the ENDDING YEAR:
Year 1989
C#     NAME               Enrollment   #Section     CourseAve    MaxClassAve  MinClassAve
CS134  Principles of Com    68           1            62           62           62
CS240  Data Structures a    102          2            62           66           61
CS246  Software Abstract    102          1            70           70           70
CS240  Data Structures a    66           1            65           65           65
CS241  Foundation of Seq    13           1            74           74           74
CS246  Software Abstract    66           1            72           72           72
CS134  Principles of Com    25           1            63           63           63
CS240  Data Structures a    21           1            75           75           75
CS246  Software Abstract    21           1            42           42           42
CS348  Introduction to D    48           2            75           76           74
CS354  Operating Systems    26           1            76           76           76
CS241  Foundation of Seq    44           1            63           63           63
CS342  Concurrent Progra    71           1            61           61           61
CS240  Data Structures a    46           1            62           62           62
CS241  Foundation of Seq    102          2            71           73           64
CS246  Software Abstract    46           1            60           60           60
CS134  Principles of Com    13           1            55           55           55
CS240  Data Structures a    68           1            53           53           53
CS241  Foundation of Seq    66           1            79           79           79
CS246  Software Abstract    68           1            63           63           63
Year 1992
Please enter the DEPARTMENT NAME:
The DEPARTMENT NAME -> CS
Please enter the BEGINNING YEAR:
Please enter the ENDDING YEAR:
Year 1990
C#     NAME               Enrollment   #Section     CourseAve    MaxClassAve  MinClassAve
CS240  Data Structures a    66           1            65           65           65
CS241  Foundation of Seq    13           1            74           74           74
CS246  Software Abstract    66           1            72           72           72
CS134  Principles of Com    25           1            63           63           63
```

```
CS240  Data Structures a    21          1           75          75          75
CS246  Software Abstract    21          1           42          42          42
CS348  Introduction to D    48          2           75          76          74
CS354  Operating Systems    26          1           76          76          76
CS241  Foundation of Seq    44          1           63          63          63
CS342  Concurrent Progra    71          1           61          61          61
CS240  Data Structures a    46          1           62          62          62
CS241  Foundation of Seq    102         2           71          73          64
CS246  Software Abstract    46          1           60          60          60
CS134  Principles of Com    13          1           55          55          55
CS240  Data Structures a    68          1           53          53          53
CS241  Foundation of Seq    66          1           79          79          79
CS246  Software Abstract    68          1           63          63          63
Year 1993
Please enter the DEPARTMENT NAME:
The DEPARTMENT NAME -> CS
Please enter the BEGINNING YEAR:
Please enter the ENDDING YEAR:
Year 1991
C#     NAME               Enrollment   #Section     CourseAve    MaxClassAve  MinClassAve
CS134  Principles of Com    25          1           63          63          63
CS240  Data Structures a    21          1           75          75          75
CS246  Software Abstract    21          1           42          42          42
CS348  Introduction to D    48          2           75          76          74
CS354  Operating Systems    26          1           76          76          76
CS241  Foundation of Seq    44          1           63          63          63
CS342  Concurrent Progra    71          1           61          61          61
CS240  Data Structures a    46          1           62          62          62
CS241  Foundation of Seq    102         2           71          73          64
CS246  Software Abstract    46          1           60          60          60
CS134  Principles of Com    13          1           55          55          55
CS240  Data Structures a    68          1           53          53          53
CS241  Foundation of Seq    66          1           79          79          79
CS246  Software Abstract    68          1           63          63          63
CS241  Foundation of Seq    21          1           72          72          72
CS342  Concurrent Progra    26          1           63          63          63
Year 1995
Please enter the DEPARTMENT NAME:
```