

* Calendar *

Page: WABES

Date: 5/1/2024

* Basic Concepts *

- (1) Multiple of 4 is leap year [4, 8, 12, 16 ...]
- (2) Every century year is not leap year [100, 200 ...]
- (3) 4th century year is a leap year [400, 800, 1200 ...]

Note Century $\div 4 = 0 \Rightarrow$ leap year
Century $\div 400 = 0 \Rightarrow$ leap year

Q. why every century year is not leap year
→

1 year is 365 days, 5 hours, 48 mins & 11 sec

Q. How many weeks in ordinary year & leap year
→

(i) for ordinary year

→ There are 365 days and in a week there are 7 days so

$$\left| \begin{array}{r} 365 \\ 7 \end{array} \right| = 52 \text{ \& } 1 \text{ days}$$

remainder 1

(ii) for leap year

$$\left| \begin{array}{r} 366 \\ 7 \end{array} \right| = 52 \text{ \& } 2 \text{ days}$$

remainder 2

Q How many odd days in ordinary year & leap year



extra days

→ in ordinary year → 1 extra days

→ in leap year → 2 extra days

Q How many leap year from 1st to 100th year

→

$$\left\lfloor \frac{100}{4} \right\rfloor = 25$$

→ because every multiple of 4th is leap year

→ But 100 is not leap year so
 $25 - 1 = 24$

Q How many odd days from 1st to 100th year

→ As we know that

ordinary year → 1 odd day

leap year → 2 odd day

→ here 1st to 100th year we consider ordinary year

→ so it has 100 odd days

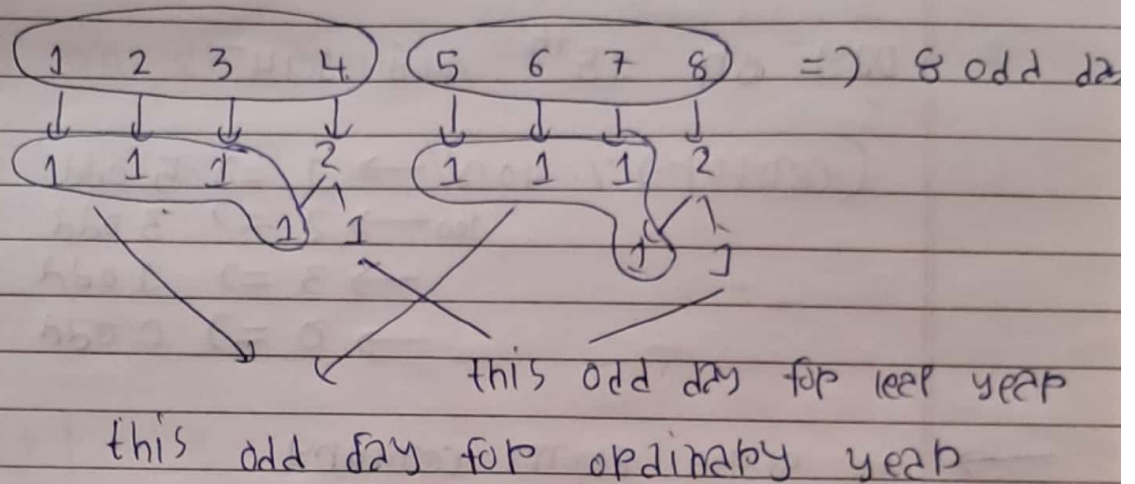
→ but as we know that 100th year has 24 leap year and leap year has 2 odd days

→ but 1 odd day has been already counted in ordinary year so now leap year has only 1 extra day

- we have 24 leap year so 24 odd days
 → so we have total $100 + 24 = 124$ odd days
 from 1st to 100th year

* simple trick +

1 to 8th year



- so total $8 + 2 = 10$

* summary *

- extra days of years $\div 7 =$ odd days
 → $124 \div 7 = 5$ odd days

- (1) 1st odd day will be monday
 (2) 2nd odd day will be tuesday
 (3) 3rd odd day will be wednesday

- (7) 7th odd day will be sunday

100 year \rightarrow 5 odd days

200 year \rightarrow 3 odd days

300 year \rightarrow 1 odd day

400 year \rightarrow 0 odd days

\rightarrow hence 400, 800, 1200, 1600, 2000
all produce 0 odd days

Q. Day on 15th Aug 1947

(century \div 400) \rightarrow 1 \Rightarrow 5 odd

100 \rightarrow 2 \Rightarrow 3 odd

\rightarrow 3 \Rightarrow 1 odd

\rightarrow 0 \Rightarrow 0 odd

\rightarrow we start from century

(1900 \div 400) \div 100 = 3 \Rightarrow 1 odd day

\rightarrow now for 47

$$\left| \begin{array}{r} 46 \\ 4 \end{array} \right| = 11$$

46 + 11 = 57 \div 7 \Rightarrow 1 odd day

~~1 + 1 = 2 odd day~~

\rightarrow now we complete upto 1946 and we enter 1947 so we go month by month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
3 odd	0	3 odd	2 odd	3 odd	2 odd	3 odd	1 odd
31 \div 7	28 \div 7	31 \div 7	30 \div 7	31 \div 7	30 \div 7	31 \div 7	15 \div 7

→ now sum of all odd day increase 10446 year

$$= 3 + 3 + 2 + 3 + 2 + 3 + 1 + 2$$

$$= 14 \text{ extra days}$$

$$= 14 \div 7$$

$$= 5 \text{ odd days Friday}$$

Q. Day on 22 April 2022

→ $(2000 \div 400) / 100 = 0 \Rightarrow 0 \text{ odd day}$

→ now for 21

$$\left\lfloor \frac{21}{4} \right\rfloor = 5$$

$$21 + 5 = 26 \div 7 = 5 \text{ odd day}$$

Jan	Feb	Mar	Apr
3 odd	0	3 odd	1 odd

$$= 3 + 3 + 1 + 5$$

$$= 12 \div 7$$

$$= 5 \text{ odd days Friday}$$

Q. if 15th Aug 1947 was Friday then 26th Jan 1950 was

→

$$(1900 \div 400) / 100 = 3 \Rightarrow 1 \text{ odd day}$$

→ for 25

$$\left[\begin{array}{c} 25 \\ 4 \end{array} \right] = 5$$

$$= 25 + 5$$

$$= 30 \times 9$$

$$= 2 \text{ odd days}$$

Jan

5 odd

$$= 5 + 2 + 1$$

$$= 8 \text{ odd day Monday}$$

* short cut trick *

	15 Aug 1977	→	Friday
+1	16	→	Saturday
+1	17	→	Sunday
+1	18	→	Monday
+1	19	→	Tuesday
+1	20	→	Wednesday
+1	21	→	Thursday
	22	→	Friday

→ so at 31 Aug which day

→ we add 16

→ after 14 2 cycle repeat and +2 extra day so Sunday

Q. if 31 Aug 1947 was Sunday, 5 July 1949 _____ ?

→ for 31 Aug 1947

SEP	OCT	NOV	DEC
2 odd	3 odd	2 odd	3 odd

→ now for 1948, is a leap year so it has 2 odd day

→ for 5 July 1949

JAN	FEB	MAR	APR	MAY	JUN	JUL
3 odd	0 odd	3 odd	2 odd	3 odd	2 odd	3 odd

$$= 30 \% 7$$

$$= 2 \text{ odd day Tuesday}$$

* Logarithm fundamentals *

