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	Test Value	Expected Result	EC-01	EC-04	EC-07	EC-10	EC-13	EC-16
01	02/01/1999	02/02/1999	✓	✓				✓
02	02/01/2000	02/02/2000	✓		✓			✓
03	04/01/2000	04/02/2000	✓			✓		✓
04	01/01/2000	01/02/2000	✓				✓	✓

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	Test Value	Expected Result	EC-02	EC-03	EC-05
05	00/01/2000	ERROR: The month needs to be between 1 to 12	✓		
06	13/01/2000	ERROR: The month needs to be between 1 to 12		✓	
07	02/00/1999	ERROR: The day needs to be between 1 to 28			✓

TC	Test Value	Expected Result	EC-06	EC-08	EC-09
08	02/29/1999	ERROR: This year isn't a leap year	✓		
09	02/00/2000	ERROR: The day needs to be between 1 to 29		✓	
10	02/30/2000	ERROR: The day needs to be between 1 to 29			✓

TC	Test Value	Expected Result	EC-11	EC-12	EC-14
11	04/00/2000	ERROR: The day needs to be between 1 to 30	✓		
12	04/31/2000	ERROR: This month only has 30 days		✓	
13	01/00/2000	ERROR: The day needs to be between 1 to 30			✓

TC	Test Value	Expected Result	EC-15	EC-17	EC-18
14	01/32/2000	ERROR: The day needs to be between 1 to 31	✓		
15	01/01/1899	ERROR: The year needs to be between 1900 to 2099		✓	
16	01/01/2100	ERROR: The year needs to be between 1900 to 2099			✓

3.2 Test Cases for Boundary Value Analysis

3.3 Test Cases for Random Testing