Design, develop, code and run the program in any suitable language to implement the Next Date function. Analyse it from the perspective of equivalence class value testing, derive different test cases, execute these test cases and discuss the test results.

Code snippets:

if(day<1 || day>31)

{

printf("value of day, not in the range 1...31\n");

flag='n';

}

if(month<1 || month>12)

{

printf("value of month, not in the range 1....12\n");

flag='n';

}

else if(check(day,month))

{

printf("value of day, not in the range day<=30");

flag='n';

}

………….

………..

if(year<=1812 || year>=2012)

{

printf("value of year, not in the range 1812.......2012\n");

flag='n';

}

if(month==2)

{

if(isleap(year) && day>29)

{

printf("invalid date input for leap year");

flag='n';

}

else if(!(isleap(year))&& day>28)

{

printf("invalid date input for not a leap year");

flag='n';

}

}

………..

……….

switch (month)

{

case 1:

case 3:

case 5:

case 7:

case 8:

case 10:if(day<31)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=month+1;

}

break;

case 4:

case 6:

case 9:

case 11: if(day<30)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=month+1;

}

break;

case 12: if(day<31)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=1;

if(year==2013)

{

printf("the next day is out of boundary value of year\n");

tomm\_year=year+1;

}

else

tomm\_year=year+1;

}

break;

case 2:

if(day<28)

tomm\_day=day+1;

else if(isleap(year)&& day==28)

tomm\_day=day+1;

else if(day==28 || day==29)

{

tomm\_day=1;

tomm\_month=3;

}

break;

}

// print the next date values as day, month, year format

**Code:**

#include<stdio.h>

int check(int day,int month)

{

if((month==4||month==6||month==9 ||month==11) && day==31)

return 1;

else

return 0;

}

int isleap(int year)

{

if((year%4==0 && year%100!=0) || year%400==0)

return 1;

else

return 0;

}

int main()

{

int day,month,year,tomm\_day,tomm\_month,tomm\_year;

char flag;

do

{

flag='y';

printf("\nenter the today's date in the form of dd mm yyyy\n");

scanf("%d%d%d",&day,&month,&year);

tomm\_month=month;

tomm\_year= year;

if(day<1 || day>31)

{

printf("value of day, not in the range 1...31\n");

flag='n';

}

if(month<1 || month>12)

{

printf("value of month, not in the range 1....12\n");

flag='n';

}

else if(check(day,month))

{

printf("value of day, not in the range day<=30");

flag='n';

}

if(year<=1812 || year>2012)

{

printf("value of year, not in the range 1812.......2012\n");

flag='n';

}

if(month==2)

{

if(isleap(year) && day>29)

{

printf("invalid date input for leap year");

flag='n';

}

else if(!(isleap(year))&& day>28)

{

printf("invalid date input for not a leap year");

flag='n';

}

}

}while(flag=='n');

switch (month)

{

case 1:

case 3:

case 5:

case 7:

case 8:

case 10:if(day<31)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=month+1;

}

break;

case 4:

case 6:

case 9:

case 11: if(day<30)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=month+1;

}

break;

case 12: if(day<31)

tomm\_day=day+1;

else

{

tomm\_day=1;

tomm\_month=1;

if(year==2013)

{

printf("the next day is out of boundary value of year\n");

tomm\_year=year+1;

}

else

tomm\_year=year+1;

}

break;

case 2:

if(day<28)

tomm\_day=day+1;

else if(isleap(year)&& day==28)

tomm\_day=day+1;

else if(day==28 || day==29)

{

tomm\_day=1;

tomm\_month=3;

}

break;

}

printf("next day is : %d %d %d",tomm\_day,tomm\_month,tomm\_year);

return 0;

}

**Valid equivalence classes are:**

M1 = {month: 1 ≤ month ≤ 12}

D1 = {day: 1 ≤ day ≤ 31}

Y1 = {year: 1812 ≤ year ≤ 2012}

**Invalid equivalence classes are:**

M2 = {month: month < 1}

M3 = {month: month > 12}

D2 = {day: day < 1}

D3 = {day: day > 31}

Y2 = {year: year < 1812}

Y3 = {year: year > 2012}

**Next date Output Equivalence Class Testing**

**Weak and Strong Normal Equivalence Class test case**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Input data | | | Expected output | | | Actual output | | |  |
| Case id | Description | Month | Day | Year | Month | Day | Year | Month | Day | Year | Comment |
| 1 | Enter the M1, D1 and Y1 valid  cases | 6 | 15 | 1912 | 6 | 16 | 1912 | 6 | 16 | 1912 | Pass |

**Weak Robust test cases**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Input data | | | Expected output | | | Actual output | | |  |
| Case id | Description | Month | Day | Year | Month | Day | Year | Month | Day | Year | Comment |
| 1 | Enter the M1, D1 and Y1 cases | 6 | 15 | 1912 | 6 | 16 | 1912 | 6 | 16 | 1912 | Pass |
| 2 | Enter the M2 , D1 and Y1 cases | -1 | 15 | 1912 | Value of month not in the range 1 ... 12 | | |  |  |  | Pass.  Actual output same as expected |
| 3 | Enter the M3 ,D1 and Y1 cases | 13 | 15 | 1912 | Value of month not in the range 1 ... 12 | | |  |  |  | Pass.  Actual output same as expected |
| 4 | Enter the M1, D2 and Y1 cases | 6 | -1 | 1912 | Value of day not in the range 1 ... 31 | | |  |  |  | Pass.  Actual output same as expected |
| 5 | Enter the M1, D3 and Y1 cases | 6 | 32 | 1912 | Value of day not in the range 1 ... 31 | | |  |  |  | Pass.  Actual output same as expected |
| 6 | Enter the M1, D1 and Y2 cases | 6 | 15 | 1811 | Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |
| 7 | Enter the M1, D1 and Y3 cases | 6 | 15 | 2013 | Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |

**Strong Robust test cases**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Input data | | | Expected output | | | Actual output | | |  |
| Case id | Description | Month | Day | Year | Month | Day | Year | Month | Day | Year | Comment |
| 1 | Enter the M2 , D1 and Y1 cases | -1 | 15 | 1912 | Value of month not in the range 1 ... 12 | | |  |  |  | Pass.  Actual output same as expected |
| 2 | Enter the M1, D2 and Y1 cases | 6 | -1 | 1912 | Value of day not in the range 1 ... 31 | | |  |  |  | Pass.  Actual output same as expected |
| 3 | Enter the M1, D1 and Y2 cases | 6 | 15 | 1811 | Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |
| 4 | Enter the M2 , D2 and Y1 cases | -1 | -1 | 1912 | Value of month not in the range 1 ... 12  Value of day not in the range 1 ... 31 | | |  |  |  | Pass.  Actual output same as expected |
| 5 | Enter the M1, D2 and Y2 cases | 6 | -1 | 1811 | Value of day not in the range 1 ... 31  Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |
| 6 | Enter the M2, D1 and Y2 cases | -1 | 15 | 1811 | Value of month not in the range 1 ... 12  Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |
| 7 | Enter the M2, D2 and Y2 cases | -1 | -1 | 1811 | Value of month not in the range 1 ... 12  Value of day not in the range 1 ... 31  Value of year not in the range 1812 ... 2012 | | |  |  |  | Pass.  Actual output same as expected |

**Some additional equivalence Boundary checking**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Input data | | | Expected output | | | | | Actual output | | |  |
| Case id | Description | Month | Day | Year | Month | | Day | | Year | Month | Day | Year | Comment |
| 1 | Enter the M1 , D1 and Y2 cases | 12 | 31 | 1811 | Value of year not in the range 1812 ... 2012 | | | | |  |  |  | Pass.  Actual output same as expected |
| 2 | Enter the M1, D1 and Y1 cases | 12 | 31 | 2012 | 1 | 1 | | 2013 | | 1 | 1 | 2013 | Pass.  Actual output same as expected |
| 3 | Enter the M1, D1 and Y3 cases | 12 | 31 | 2013 | Value of year not in the range 1812 ... 2012 | | | | |  |  |  | Pass.  Actual output same as expected |