

# Functional Testing

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## 1 Input Domain

The input domain of the unit `nextDate` consists of dates formatted as follows:  $MM/DD/YYYY$ . For months,  $MM$ , the input condition specifies the range  $[1, 12]$ . If  $MM = 2$  and the year is not a leap year, then the input condition range for dates,  $DD$  is  $[1, 28]$  (a year is a leap year if divisible by 4 and not divisible by 100 (unless divisible by 400)). If  $MM = 2$  and the year is a leap year, then the input condition range for  $DD$  is  $[1, 29]$ . If  $MM = 4, 6, 9$ , or  $11$ , then the input condition range for  $DD$  is  $[1, 30]$ . If  $MM = 1, 3, 5, 7, 8, 10$ , or  $12$ , then the input condition range for  $DD$  is  $[1, 31]$ .

## 2 Equivalence Classes

In order to identify equivalence classes (ECs), the following strategy was used: input conditions typically specified a range  $[a, b]$ , thus one EC valid input was identified for  $a \leq X \leq b$ , and two others with invalid input were identified for  $X < a$  and  $b < X$ .

### 2.1 Months

- EC-01:  $01 \leq MM \leq 12$
- EC-02:  $MM < 01$
- EC-03:  $12 < MM$

### 2.2 Dates

#### 2.2.1 $MM = 2$ , $YY$ is not a leap year

- EC-04:  $01 \leq DD \leq 28$
- EC-05:  $DD < 01$
- EC-06:  $28 < DD$

### **2.2.2 MM = 2, YY is a leap year**

- EC-07:  $01 \leq DD \leq 29$
- EC-08:  $DD < 01$
- EC-09:  $29 < DD$

### **2.2.3 MM = 4, 6, 9, or 11**

- EC-10:  $01 \leq DD \leq 30$
- EC-11:  $DD < 01$
- EC-12:  $30 < DD$

### **2.2.4 MM = 1, 3, 5, 7, 8, 10, or 12**

- EC-13:  $01 \leq DD \leq 31$
- EC-14:  $DD < 01$
- EC-15:  $31 < DD$

## **2.3 Years**

- EC-16:  $1900 \leq YYYY \leq 2099$
- EC-17:  $YYYY < 1900$
- EC-18:  $2099 < YYYY$

### 3 Test Cases

#### 3.1 Test Cases from Equivalence Classes

In order to identify test cases (TCs) from ECs, the following strategy is used: For each EC with valid input that has not been covered by a TC, write a TC covering as many uncovered ECs as possible. Then, for each EC with invalid input that has been covered, write a new TC that covers only that EC.

##### 3.1.1 Test Cases for ECs with Valid Input

Valid Input ECs: EC-01, EC-04, EC-07, EC-10, EC-13, EC-16

TC #	TC	EC-01	EC-04	EC-07	EC-10	EC-13	EC-16
01	02/01/1999	✓	✓				✓
02	02/01/2000	✓		✓			✓
03	04/01/2000	✓			✓		✓
04	01/01/2000	✓				✓	✓

##### 3.1.2 Test Cases for ECs with Invalid Input

Invalid Input ECs: EC-02, EC-03, EC-05, EC-06, EC-08, EC-09, EC-11, EC-12, EC-14  
EC-15, EC-17, EC-18

TC #	TC	EC-02	EC-03	EC-05	EC-06	EC-08	EC-09
05	00/01/2000	✓					
06	13/01/2000		✓				
07	02/00/1999			✓			
08	02/29/1999				✓		
09	02/00/2000					✓	
10	02/30/2000						✓

TC #	TC	EC-11	EC-12	EC-14	EC-15	EC-17	EC-18
11	04/00/2000	✓					
12	04/31/2000		✓				
13	01/00/2000			✓			
14	01/32/2000				✓		
15	01/01/1899					✓	
16	01/01/2100						✓

### **3.2 Test Cases for Boundary Value Analysis**

### **3.3 Test Cases for Random Testing**