

Mr. Giansante



C++ Programming
Day of the Week

August 2018

Day of the Week

Design a C++ program that will prompt the user for a date and then indicate what day of the week the date was or will be.

The program should be user friendly as far as entering the date and should also have full error checking to ensure only valid dates are entered.

Weekday of a Given Date

The following procedure will work for dates between 1900 and 2099.

1. Take the last two digits of the year
2. Divide this amount by 4 (ignore any remainder)
3. Add this number to the last two digits of the year
4. Determine if the year is a leap year (use the 4/100/400 rule)
5. Add a month number according to the chart below

January = 1 (0 in a leap year)
February = 4 (3 in a leap year)
March = 4
April = 0
May = 2
June = 5
July = 0
August = 3
September = 6
October = 1
November = 4
December = 6

6. Add the number of the day of the month
7. If the year is greater than or equal to 2000, add 6
8. Determine the remainder when the number is divided by 7
9. Use the chart below to match the answer with a day

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
0 = Saturday

Leap Year Rule

A year is a leap year if it is divisible by 4
... but it is not a leap year if it is divisible by 100
... but it is a leap year if it is divisible by 400

Example: 1900 is not a leap year

Note: 2100 is a leap year (in violation of the rule) by International agreement

Weekday Example

September 3, 1939 (outbreak of World War II)

Last two digits of year are 39

Dividing 39 by 4, you get 9.75

Ignoring the remainder leaves you with 9

Adding 9 to 39 gives you 48

The month is September, so add 6, giving you 54

The day of month is the 3rd, so add 3, giving you 57

The remainder when 57 is divided by 7 is 1.

From the chart, 1 corresponds to Sunday.

Perpetual Calendar

In order for you to verify the days of the week a date falls on, you can check the perpetual calendar on the following page.

Checking Results Online

There are several websites that will give you the day of the week for a given date.

Example:

<https://www.timeanddate.com/date/weekday.html>

Day of the Week

PERPETUAL CALENDAR

Instructions

These charts enable you to find the day of the week in any year from 1753 through 2030.

FIRST: Under Years, find the year you're interested in and note the letter that follows it.

SECOND: Under Months, find the same letter, and note which number falls under the month you're looking for.

THIRD: Under The Seven Calendars, use the calendar which bears the number you have just found.

Years								Months												The Seven Calendars																												
1786G	1821A	1856I	1891D	1926E	1961G	1996H		January	February	March	April	May	June	July	August	September	October	November	December	1	2	3	4	5	6	7																						
1753A	1788I	1823C	1858E	1893G	1928N	1963B	1998D	A	1	4	4	7	2	5	7	3	6	1	4	6	Monday	8	7	6	5	4	3	2																				
1754B	1789D	1824K	1859F	1894A	1929B	1964J	1999E	B	2	5	5	1	3	6	1	4	7	2	5	7	Tuesday	9	8	7	6	5	4	3																				
1755C	1790E	1825F	1860N	1895B	1930C	1965E	2000M	C	3	6	6	2	4	7	2	5	1	3	6	1	Wednesday	10	9	8	7	6	5	4																				
1756K	1791F	1826G	1861B	1896J	1931D	1966F	2001A	D	4	7	7	3	5	1	3	6	2	4	7	2	Thursday	11	10	9	8	7	6	5																				
1757F	1792N	1827A	1862C	1897E	1932L	1967G	2002B	E	5	1	1	4	6	2	4	7	3	5	1	3	Friday	12	11	10	9	8	7	6																				
1758G	1793B	1828I	1863D	1898F	1933G	1968H	2003C	F	6	2	2	5	7	3	5	1	4	6	2	4	Saturday	13	12	11	10	9	8	7																				
1759A	1794C	1829D	1864L	1899G	1934A	1969C	2004K	G	7	3	3	6	1	4	6	2	5	7	3	5	SUNDAY	14	13	12	11	10	9	8																				
1760I	1795D	1830E	1865G	1900A	1935B	1970D	2005F	H	1	4	5	1	3	6	1	4	7	2	5	7	Monday	15	14	13	12	11	10	9																				
1761D	1796L	1831F	1866A	1901B	1936J	1971E	2006G	I	2	5	6	2	4	7	2	5	1	3	6	1	Tuesday	16	15	14	13	12	11	10																				
1762E	1797G	1832N	1867B	1902C	1937E	1972M	2007A	J	3	6	7	3	5	1	3	6	2	4	7	2	Wednesday	17	16	15	14	13	12	11																				
1763F	1798A	1833B	1868J	1903D	1938F	1973A	2008I	K	4	7	1	4	6	2	4	7	3	5	1	3	Thursday	18	17	16	15	14	13	12																				
1764N	1799B	1834C	1869E	1904L	1939G	1974B	2009D	L	5	1	2	5	7	3	5	1	4	6	2	4	Friday	19	18	17	16	15	14	13																				
1765B	1800C	1835D	1870F	1905G	1940H	1975C	2010E	M	6	2	3	6	1	4	6	2	5	7	3	5	Saturday	20	19	18	17	16	15	14																				
1766C	1801D	1836L	1871G	1906A	1941C	1976K	2011F	N	7	3	4	7	2	5	7	3	6	1	4	6	SUNDAY	21	20	19	18	17	16	15																				
1767D	1802E	1837G	1872H	1907B	1942D	1977F	2012N																		Monday	22	21	20	19	18	17	16																
1768L	1803F	1838A	1873C	1908J	1943E	1978G	2013B																			Tuesday	23	22	21	20	19	18	17															
1769G	1804N	1839B	1874D	1909E	1944M	1979A	2014C																			Wednesday	24	23	22	21	20	19	18															
1770A	1805B	1840J	1875E	1910F	1945A	1980I	2015D																			Thursday	25	24	23	22	21	20	19															
1771B	1806C	1841E	1876M	1911G	1946B	1981D	2016L																			Friday	26	25	24	23	22	21	20															
1772J	1807D	1842F	1877A	1912H	1947C	1982E	2017G																			Saturday	27	26	25	24	23	22	21															
1773E	1808L	1843G	1878B	1913C	1948K	1983F	2018A																			SUNDAY	28	27	26	25	24	23	22															
1774F	1809G	1844H	1879C	1914D	1949F	1984N	2019B																			Monday	29	28	27	26	25	24	23															
1775G	1810A	1845C	1880K	1915E	1950G	1985B	2020J																			Tuesday	30	29	28	27	26	25	24															
1776H	1811B	1846D	1881F	1916M	1951A	1986C	2021E																			Wednesday	31	30	29	28	27	26	25															
1777C	1812J	1847E	1882G	1917A	1952I	1987D	2022F																			Thursday																						
1778D	1813E	1848M	1883A	1918B	1953D	1988L	2023G																				Friday																					
1779E	1814F	1849A	1884I	1919C	1954E	1989G	2024H																				Saturday																					
1780M	1815G	1850B	1885D	1920K	1955F	1990A	2025C																				SUNDAY																					
1781A	1816H	1851C	1886E	1921F	1956N	1991B	2026D																				Monday																					
1782B	1817C	1852K	1887F	1922G	1957B	1992J	2027E																				Tuesday																					
1783C	1818D	1853F	1888N	1923A	1958C	1993E	2028M																				Wednesday																					
1784K	1819E	1854G	1889B	1924I	1959D	1994F	2029A																				Thursday																					
1785F	1820M	1855A	1890C	1925D	1960L	1995G	2030B																				Friday																					
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Learning Outcomes

Programming Concepts and Skills

- A1. demonstrate the ability to use different data types, including one-dimensional arrays, in computer programs
- A2. demonstrate the ability to use control structures and simple algorithms in computer programs
- A3. demonstrate the ability to use subprograms within computer programs
- A4. use proper code maintenance techniques and conventions when creating computer programs

Software Development

- B1. use a variety of problem-solving strategies to solve different types of problems independently and as part of a team
- B2. design software solutions to meet a variety of challenges
- B3. design algorithms according to specifications
- B4. apply a software development life-cycle model to a software development project

Please fill out all the information in this column using a pen before getting this assignment marked.

Name

_____ _____
Date Class

Academic Honesty

The work I am submitting is completely my own creation and has not been copied from anyone else's work. If I have received help on this project, the names of those who have assisted are listed below.

Signature

Pre-Marking

The following people have pre-marked this assignment:
(minimum of two)

User Interface

- Appropriate Title, Author Information, etc.
- Efficient and Esthetically-Pleasing User Interface
- Spelling and Grammar are correct

Code / Programming Style

- Variables are declared and logically named
- Code is commented where appropriate
- Code is indented and spaced to show structure
- Code is efficient

Work Ethic / Problem Solving Skills

- Problem Solving Skills are demonstrated
- Makes Productive Use of Time
- Only Seeks Help when Necessary

Program-Specific Criteria

- Program allows easy entry of date
- Invalid dates (ie. April 31) are rejected
- Feb. 29 can only be selected on a leap year
- The proper Day of the Week is displayed

Teacher Comments

- Level 1 - Limited ability to meet standard and limited effectiveness
- Level 2 - Some ability demonstrated and moderately effective
- Level 3 - Considerable ability demonstrated, considerable clarity or accuracy
- Level 4 - Thorough, high degree of skill demonstrated, insightful, highly accurate

Level