

CALCULATING THE UPOSATHA MOONDAYS

v1.0 · 1st November 2015 · [link](#)

TL,DR

Too Long,
Didn't Read

- The method is based on a set of formulas called *suriyayatra*, originating from India and including additional rules observed in Southeast Asia.
- These formulas are now implemented in [suriya-go](#) for generating the *uposatha* moondays for any arbitrary year.
- To keep the lunar year in sync with the solar, add an extra month 7 times in 19 years (the *adhikamāsa*, อธิกมาส), and add an extra day 11 times in 57 years (the *adhikavāra*, อธิกวาร).
- Conditions on the values produced by formulas determine if a year should be assigned an *adhikamāsa* or *adhikavāra*.
- The 3-3-2 - 3-3-3-2 shorthand for *adhikamāsa* years is not sufficient
- Conventions on how to practise this can differ by countries and monastic groups
- *Adhikamāsa* years are reliable to predict. Some *adhikavāra* years have been irregular, approx. 1 in 20. However, everything since 1997 have been according to the regular pattern.

Just looking for the formulas? Dive in at sec. [3.1](#).

Reading time:

Short Read section 1 (3 pages). You will understand how to construct a given year's uposathas.

Long Up to X, to understand to formulas which determine the *adhikamāsa* and *adhikavāra*.

Longer even more, position of the Sun and Moon, up to the Raek.

Related:

- [forestsangha.org](#) wallcalendar and year planner
- [suriya-go](#)
- [splendid moons](#)
- [uposatha .ical](#) link for Google Calendar

Download [this PDF](#) or a [ZIP archive](#). The ZIP contains the PDFs referenced in this document.

Much appreciation for the answers from the Venerable Ajahns who endured my questions, in particular Ajahn Hāsapaṇṇo and Ajahn Amaro, and the many others who have helped to correct and improve it. Comprehension and consistency was only possible with their experience and understanding.

Please send comments, corrections and further information to:

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1 MAHĀNIKĀYA UPOSATHA CALENDAR TUTORIAL

This section is a step-by-step guide on how to calculate the uposathas for a given year.

1.1 COLLECTING INFORMATION ABOUT THE YEAR

We need to know the following:

- the last uposatha of the previous lunar year
- whether there is an extra lunar month (adhikamāsa),
- or an extra day (adhikavāra),
- or neither, and so it is a common year.

Find the Full Moon in last year November, this is the last uposatha of the previous lunar year.

In Thai practice a lunar year can't have both an adhikamāsa and an adhikavāra.

Check Table 1.1 whether the given year will have an adhikamāsa or adhikavāra. For more data, see Table 2.1.

Keep in mind that the data on future adhikavāra years is provisional. Even when a year would be due for an adhikavāra, the calendar authorities may choose to add it in a different year.

Now we know that the year is either:

- a common year,
- an adhikamāsa year, or
- an adhikavāra year.

Gregorian leap years don't affect the lunar calendar, but it may be useful to check when planning ahead. Table 4.1 shows a few leap years.

1.2 COMMON YEAR

1.2.1 Alternate 30 and 29 day months

Counting from the last Full Moon of the previous lunar year (which will be in November), the first month is 30 days, the second is 29 days:

15 days	● New Moon	First uposatha of the Cold Season
15 days	○ Full Moon	End of first month, 30 days
14 days	● New Moon	
15 days	○ Full Moon	End of second month, 29 days

A Full Moon is always on the 15th day. Every second New Moon is on the 14th day.

The ● Waxing- and ● Waning Moons are on the 8th day.

Year	ΔM	ΔV
2000		6
2001		
2002	3	
2003		
2004	2	
2005		5
2006		
2007	3	
2008		
2009		4
2010	3	
2011		
2012	2	
2013		
2014		
2015	3	
2016		7
2017		
2018	3	
2019		
2020		4
2021	3	
2022		
2023	2	
2024		
2025		5
2026	3	
2027		
2028		
2029	3	
2030		5

Table 1.1: 2000-2030.

ΔM , ΔV : years since the last adhikamāsa (M) or adhikavāra (V).



Keep alternating 30 and 29 day months. One season is four months, one year is three seasons: Cold-, Hot- and Rainy Season. See Figure 1.1 or Table 3.1 for the Pāli names of months and seasons.

1.2.2 Marking the Vassa and Major Moondays

Mark the months and seasons according to Figure 1.1.

The key annual events are on the Full Moon of the given lunar months:

Table 1.2: Major Events in a Common Year

Event	Time
Māgha Pūjā	3rd Full Moon
Visākha Pūjā	6th Full Moon
Āsāḷha Pūjā	8th Full Moon
First Day of Vassa	the day after Āsāḷha
Pavāraṇā Day	11th Full Moon
Last Day of Vassa	Pavāraṇā Day

Mark the Vassa (Rainy Season Retreat):

- The first day of the Vassa is the day after Āsāḷha Pūjā
- The last day of the Vassa is Pavāraṇā Day

The Vassa Retreat therefore is 6 uposathas long (5 + Pavāraṇā), and the Vassāna season is 8 uposathas.

In a common year, the calendar is finished.

Note that in *monastic* lunar months, the Full Moon is on the last day of the month.

In *Thai* lunar months, the Full Moon is in the middle of the month, and the New Moon is on the last day.

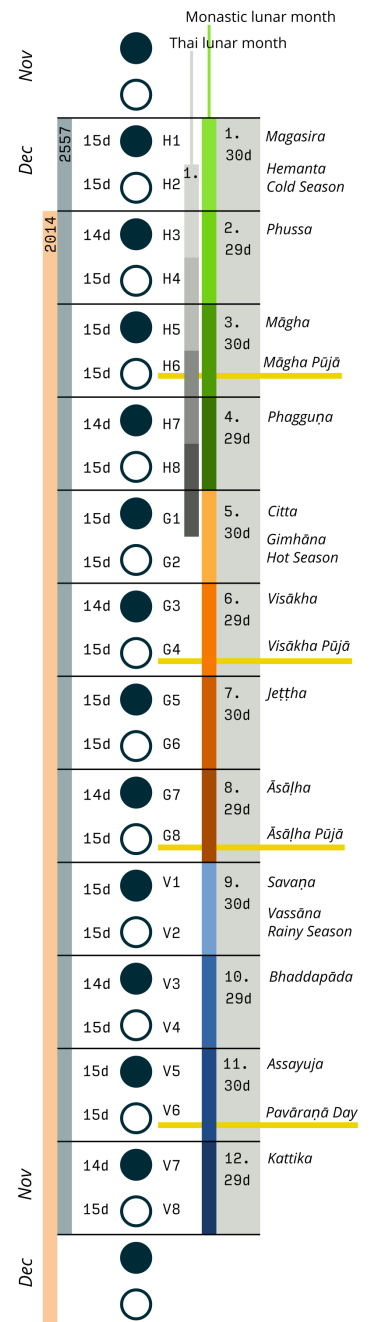
1.3 ADHIKAMĀSA YEAR

1.3.1 Marking the Vassa and Major Moondays

Adding the extra month has three consequences:

- the Major Moondays shift to the next Full Moon
- Gimhāna (Hot Season) has 10 uposathas instead of 8
- the Vassa starts 30 days later

Figure 1.1: Common Year.



The extra month is a 30 day month. In Thai practice, it is appended to the end of the Hot Season, after the 8th month (Āsāḷha). The convention is to call this the ‘second 8th’ or ‘second Āsāḷha’, marked as 8/8.

Āsāḷha Pūjā will be held in the 8/8 2nd Āsāḷha month, the first day of the Vassa being on the following day. The Vassa remains the same length, 8 uposathas.

Āsāḷha Pūjā and Pavāraṇā Day therefore shifted because we added an extra month to the end of the Hot Season.

From a practical perspective, Māgha Pūjā and Visākha Pūjā are simply moved to the next month, and are marked in the 4th and 7th month instead of the 3rd and 6th. This is as though the Major Moons had a parallel, separate system of numbering, in which the adhikamāsa was assumed to be added at the beginning of the year, but this doesn’t influence the actual numbering or length of the months.

This has the advantage that there will not be a large gap between Visākha and Āsāḷha Pūjā (now in the 2nd Āsāḷha).

Figure 1.2 shows how the sequence of the uposathas and the major moondays fall in an adhikamāsa year.

1.4 ADHIKAVĀRA YEAR

The extra day is inserted in the 8th month (Āsāḷha), at the New Moon uposatha before Āsāḷha Full Moon, making the 7th uposatha of the Hot Season a 15-day uposatha instead of the expected 14-day, and making Āsāḷha a 30-day month that year.^[1]

In adhikavāra years the Vassa starts one day later.

order	name	days
6	Visākha	29
7	Jeṭṭha	30
8	Āsāḷha	30
9	Savaṇa	30
10	Bhaddapāda	29

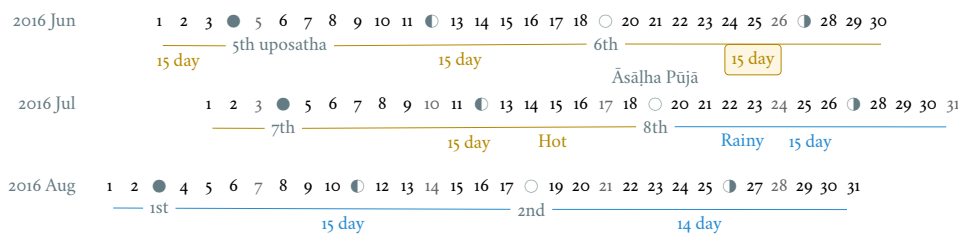


Figure 1.2: Adhikamāsa Year.

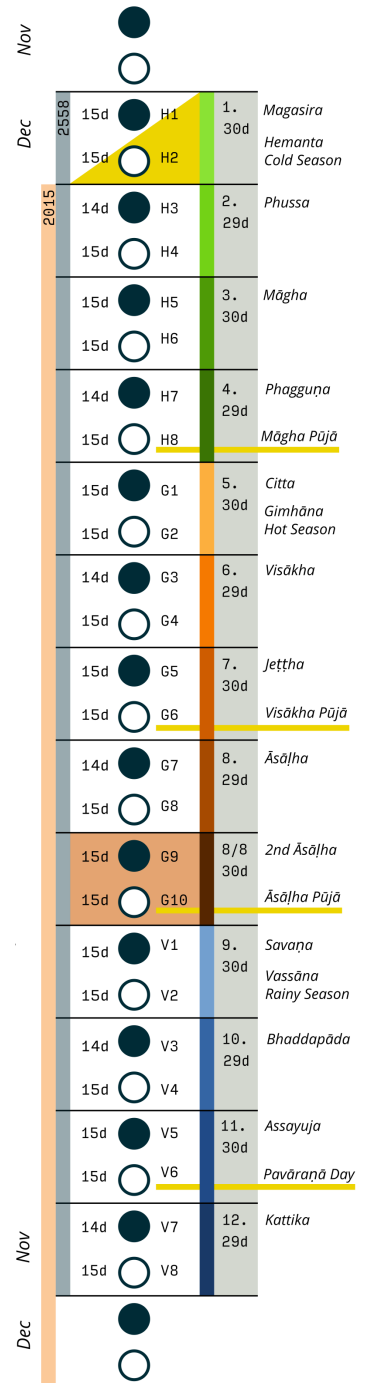
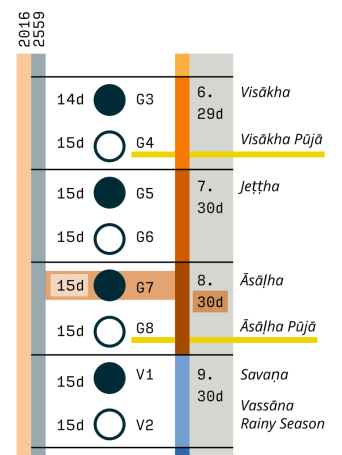


Figure 1.3: Adhikavāra Year.



2 THE MAHĀNIKĀYA UPOSATHA CALENDAR METHOD

2.1 ADDING THE EXTRA MONTH

The extra month (adhikamāsa) is added 7 times in a 19 year period. This is determined by the formulas at sec. 3.1, which generate a pattern such that an adhikamāsa year is due in every 2 or 3 years.

It is not sufficient to rely on a shorthand pattern to determine the variation of 2 or 3 years – the pattern of 3-3-2 - 3-3-3-2 has been mentioned by Ajahn Khemanando[2], but this doesn't always match the cycles produced by the formulas.

Table 2.1 shows adhikamāsa years for 1975-2030.

In Thai practice, the extra month is a 30 day month inserted after the 8th month (*Āsāḷha*), at the end of the Hot Season. The convention is to call this the 'second 8th' or 'second *Āsāḷha*', marked as 8/8.

In adhikamāsa years the Vassa starts 30 days later, after the 2nd *Āsāḷha*, on the day after the Full Moon uposatha of 8/8.

order	name	days
8	<i>Āsāḷha</i>	29
8/8	2nd <i>Āsāḷha</i>	30
9	<i>Savaṇa</i>	30

2.2 ADDING THE EXTRA DAY

The extra day (adhikavāra) is added 11 times in every 57 year.

Whether a year should have an extra day is determined by the conditions at sec. 3.1.2.2.

In Thai practice a year with an extra month is not allowed to also have an extra day. If the year should have an extra day, but it already has an extra month, the extra day is assigned to one of the flanking years (next or previous, in the case of planning several years in advance).

In adhikavāra years the Vassa starts one day later.

The extra day is inserted in the 8th month (*Āsāḷha*), at the New Moon uposatha before *Āsāḷha* Full Moon (the 7th uposatha of the Hot Season), making it a 15-day uposatha instead of the expected 14-day, and making *Āsāḷha* a 30-day month that year.[1]

The announcement of the adhikavāra years by the calendar authorities is not entirely predictable. In some of cases the calendar committees add the adhikavāra in a different year than the regular pattern. However, the years since 1997 have all been regular.

See Table 2.2 for examples of irregular years in the past.

Nonetheless it would be observed that:

- the count for 11 times in 57 years is maintained to keep the calendar at pace
- the extra day will not be in years that also have an extra month.

2.3 MARKING THE VASSA AND MAJOR MOONDAYS

Common year: sec. 1.2.2

Adhikamāsa year: sec. 1.3.1

Adhikavāra year: the logic is the same as in common years.

Table 2.1: Adhikamāsa and adhikavāra years

ΔM : years since the last adhikamāsa. nM: position in the 19-year cycle. ΔV : years since the last adhikamāsa. nV: position in the 57-year cycle. 'x' marks years which would qualify for adhikavāra, but there is already an adhikamāsa, and so the adhikavāra shifts to the following year.

CE year	BE year	nM	ΔM	nV	ΔV	CE year	BE year	nM	ΔM	nV	ΔV
1975	2518	11	3	49		2003	2546	1		20	
1976	2519	12		50		2004	2547	2	2	21	x
1977	2520	13	2	51		2005	2548	3		22	5
1978	2521	14		52	5	2006	2549	4		23	
1979	2522	15		53		2007	2550	5	3	24	
1980	2523	16	3	54		2008	2551	6		25	
1981	2524	17		55		2009	2552	7		26	4
1982	2525	18		56		2010	2553	8	3	27	
1983	2526	19	3	57		2011	2554	9		28	
1984	2527	1		1	6	2012	2555	10	2	29	
1985	2528	2	2	2		2013	2556	11		30	
1986	2529	3		3		2014	2557	12		31	
1987	2530	4		4		2015	2558	13	3	32	x
1988	2531	5	3	5		2016	2559	14		33	7
1989	2532	6		6	5	2017	2560	15		34	
1990	2533	7		7		2018	2561	16	3	35	
1991	2534	8	3	8		2019	2562	17		36	
1992	2535	9		9		2020	2563	18		37	4
1993	2536	10	2	10		2021	2564	19	3	38	
1994	2537	11		11	5	2022	2565	1		39	
1995	2538	12		12		2023	2566	2	2	40	
1996	2539	13	3	13		2024	2567	3		41	
1997	2540	14		14		2025	2568	4		42	5
1998	2541	15		15		2026	2569	5	3	43	
1999	2542	16	3	16	x	2027	2570	6		44	
2000	2543	17		17	6	2028	2571	7		45	
2001	2544	18		18		2029	2572	8	3	46	
2002	2545	19	3	19		2030	2573	9		47	5

Table 2.2: Irregular Adhikavāra years. Past calendar sources: myhora.com, thaiorc.com.

CE year	BE year	K	A	T	nM	ΔM	nV	ΔV	Āsālha by Calc.	Āsālha in Calendar	test	comments
1977	2520	54	252	27	13	2	51		1977-07-30	1977-07-30		
1978	2521	647	126	9	14		52	5	1978-07-20	1978-07-19	X	adhikavāra is missing from the calendar
1979	2522	440	681	19	15		53		1979-07-09	1979-07-09		
...												
1983	2526	412	144	4	19	3	57		1983-07-24	1983-07-24		
1984	2527	205	7	15	1		1	6	1984-07-13	1984-07-12	X	adhikavāra is missing
1985	2528	798	573	26	2	2	2		1985-08-01	1985-07-31	X	off by -1 day
1986	2529	591	436	7	3		3		1986-07-21	1986-07-20	X	off by -1 day
1987	2530	384	299	18	4		4		1987-07-10	1987-07-10		
...												
1993	2536	742	191	25	10	2	10		1993-08-02	1993-08-02		
1994	2537	535	54	6	11		11	5	1994-07-23	1994-07-22	X	adhikavāra is missing
1995	2538	328	609	16	12		12		1995-07-12	1995-07-11	X	off by -1 day
1996	2539	121	472	27	13	3	13		1996-07-30	1996-07-29	X	off by -1 day
1997	2540	714	346	9	14		14		1997-07-19	1997-07-19		

3 THE THAI LUNI-SOLAR CALENDAR

Luni-solar calendars are constructed so as to count **years** according to the *solar* cycle, but to count **months** according to the *lunar* cycle.

tropical year¹ of the Earth 365.24219 days
synodic month² of the Moon ~29.53 days, can vary up to 7 hours

The epoch of the Thai lunar calendar is 25 March 638 AD, this is the beginning of the *Chulasakkarat Era*[?].

The epoch of the Buddhist Era is the Parinibbāna of the Buddha Gotama in 543 BC.

Thus the conversion between the eras:

CE 1963	Common Era (AD)	
BE 2506	Buddhist Era	CE + 543
CS 1325	Chulasakkarat Era	CE - 638

The Thai luni-solar calendar is *procedural*. It uses a few constant, key numbers derived from astronomical observations, and applies a series of mechanical calculations (i.e. the “rules”) again and again to generate the dates of lunar phases and new years.

This working is deliberately concise, since it thereby reflects how the calculation would have been made by a South East Asian calendrist. Each stage is subjected to an operation learnt by rote, and the underlying theory disappears from view. The rote operations, however, will provide a valid answer for any date in any year. It seemed greatly preferable to set out the procedure thus starkly, rather than to give a detailed exposition of what is involved.[6]

Southeast Asian astronomers refined a fraction to obtain the length of the year. Taking 800 years as one Era, and 292207 days in the Era, they expressed the length of one year in days as:

$$\frac{292207}{800} = 365.25875 \text{ days}[6] \quad (3.1)$$

This is 0.01656 days longer than the modern measurement (accumulating 1 day in ~60 years). Remarkably, the *suriyayatra* accounts for this and generates accurate results:

For instance, a Pagan inscription of 14 April 1288 AD maintains that at midnight the Sun’s position was 0 signs, 19 degrees and 59 minutes: the computer program returns 0 19 59.[4]

Nonetheless, the calendar dates published in Thailand (historical or recent) in a given year reflect not only these principles, but also adjustments and omissions which cannot be foreseen or retraced.

¹tropical year: the time it takes the Earth to complete an orbit around the Sun

²synodic month: the time it takes the Moon to reach the same visual phase

The historical record however, frequently defies prediction, forcing the conclusion that the pressure upon the *horas* (astronomers / astrologers) was not to follow the “rules” but merely, within some more leisurely constraints, to ensure that the calendar did not get out of control.[4]

Eade discusses a calendar error in CS 855 (CE 1493) when the formulas have determined a *twelfth* adhikavāra year in a 57 year period, which was not noticed by several astronomers at the time, who were using the “11 times in 57 years” rule of thumb for adhikavāra years. This resulted in wrong dates being used on any inscriptions made until the error was corrected in the calendar.[7]

3.1 SURIYAYATRA FORMULAS

3.1.1 Overview

The formulas take two inputs: the year, and the n^{th} day in the lunar year. They go through a series of operations step by step to produce certain values which describe properties of the lunar year and the given day.

These results are used to determine whether the year is common, adhikamāsa or adhikavāra, and they give the position of the Sun and the Moon on the given day.

Significant values are assigned names[3]. Determining the adhikamāsa and adhikavāra will require these three:

Kammacubala Remaining 800ths of a day

Avoman For the Moon’s mean motion

Tithi Age of the moon at the start of the year³

As we follow the steps, we will also obtain:

Horakhun Elapsed days of the era

Uccabala Age of the moon’s Apogee

Masaken Elapsed months of the era

MeanSun mean position of the Sun

TrueSun true position of the Sun

MeanMoon mean position of the Moon

TrueMoon true position of the Moon

Raek raek⁴

Consider the ancient *hora* (astronomer / astrologer) in a rural village who is practising these steps. He doesn’t have the equipment to make precise astronomical observations. He is not educated in the underlying theory of the complex interaction of the Sun, Earth and the Moon. He is only trained in following the steps, and still this allows him to obtain the necessary information to mark the progress of the calendar.

³a.k.a. Thaloengsok or New Year’s Day

⁴a.k.a. Naksatra

3.1.2 Calculation

Here we will take the year CE 1963 (CS 1325) as an example and calculate its properties. We should find that it is an adhikavāra year. As an exercise, calculate the following year CE 1964 (CS 1326), and you should find that it is adhikamāsa.

Notation:

$a \bmod b$ produces the *remainder part* of a/b .

E.g. $14 \bmod 5 = 4$, because $14/5 = 2 * 5 + 4$.

$\lfloor a \rfloor$ *floors* (or *truncates*) a fraction value, meaning we only keep its integer part.

E.g. $\lfloor 12.8 \rfloor = 12$.

Constants: **EraYears** = 800 **EraDays** = 292207

$$\begin{aligned} \text{CS_year} &= \text{CE_year} - 638 \\ &= 1325 \end{aligned} \tag{3.2}$$

$$\begin{aligned} a &= (\text{CS_year} * 292207) + 373 \\ &= 387174648 \end{aligned} \tag{3.3}$$

$$\begin{aligned} \text{Horakhun} &= \lfloor a/800 + 1 \rfloor \\ &= 483969 \end{aligned} \tag{3.4}$$

$$\begin{aligned} \text{Kammacubala} &= 800 - (a \bmod 800) \\ &= 552 \end{aligned} \tag{3.5}$$

$$\begin{aligned} \text{Avoman} &= ((\text{Horakhun} * 11) + 650) \bmod 692 \\ &= 61 \end{aligned} \tag{3.6}$$

$$\begin{aligned} b &= \lfloor ((\text{Horakhun} * 11) + 650)/692 \rfloor \\ &= 7694 \end{aligned} \tag{3.7}$$

$$\begin{aligned} \text{Masaken} &= \lfloor (b + \text{Horakhun})/30 \rfloor \\ &= 16388 \end{aligned} \tag{3.8}$$

$$\begin{aligned} \text{Tithi} &= (b + \text{Horakhun}) \bmod 30 \\ &= 23 \end{aligned} \tag{3.9}$$

Now we can determine if the year qualifies for adhikamāsa or adhikavāra.

3.1.2.1 *Adhikamāsa years*

(Thai: atikamat อธิกมาส)

The year could be adhikamāsa:

- IF the **Tithi** is between 24 and 29 inclusive,
- OR between 0 and 5 inclusive.

However:

- IF the next year also satisfies the above,
- THEN this year will not be adhikamāsa, and the next year will be.

Adhikamāsa years are not allowed to be contiguous, and max. 2 years are allowed between them. If next year also qualifies for adhikamāsa, then it will be assigned there and not to the current year.

In the above example for year CS 1325, the **Tithi** is 23, which doesn't satisfy the first condition, and so it can't be adhikamāsa.

3.1.2.2 *Adhikavāra years*

(Thai: adhikawan อธิกวาร)

Determine if it is a leap year:

- IF the **Kammacubala** is less than or equal to 207,
- THEN it is a leap year.

The year could be adhikavāra:

- IF it is a leap year AND the **Avoman** is less than or equal to 126,
- ELSE IF it is NOT a leap year AND the **Avoman** is less than 137.

However:

- IF the year is adhikamāsa,
- THEN it can't be adhikavāra.
- ELSE IF there is a carried adhikavāra from last year,
- THEN this year will be adhikavāra.

In the above example for year CS 1325: The year is not adhikamāsa, so we can examine it further. The **Kammacubala** is 552 so it is not a leap year. The **Avoman** is 61, so the year qualifies to be assigned an adhikavāra.

Now we know if the year is adhikamāsa, adhikamāsa or common, and we can plan the *uposathas* as shown in the diagram on p.16.

Checking the past calendars for year CS 1325 (see Table 3.3), we see that indeed it was adhikavāra, conforming to the formulas.

Nonetheless, the future remains uncertain and the past inscrutable at times. When the calendar committees plan several years ahead, they may assign the adhikavāra to a different year for reasons that remain obscured, causing at least two irregular years. This can be observed in past calendars (Table 2.2), but recently this hasn't been happening, and the years follow the prediction of the formulas.

“Carried adhikavāra” meaning that last year qualified both for adhikamāsa and adhikavāra, so it was not allowed to be assigned the adhikavāra, which was “carried on” and will now be assigned to this year.

In Thailand, years with an extra month are not allowed to also have an extra day, and the adhikavāra may be assigned to one of the flanking years. So in theory it could be assigned to the following or preceding year, but the general practice is to “carry on” the adhikavāra and assign it to the following year.

Going through all this may be intriguing to calculate once, but mention repeating it every year, then checking and proofing it, and one is reminded of a phrase in Eade's *Calendrical Systems*: “Few would undertake cheerfully the task.”[4]

Better tell the computer how to do it and let us get on with living. Using [suriya-go](#) we can write the following Golang code:

```
package main

import "fmt"
import "github.com/splendidmoons/suriya-go"

func main() {
    suYear := suriya.SuriyaYear{}
    suYear.Init(1963) // CS 1325

    dateFmt := "2006-01-02"
    fmtStr := `Year: %v
Tithi: %v
Adhikamāsa: %v
Adhikavāra: %v
Āsālha: %v
`

    fmt.Printf(fmtStr,
        suYear.Year,
        suYear.Tithi,
        suYear.Is_Adhikamasa(),
        suYear.Is_Adhikavara(),
        suYear.AsalhaPuja().Format(dateFmt))
}
```

Which will print:

```
Year: 1963
Tithi: 23
Adhikamāsa: false
Adhikavāra: true
Āsālha: 1963-07-06
```

3.1.2.3 Sun, Moon and Raek

Eade describes the formulas at the end of his paper *Rules for interpolation in the Thai calendar*[5], but his notation is a puzzle in itself, with its implied conversions and obscure progression from one step to the next.

The folks at [Astronomy Stack Exchange](#) helped to decipher it:

- [How to interpret this old degree notation?](#)
- [From Mean Moon to True Moon in an old procedural calendar](#)

This allows us to continue examining the year CS 1325 as an example.

TODO

3.2 NAMES OF THE MONTHS

The name of a given month is determined by the astrological sign which the Full Moon enters at midnight. See Table 3.1.

Table 3.1: Lunar and Solar Months and Zodiacs[1]

Season			Lunar Month	Solar Month	Solar Zodiac (Western / Sanskrit)
		days			
Hemanta-utu	1	30	Magasira-māsa	December	Sagittarius / Dhanus
Cold Season	2	29	Phussa-māsa	January	Capricorn / Makara
	3	30	Māgha-māsa	February	Aquarius / Kumbha
	4	29	Phagguṇa-māsa	March	Pisces / Mīna
Gimha-utu	5	30	Citta-māsa	April	Aries / Meṣa
Hot Season	6	29	Visākha-māsa	May	Taurus / Vṛṣabha
	7	30	Jetṭha-māsa	June	Gemini / Mithuna
	8	29	Āsāḷha-māsa	July	Cancer / Karkaṭa
Vassāna-utu	9	30	Savaṇa-māsa	August	Leo / Siṃha
Rainy Season	10	29	Bhaddapāda-māsa	September	Virgo / Kanyā
	11	30	Assayuja-māsa	October	Libra / Tulā
	12	29	Kattika-māsa	November	Scorpio / Vṛścika

3.3 THE FIRST AND LAST DAY OF A LUNAR MONTH

In monastic practice, the Full Moon day is on the last day of a given month. The next month starts on the following day (first day of the waning phase), thus the first uposatha will be on a New Moon.

In many Thai calendars, the New Moon day is the last day of the month, and the Full Moon day is in the middle. This only changes the numbering of the months, not the actual moondays. In these calendars the thresholds of months are shifted two weeks forward relative to the monastic calendar.

This can be particularly important to watch at the end of the lunar year:

The New Moon of the 12th *Thai* lunar month is the New Moon (1st uposatha) of the 1st *monastic* lunar month.

Table 3.2: Monastic and Thai lunar months in a year

Nth	phase	month	Monastic	Thai
1	New		1	12
2	Full	Magasira	1	1
3	New		2	1
4	Full	Phussa	2	2
5	New		3	2
6	Full	Māgha	3	3
7	New		4	3
8	Full	Phagguṇa	4	4

Table 3.3: Adhikamāsa and adhikavāra in the period 1958 to 1978 (CS 1320-1340).[6]

m for adhikamāsa, d for adhikavāra years, Δm and Δd for years since last adhikamāsa and adhikavāra.

	Δd	Δm	year	type	Asalha	2nd Asalha
		0	1320	m	19:42	22:24
0		1	1321	d	21:05	
1		2	1322		20:40	
2		3	1323	m	19:12	22:00
3		4	1324		20:38	
4	4	5	1325	d	19:34	
5		6	1326	m	19:38	22:05
6		7	1327		21:15	
7		8	1328	m	19:20	22:55
8		9	1329		21:48	
9	5	10	1330	d	20:26	
10		11	1331	m	19:59	22:50
11		12	1332		21:20	
12		13	1333		20:02	
13		14	1334	m	19:03	21:33
14	5	15	1335	d	20:40	
15		16	1336		20:44	
16		17	1337	m	19:44	22:19
17		18	1338		21:11	
18		19	1339	m	19:45	22:35
19	5		1340	d	21:05	

4 GREGORIAN LEAP YEARS

Table 4.1: Gregorian leap years

2004	2016	2028	2040
2008	2020	2032	2044
2012	2024	2036	2048

```
IF (year is not exactly divisible by 4) THEN (it is a common year)
ELSE
IF (year is not exactly divisible by 100) THEN (it is a leap year)
ELSE
IF (year is not exactly divisible by 400) THEN (it is a common year)
ELSE (it is a leap year) [8]
```

WEBSITES AND APPS

TODO

myhora.com

<http://horoscope.thaiorc.com/calendar/thaicalendar.php>

uposatha app

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- [4] J.C. Eade. *The calendrical systems of mainland south-east Asia* (preview on [Google Books](#)). E.J. Brill, 1995.
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- [8] Wikipedia. [Leap Year](#).

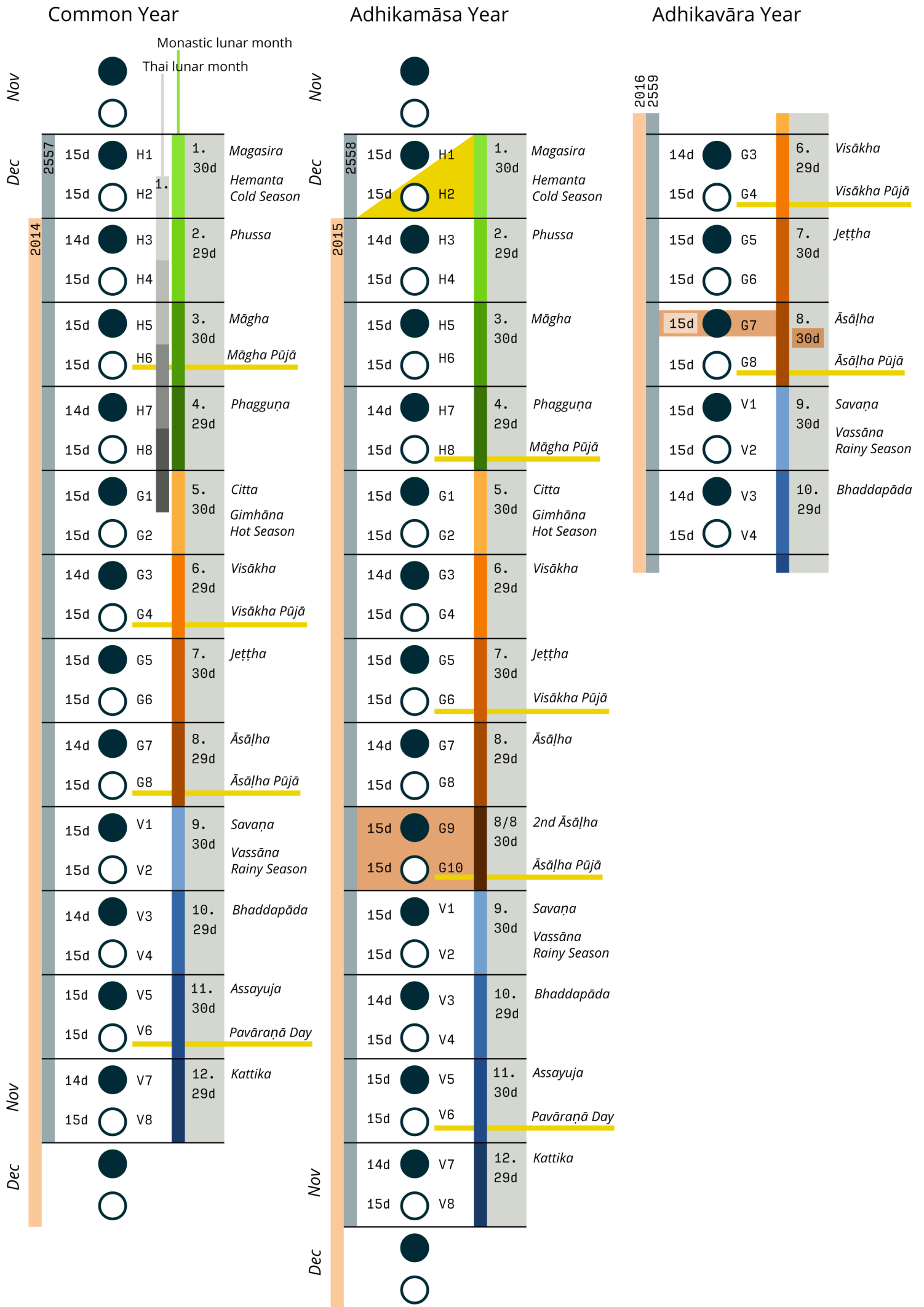
COLOPHON

[Org-mode](#) and \LaTeX . Sources at [Github](#).

Please send comments, corrections and further information to:

Gambhiro Bhikkhu <gambhiro.bhikkhu.85@gmail.com>

Last updated on 2015-11-01.



Forest Sangha Calendar 2015 - 2558

January		T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S										
		1	2	3	◯	5 _◊	6	7	8	9	10	11	◯	13 _◊	14	15	16 ¹	17	18	●	20 _◊	21	22	23	24	25	26	◯	28	29	30	31			
February				1	2	◯	4	5	6	7	8	9	10	◯	12 _◊	13	14	15	16	●	18 _◊	19	20	21	22	23	24	◯	26	27	28				
March				1	2	3	◯ ²	5 _◊	6	7	8	9	10	11	◯	13 _◊	14	15	16	17	18	●	20 _◊	21	22	23	24	25	26	◯	28	29	30	31	
April		1	2	◯	4 _◊	5	6	7	8	9	10	◯	12 _◊	13	14	15	16	●	18 _◊	19	20	21	22	23	24	◯	26	27	28	29	30				
May				1	◯	3	4 _◊	5	6	7	8	9	◯	11 _◊	12	13	14	15	16	●	18 _◊	19	20	21	22	23	24	◯	26	27	28	29	30	31	
June		◯ ³	2 _◊	3	4	5	6	7	8	◯	10 _◊	11	12	13	14	●	16 _◊	17 ⁴	18	19	20	21	22	◯	24 _◊	25	26	27	28	29	◯				
July		1	2 _◊	3	4	5	6	7	◯	9 _◊	10	11	12	13	14	●	16 _◊	17	18	19	20	21	22	◯	24 _◊	25	26	27	28	29	◯ ⁵	31 _◊	6		
August				1	2	3	4	5	6	◯	8 _◊	9	10	11	12	13	●	15	16	17	18	19	20	21	◯	23	24	25	26	27	28	◯	30	31	
September		1	2	3	4	5 _◊	◯	7	8	9	10	11	●	13 _◊	14	15	16	17	18	19	◯	21 _◊	22	23	24	25	26	◯	28 _◊	29	30				
October		1	2	3	4 _◊	◯	6	7	8	9	10	11	●	13 _◊	14	15	16	17	18	19	◯	21 _◊	22	23	24	25	26	◯ ⁷	28	29	30	31			
November				1 ⁸	2	3 _◊	◯	5	6	7	8 ^{9,10}	9	●	11 _◊	12	13	14	15 ¹¹	16	17	◯	19 _◊	20	21	22 ^{12,13}	23	24	◯	26	27	28	29	30		
December		T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T										
		1	2	◯	4	5	6	7	8	9	●	11 _◊	12	13	14	15	16	17	◯	19 _◊	20	21	22	23	24	◯	26	27	28	29	30	31			



1 Jan 16: Ajahn Chah Memorial Day

2 Mar 4: Māgha Pūjā

3 Jun 1: Vesākha Pūjā

4 Jun 17: Ajahn Chah's Birthday

5 July 30: Āsāḥā Pūjā

6 July 31: Vassa begins

7 Oct 27: Pavāraṇā

8 Nov 1: Aruna Ratanaḡiri

9 Nov 8: Santacittarama

10 Nov 8: Hartridge

11 Nov 15: Amaravati

12 Nov 22: Cīttavīveka

13 Nov 22: Dhammapala

Forest Sangha Calendar 2016 - 2559

January

F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	S														
1			3	4	5	6	7		9	10 ¹	11	12	13	14	15		17	18	19	20	21	22		24 ²	25	26	27	28	29	30	

February

1 ¹	2	3	4	5	6		8		9	10	11	12	13	14		16	17	18	19	20	21		23	24	25	26	27	28	29
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March

	2 ¹	3	4	5	6		8		9	10	11	12	13	14		16	17	18	19	20	21		23	24	25	26	27	28	29		31 ¹
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April

1	2	3	4	5	6	7		8	9	10	11	12	13		15	16	17	18	19	20		22	23	24	25	26	27	28	29		30 ¹
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May

			1	2	3	4	5	6	7	8	9	10	11	12		14	15	16	17	18	19		21	22	23	24	25	26	27	28	29	30	31
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June

1	2	3		5	6	7	8	9	10	11		13	14	15	16	17 ⁴	18		20	21	22	23	24	25	26		28	29	30
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July

1	2	3		5	6	7	8	9	10	11		13	14	15	16	17	18		20 ⁵	21	22	23	24	25	26		28	29	30	31
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August

1	2 ¹		4	5	6	7	8	9	10 ¹		12	13	14	15	16	17		19	20	21	22	23	24	25 ¹		27	28	29	30	31
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September

	2 ¹	3	4	5	6	7	8		10	11	12	13	14	15		17	18	19	20	21	22	23 ¹		25	26	27	28	29	30
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October

	2 ¹	3	4	5	6	7	8		10	11	12	13	14	15		17	18	19	20	21	22 ¹	23		25	26	27	28	29	30	31
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November

1	2	3	4	5	6		8	9	10	11	12	13		15	16	17	18	19	20	21 ¹		23	24	25	26	27	28		30
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December

T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6		8	9	10	11	12	13		15	16	17	18	19	20	21 ¹		23	24	25	26	27		29	30	31



¹ Jan 16: Ajahn Chah Memorial Day
² Feb 22: Māgha Pūjā
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