CS5812 12/5/2019

Homework 7
Method-Level Structural Unit Testing I
Due Monday, December 16, 2019

1. Problem:

Use the method-level structural unit testing techniques to develop a Java test class DateTest for the Java class Date on Eclipse Java development environment. You only need to develop test cases using the constraint logic graph converted from the control flow graph for the method absoluteNumberOfDays( ). Each constraint node in the constraint logic graph contains only a condition. The class diagram of the class Date is given as follows:

Date

year: Integer
month: Integer
day: Integer

Date(y: Integer, m: Integer, d:Integer)
getYear(): Integer
getMonth(): Integer
getDay(): Integer
absoluteNumberOfDays( ): Integer
equal(date: Date): Boolean
toString( ): String

The method toString returns the representation of a Date object as a string in the format of year/month/day. For example, a Date object with year 2012, month 11, and day 28, is represented as “2012/11/28”. The implementation for the class is given as follows:

```
/*
  * class: Date
  */
public class Date {
        private int year;
        private int month;
        private int day;
/*
  * The constructor.
  */
```

```
    public void Date(int y, int m, int d) {
        if (y < 1 || m < 1 || m > 12 || d < 1) throw IllegalDateException;
        if (m == 2) {
            if ((((y % 4) == 0) && ((y % 100) != 0)) || ((y % 400) == 0)) {
                if (d > 29) throw IllegalDateException;
            } else {
                if (d > 28) throw IllegalDateException;
            }
        } else if (m == 4 || m == 6 || m == 9 || m == 11) {
            if (d > 30) throw IllegalDateException;
        } else {
            if (d > 31) throw IllegalDateException;
        }
        year = y;
        month = m;
        day = d;
    }

    public int getYear() { return year; }

    public int getMonth() { return month; }

    public int getDay() { return day; }

/*
 * The absoluteNumberOfDays method calculates the number of days
 * from January 1, 1 A. D. to the current date.
 */
    public int absoluteNumberOfDays() {
         int thisYear, priorYears;

         thisYear = (month – 1) * 31 + day;
         if (month > 2) {
           thisYear = thisYear – ((4 * month) + 23) / 10);
           if ((((year % 4) == 0) && ((year % 100) != 0)) || ((year % 400) == 0))
             thisYear = thisYear + 1;
         }
         priorYears =
            365 * (year – 1) + (year – 1)/4 – (year – 1)/100 + (year – 1)/400;
        return thisYear + priorYears
    }

    public boolean equal(Date date) {
        return year == date.getYear() && month == date.getMonth() &&
            day == date.getDay();
    }

    public String toString() {
        return year.toString + "/" + month.toString() + "/" + day.toString();
    }
}
```

2. **Handing in your assignment:**

   You should upload two files to the eCourse2 website: a pdf file hw7.pdf that describes how you obtain the set of test cases and the compressed file hw7.zip that contains the package for both the source class and the test class.