



Software Quality

Assignment 3

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GitHub link: <https://github.com/verinaB/QA---Assignment3>

Characteristics, domains, blocks, values:

Characteristics: different inputs that go into the function and how it can affect its output.

- Day – representing the day of the date.
- Months – representing the month of the date.
- year - representing the year of the date.

Domains: represent the range for each characteristic. It defines all the possible inputs.

- Day: integer number between 1 – 31.
- Months: integer number between 1 – 12.
- Year: integer number between 1812 – 2212.

Blocks: partitions or categories within each characteristic. Help organize inputs into groups.

- Valid value: valid input value that would give you a valid output value.
- Invalid value: values outside the min and max boundaries is considered as an invalid input, that would give you an error/invalid output.
- Leap year value: having a different output at the end of month February, the date values that are given must be during a leap year.

Values: input values that are going to be used in the test cases table for this function.

Test cases:

Valid inputs values (No leap years):

Test Cases	Day	Months	year	Expected output	explanation
1	16	5	2000	17/5/2000	Valid date, in the middle of the month
2	1	1	2012	2/1/2012	Valid date, at the beginning of the year.
3	31	12	2002	1/1/2003	Last day of the year, next year is within domain.
4	30	3	2024	1/4/2024	End of the month.
5	28	2	2020	1/3/3030	Valid output in a non-leap year.
6	30	4	24	1/5/2024	End of months
7	31	8	2022	1/9/2022	End of months
8	31	10	2023	1/11/2023	End of months

Invalid dates inputs:

9	15	14	2002	Error	Month input out of range.
10	1	2	2213	Error	Year input out of range.
11	29	2	2006	Error	Day input out of range.
12	3	3	1810	Error	Year out of range
13	32	3	2023	Error	Day out of range.

Leap year inputs:

14	28	2	2024	29/2/2024	Valid output for leap years.
15	29	2	2020	1/3/2020	Valid input for a leap year.

NextDate function:

```
public class App {
    // Function to calculate the next date from the given date
    public static String getNextDate(int currentDay, int currentMonth, int
currentYear) {
        // Validate input date
        if (!isValidDate(currentDay, currentMonth, currentYear)) {
            return "ERROR: Date is not valid.";
        }

        // Handle the special case for the end of time boundary
        if (currentDay == 31 && currentMonth == 12 && currentYear == 2212) {
            return "1/1/2213";
        }

        // Calculate next day
        int nextDay = currentDay;
        int nextMonth = currentMonth;
        int nextYear = currentYear;

        nextDay++; // Move to the next day

        // Check if the new day is beyond the current month's days
        int daysInMonth = getDaysInMonth(nextMonth, nextYear);

        if (nextDay > daysInMonth) {
            nextDay = 1; // Reset to the first day
            nextMonth++; // Move to the next month

            if (nextMonth > 12) { // Check if the new month is beyond a year
                nextMonth = 1; // Reset to January
                nextYear++; // Move to the next year
            }
        }

        // Build the next date string
        return nextDay + "/" + nextMonth + "/" + nextYear;
    }

    // Helper function to get the number of days in a month
    private static int getDaysInMonth(int month, int year) {
        switch (month) {
            case 4:
            case 6:
            case 9:
            case 11:
                return 30;
            case 2:
                return isLeapYear(year) ? 29 : 28;
            default:
                return 31;
        }
    }
}
```

```

        return 31;
    }
}

// Helper function to check for leap year
private static boolean isLeapYear(int year) {
    return (year % 4 == 0 && (year % 100 != 0 || year % 400 == 0));
}

// Helper function to validate the input date
private static boolean isValidDate(int day, int month, int year) {
    return year >= 1812 && year <= 2212 && month >= 1 && month <= 12 &&
    day >= 1 && day <= getDaysInMonth(month, year);
}
}

```

Test cases:

```

import org.junit.Test;
import static org.junit.Assert.assertEquals;

public class AppTest {

    @Test
    public void testValidDates() {
        assertEquals("17/5/2000", App.getNextDate(16, 5, 2000));
        assertEquals("2/1/2012", App.getNextDate(1, 1, 2012));
        assertEquals("1/1/2003", App.getNextDate(31, 12, 2002));
        assertEquals("1/4/2024", App.getNextDate(31, 3, 2024));
        assertEquals("1/3/2021", App.getNextDate(28, 2, 2021));
        assertEquals("1/5/2024", App.getNextDate(30, 4, 2024));
        assertEquals("1/9/2022", App.getNextDate(31, 8, 2022));
        assertEquals("1/11/2023", App.getNextDate(31, 10, 2023));
    }

    @Test
    public void testInvalidDates() {
        assertEquals("ERROR: Date is not valid.", App.getNextDate(15, 14,
2002));
        assertEquals("ERROR: Date is not valid.", App.getNextDate(1, 2,
2213));
        assertEquals("ERROR: Date is not valid.", App.getNextDate(29, 2,
2006));
        assertEquals("ERROR: Date is not valid.", App.getNextDate(3, 3,
1810));
        assertEquals("ERROR: Date is not valid.", App.getNextDate(32, 3,
2023));
    }

    @Test
    public void testLeapYearDates() {
        assertEquals("29/2/2024", App.getNextDate(28, 2, 2024));
        assertEquals("1/3/2020", App.getNextDate(29, 2, 2020));
    }
}

```

```
C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3>
C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3>mvn test
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.ontariotechu.sofe3980U:Assignment3 >-----
[INFO] Building Assignment3 1.0.0
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- resources:3.0.2:resources (default-resources) @ Assignment3 ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3\src\main\resources
[INFO]
[INFO] --- compiler:3.8.0:compile (default-compile) @ Assignment3 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3\target\classes
[INFO]
[INFO] --- resources:3.0.2:testResources (default-testResources) @ Assignment3 ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3\src\test\resources
[INFO]
[INFO] --- compiler:3.8.0:testCompile (default-testCompile) @ Assignment3 ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3\target\test-classes
[INFO]
[INFO] --- surefire:2.22.1:test (default-test) @ Assignment3 ---
[INFO]
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running AppTest
[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.086 s - in AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 5.179 s
[INFO] Finished at: 2024-02-28T23:41:31-05:00
[INFO] -----
C:\Users\verin\OneDrive\Desktop\Software Quality\Assignment3final\Assignment3>
```