**Problem Statement:** Determine whether a year is a leap year

**Explanation:** In the Gregorian calendar, a normal year consists of 365 days. A "leap year" of 366 days is used once every four years to eliminate the error caused by three normal (but short) years. Any year that is evenly divisible by 4 is a leap year: for example, 1988, 1992, and 1996 are leap years.

The following years are leap years:

1600, 2000, 2400

This is because they are evenly divisible by both 100 and 400.

**Algorithm** to find if a year is a leap year or not:

To determine whether a year is a leap year, follow these steps:

1. If the year is evenly divisible by 4, go to step 2. Otherwise, go to step 5.
2. If the year is evenly divisible by 100, go to step 3. Otherwise, go to step 4.
3. If the year is evenly divisible by 400, go to step 4. Otherwise, go to step 5.
4. The year is a leap year (it has 366 days).
5. The year is not a leap year (it has 365 days).

**Trace table:**

Test Case 1: If given year fails in condition 1

|  |  |  |
| --- | --- | --- |
| **Input by user** | **Control Flow Input** | **Control Flow Output** |
| Input year= **1700** | Enter Input |  |
| 1700 is divisible by 4 = 425 | Read Input and check condition IF | Return value 1 |
| Checks if 1700 divisible by 100 | Checks condition 2 in if loop | Return value 1 |
| Checks if 1700 divisible by 400 | Checks condition 3 in if loop | Return value 0 |
| Prints “**Not Leap yea**r” | Condition 3 check is failed | 1 0r 1 and 0 = 0 |
| END | Control flow comes out of ELSE |  |

Test Case 2: If given year fails in condition 2

|  |  |  |
| --- | --- | --- |
| **Input by user** | **Control Flow Input** | **Control Flow Output** |
| Input year= **1900** | Enter Input |  |
| 1900 is divisible by 4 = 475 | Read Input and check condition IF | Return value 1 |
| Checks if 1900 divisible by 100 | Checks condition 2 in if loop | Return value 1 |
| Checks if 1900 divisible by 400 | Checks condition 3 in if loop | Return value 0 |
| Prints “**Not Leap year**” | Condition 3 check is failed | 1 or 1 and 0 = 0 |
| END | Control flow comes out of ELSE |  |

Test Case 3: If given year fails in condition 2 and 3

|  |  |  |
| --- | --- | --- |
| **Input by user** | **Control Flow Input** | **Control Flow Output** |
| Input year= **1988** | Enter Input |  |
| 1988 is divisible by 4 = 472 | Read Input and check condition IF | Return value 1 |
| Checks if 1988 divisible by 100 | Checks condition 2 in if loop | Return value 0 |
| Checks if 1988 divisible by 400 | Checks condition 3 in if loop | Return value 0 |
| Prints “**Leap year**” | Condition 1 is true | 1988 evenly divisible by 4 |
| END | Control flow comes out of ELSE |  |

Test Case 4: If given year fails in condition 1, 2 and 3

|  |  |  |
| --- | --- | --- |
| **Input by user** | **Control Flow Input** | **Control Flow Output** |
| Input year= **0** | Enter Input |  |
| 1700 is divisible by 4 | Read Input and check condition IF | Return value 0 |
| Checks if 1700 divisible by 100 | Checks condition 2 in if loop | Return value 0 |
| Checks if 1700 divisible by 400 | Checks condition 3 in if loop | Return value 0 |
| Prints “**Not Leap yea**r” | Condition 3 check is failed | 0 or 0 and 0 = 0 |
| END | Control flow comes out of ELSE |  |