**Group: 31**

**Lab: 9**

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**Question 1:**

**Equivalence Class:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Equivalent  Classes | Day | Month | Year | Expected Output |
| Day > 31 | 67 | 6 | 2012 | Invalid |
| Day < 1 | -2 | 4 | 2000 | Invalid |
| Within Constraints | 21 | 4 | 2014 | A date within constraints would be 20-4-2014 |
| Month > 12 | 38 | 14 | 2013 | Invalid |
| Month < 1 | 5 | -3 | 2012 | Invalid |
| Year > 2015 | 17 | 8 | 2021 | Invalid |
| Leap Year | 29 | 2 | 2004 | The valid date, in this case, would be  28 -02-2004 |
| Days exceeding the actual number of days in a month | 31 | 2 | 2006 | Invalid |
| Year < 1900 | 25 | 12 | 1789 | Invalid |
| None Leap Year | 29 | 2 | 2009 | Invalid |

**Boundary Value:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case # | Day | Month | Year | Expected Output |
| 1 | 0 | Any | Any | Invalid |
| 2 | 1 | Any | Any | Valid |
| 3 | 22 | Any | Any | Valid |
| 4 | 30 | Any(Except 2) | Any | Valid |
| 5 | 30 | 2 | Any | Invalid |
| 6 | 31 | Any(Except 2,4,6,9,11) | Any | Valid |
| 7 | 31 | 2,4,6,9,11 | Any | Invalid |
| 8 | 32 | Any | Any | Invalid |
| 9 | Any | 0 | Any | Invalid |
| 10 | Any | 1 | Any | Valid |
| 11 | Any | 7 | Any | Valid |
| 12 | Any(Except 31) | 11 | Any | Valid |
| 13 | 31 | 11 | Any | Invalid |
| 14 | Any | 12 | Any | Valid |
| 15 | Any | 13 | Any | Invalid |
| 16 | Any | Any | 1900 | Valid |
| 17 | Any | Any | 1899 | Invalid |
| 18 | Any | Any | 1985 | Valid |
| 19 | Any | Any | 2014 | Valid |
| 20 | Any | Any | 2015 | Valid |
| 21 | Any | Any | 2016 | Invalid |

**\*Any: Stands for the range within the given constraints.**

**Code:**

|  |
| --- |
| #include <bits/stdc++.h> using namespace std;  bool is\_leap\_year(int year) {  if(year%4==0)   {  if(year%100==0)   {  if (year%400==0)  return true;  else  return false;  }  else  return true;  }  else  return false; } bool is\_valid(int date,int month,int year) {  if(date<1 || date>31)  {  return false;  }  if(month<1 || month>12)  {  return false;  }  if(year<1900 || year >2015)  {  return false;  }  if(month==2)  {  if(is\_leap\_year(year) && date>29)  {  return false;  }  if(!is\_leap\_year(year) && date>28)  {  return false;  }  }  if(month==4 || month==6 || month==9 || month==11)  {  if(date>30)  {  return false;  }  }  return true; } void Prev\_date(int date,int month, int year) {  if(date==1)  {  if(month==4|| month==6|| month==9|| month==11)  {  date=31;  month = month -1;   }  else if(month==1)  {  date=31;  month=12;  year=year-1;  }  else if(month==2)  {  date=31;  month=month -1;  }  else if(month==3)  {  if(is\_leap\_year(year))   date=29;  else  date=28;  month=month -1;  }  else  {  date=30;  month=month-1;  }  }  else  {  date=date-1;  }   cout<<date<<" "<<month<<" "<<year; }  int main() {  int date, month, year;  cin>>date>>month>>year;    if(is\_valid(date,month,year)==false)  {  cout<<"Invalid Date";  }  else  {  Prev\_date(date,month,year);  } } |

**Question 2:**

**Input Constraints**

ID: 00000-99999

Quantity 1-99

Max cart total ≤ 999.99

**Equivalence classes:**

**ID:**

E1: 00000 ≤ ID ≤ 99999

E2: ID < 00000

E3: ID > 99999

**Quantity(Q):**

E4: Q=0

E5: 0 **<** Q **≤** 99, 0 **≤** cart total **≤** 999.99

E7: 0 **<** Q **≤** 99, cart total **>** 999.99

E8: Q **<** 0

E9: Q **>** 99

**Final Equivalence Classes**

E1: Q=0, ID Existing in Cart

E2: Q =0, ID Not-Existing in Cart

E3: 00000 ≤ ID ≤ 99999, 0 **<** Q **≤** 99, 0 **≤** cart total **≤** 999.99

E4: 00000 ≤ ID ≤ 99999, 0 **<** Q **≤** 99, cart total **>** 999.99

E5: 00000 ≤ ID ≤ 99999, Q **<** 0

E6: 00000 ≤ ID ≤ 99999, Q > 99,

E7: ID < 00000

E8: ID > 99999

**Boundary Value Analysis:**

|  |  |  |
| --- | --- | --- |
| No. | Test Case | Expected Output |
| 1 | Q=0, ID Existing in cart | Item Removed From Cart |
| 2 | Q=0, ID Not-Existing in Cart | Invalid Input |
| 3 | ID=-1, Q=any, CartTotal=any | Invalid ID |
| 4 | ID=100000, Q=any, CartTotal=any | Invalid ID |
| 5 | ID=1, Q=1, CartTotal=999.99 | Cart Total as Expected (Valid Input) |
| 6 | ID=1, Q=1, CartTotal=999.98 | Cart Total as Expected (Valid Input) |
| 7 | ID=1, Q=1, CartTotal=1000 | Invalid CartTotal |
| 8 | ID=99998, Q=1,CartTotal= 999.99 | Cart Total as Expected (Valid Input) |
| 9 | ID=99998, Q=1,CartTotal= 999.98 | Cart Total as Expected (Valid Input) |
| 10 | ID=99998, Q=1,CartTotal= 1000 | Invalid CartTotal |
| 11 | ID=1, Q = -1, CartTotal=any | Invalid Quantity |
| 12 | ID=1, Q = 2, CartTotal=999.99 | Cart Total as Expected (Valid Input) |
| 13 | ID=1, Q = 98, CartTotal=999.99 | Cart Total as Expected (Valid Input) |
| 14 | ID=1, Q = 100, CartTotal=any | Invalid Quantity |