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Introduction

Let us take a look at the general definitions of the Solar, Lunar and Lunisolar calendars before delving into the specificities of that of the Indian Calendar.

The Solar Calendar

The length of the solar month varies from 29.318 days to 31.644 days. The solar day has a fixed number of 24 hours. Therefore, the change of date begins when the midnight occurs. The midnight is measured with respect to the time zone of the specific country. This calendar is fixed at 365 days for normal years and at 366 days for leap years which occur every fourth year. A leap year is so named because the extra day causes any date after February in a leap year to 'leap' over 1 day in the week and to occur 2 days later in the week than it did in the previous year, rather than just 1 day later as in a normal year.

One anti-clockwise revolution of the Earth around the Sun is considered as one year. Instead of visualizing the movement of the Earth around the sun, let us visualize the Earth as an immobile body and the Sun moving around it. In other words, we are considering the apparent motion of the Sun. The general solar year is calculated by noting the time taken for the Sun to revolve around the Earth and return to the same reference point in the sky. There are 2 types of solar year, the sidereal year and the solar year. The sidereal year is the time taken by the Sun to move along the ecliptic from the starting point, which is taken with reference to a background star, and returning to the same reference point. Furthermore, the sidereal year takes into consideration the star which is seen just before sunrise on the day of the equinox. This star is the reference point to which the Sun returns to after a revolution. The Time taken for the Sun to complete its path is the sidereal year. The tropical year is the time between two equinoctial points, usually the March equinoxes are considered. The equinoctial point is the reference point to which the Sun has to return to.

The Lunar Calendar

A lunar, or synodic, month is the time required for the moon to make a complete rotation around the Earth, passing from a particular phase, such as the full moon, back to the same phase; it averages 29.53059 days. Each lunar year is made up of 12 lunar months of about 354 days in total, making it shorter than the solar year by about 11 days. This difference is accounted for by the addition of an extra lunar month about once every 2.5 years.

The Lunisolar Calendar

The variations among the many calendars in use have been caused by the inaccuracy of the determinations of the duration of the year, together with the fact that a year cannot be divided evenly by any of the other time units: days, weeks, or months. The earliest calendars based on lunar months thus failed to agree with the seasons. A month occasionally had to be added to reconcile lunar months with the solar year. A calendar that makes such adjustments is a lunisolar calendar.

The Indian Solar Calendar

The Indian Solar Year

Since the Indian Solar Calendar is a type of the solar calendar, it is similar to the solar calendar. The Indian Solar Calendar follows the same system of noting the time taken for

the Sun to apparently revolve around the Earth and return to the same reference point as the solar calendar. The Indian Solar calendar can be calculated just as the solar calendar, in 2 ways - the nirayana system (sidereal) and the sayana (tropical) system. The method used is similar to that of the solar calendar mentioned earlier.

In India, the traditional calendar utilises the nirayana system. In the nirayana system, the reference point to which the Sun has to return to is taken as the fixed point on the ecliptic which is opposite to the bright star Chaitra. Initially, this fixed point was taken to be the March equinoctial point as the reference point coincided with the March Equinox of 285A.D. But over centuries, due to precession, the equinoctial point (fixed point) has moved significantly westward on the ecliptic. However, as the nirayana year follows the Surya Siddhanta (ancient astronomical treatise), the approximation of the sidereal year, the precession of the March equinox has no effect on the length of the Indian Solar year. More about the Indian Solar Year:

- # Length: 365.258756 days
- # Deviation: +9min or -9min

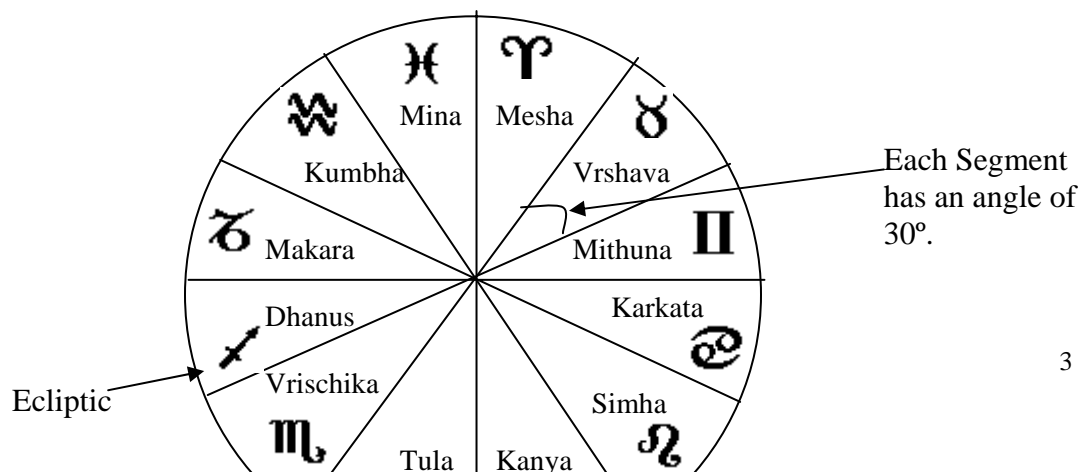
The Indian Solar Month

The nirayana year consists of 12 months and these are related to the 12 rasis (zodiacs).

The ecliptic lies in the middle of the zodiac stars and these stars act as landmarks which signify the different months. The 12 rasis divide the ecliptic into 12 equal parts as shown in the diagram below. This division starts from the fixed point on the ecliptic which acts as the reference point when observing the sidereal year. In this case the division starts from Mesha (Aries) rasi. Hence, the Indian solar calendar starts from zodiac zone Mesha and ends at the zodiac zone Mina (Pisces).

Samkranti is the movement of the Sun into a rasi arc (zodiac zone). Hence, the length of the month is the time taken for the sun to travel through one rasi arc and it usually is about 30-31 days.

The samkranti may take place at any time of the day or night and this gives rise to the four schools of the Indian Solar Calendar.

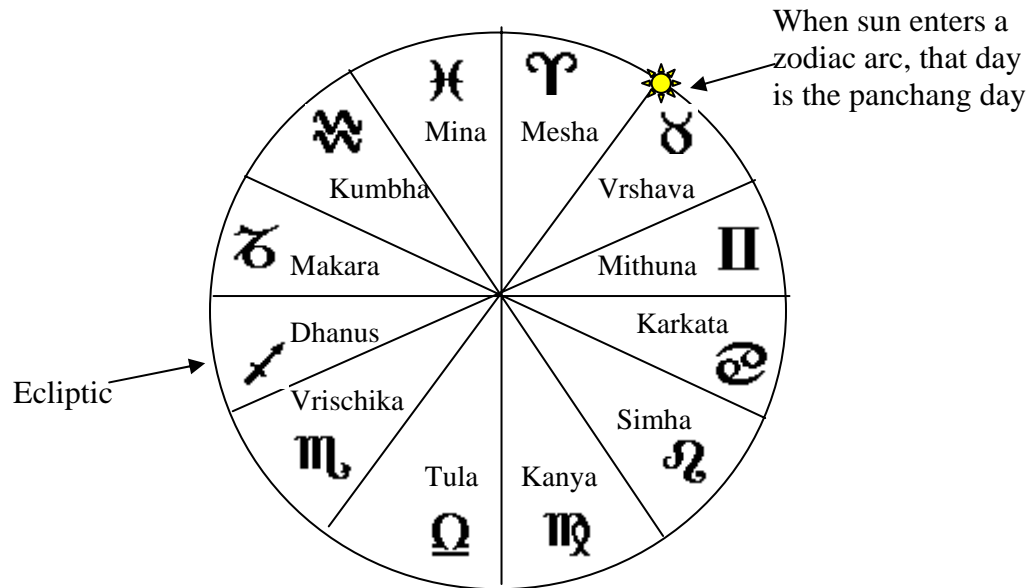


Division of the ecliptic into the 12 rasis

4 different Schools of the Indian Solar Calendar:

1. Orissa School

The panchang* day and the start of a month is the day when the sun first enters a rasi arc. In other words the month starts on the day of samkranti. In this system the time of the day is insignificant. This system is used in Punjab, Haryana and Orissa.

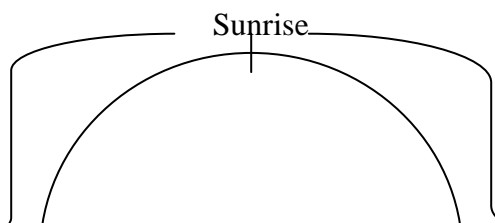


Determining the panchang in the Orissa school.

2. Tamil School

If samkranti happens before sunset, the month begins on the same day. If it happens after sunset, the panchang day occurs the next day. Hence the time of the day is of great importance in the system. This calendar is followed by the people of Tamil Nadu.

If samkranti occurs here,

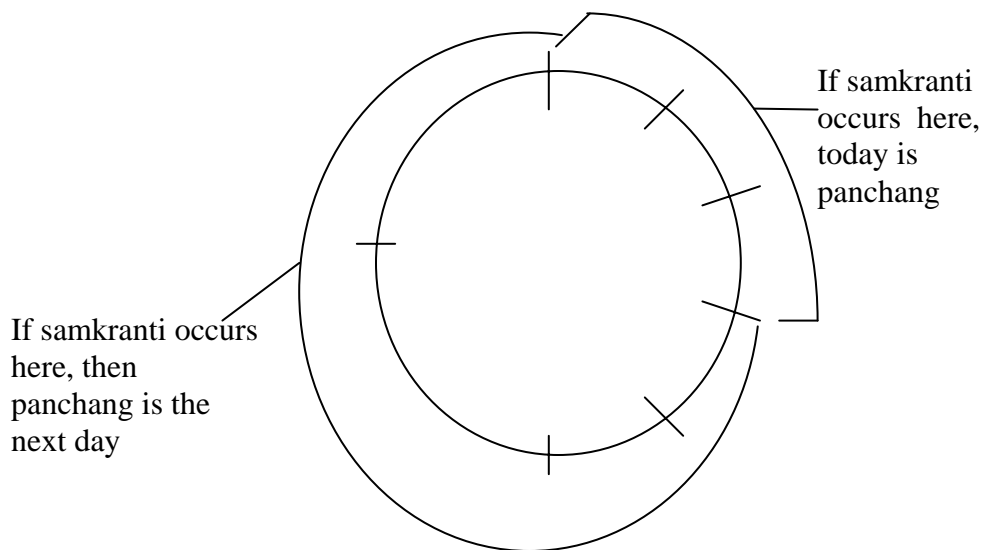


If samkranti

Determining Panchang in Tamil school.

3. Malayali School

This school not only takes samkranti into account but also takes aparahna into account. Aparahna is $\frac{3}{5}$ th duration of the time taken from sunrise to sunset. In the system, if the samkranti occurs before aparahna, the panchang is on that day. If it occurs after aparahna, the panchang is on the next day. This calendar is used mainly in Kerala.



Determination of panchang in the Malayali School.

4. Bengal School

When the samkranti takes place between sunrise and the following midnight, the solar month starts the next day. If it begins after midnight, the panchang is on the following day. The rule is generally utilised in Assam, Bengal and Tripura.

If samkranti occurs here,
the panchang takes
place the 2nd Day

*Note: Panchang will be mentioned under the section on the Indian lunisolar calendar.

The Indian Lunar Calendar

The Hindu lunar day is known usually begins at the sunrise and the length of the day is usually measured by the time elapsed between the 2 successive sunrises. The lunar day is known as the 'Tithi'. The length of the day varies between 22-26 hours. This number of hours is based on the angular rotation of the moon around the Earth in its elliptical orbit. As the moon revolves around the Earth, the angular distance between the sun and the moon change from 0° to 360° . When the angular distance returns to 0, it represent the birth of the new lunar month.

The Hindu lunar month is calculated on the basis that the moon revolution around the Earth. Therefore, one lunar month equals to one complete revolution of the moon around the Earth. The rotation period of the moon around the sun varies so this in turns affect the duration of the lunar month. The length of the Hindu lunar month therefore varies from the period of 29.305 to 29.812.

The Hindu lunar year is based on the Earth revolution of the Earth around the sun. In the lunar year, there is generally about 12 lunar months which equates to about 354 days. This male it 1 days shorter that the solar year. Therefore, the only way to reduce this difference is to add an extra lunar month about once every 2.5 years. This extra month is referred as "Adhik Mas" which means extra month.

The Hindu synodic month takes the motion of the sun into the account where it takes the mean time between new months. The length with respect of the Hindu synodic month is 29.5305879.

The mean time for the sunrise is 6a.m. However, it is being affected by 4 factors:

- The latitude of the location affects the time of the sunrise which also is in turn dependant on the season.
- There is also the $\frac{1}{4}$ time difference between the sidereal day and the solar day.
- The equation of time will give the difference between the local and the civil midnight. This is caused by the uneven motion of the sun throughout the seasons.

For the different locations, the difference in the longitude affects the local time of astronomical events by 4 minutes for every degree of longitude.

The Indian Lunisolar calendar

Amanta is a lunar month which starts from a new moon to another new moon. While purnimanta is the month begins from one full month to another. The lunar calendar using these months are called amanta calendar and purnimanta calendar respectively.

Since the solar calendar is longer than the lunar calendar, it is kept adjusted to the earlier by adding intercalary months at intervals. The first day of the lunar year will change from one year to another and will fall between March and April. This is due to the fact that Chaitra, the first month of Indian Calendar, generally take place from 15th March to 13th April.

Amanta Lunisolar Calendar

The amanta lunisolar calendar is called mukhyamana, where mukhya means primary. This is an important calendar as the days of festival is fixed based on it even if the purnimanta calendar is followed.

This amanta calendar begins from the Chaitra. The solar months in which the new moon of the lunar month occurs is used to name the months of this calendar. The months of this amanta calendar can be grouped into two, the Sukla paksha, which means the bright half of the month, and Krishna paksha, which means the dark half of the month. Sukla paksha occupy the period of time from new moon to the coming full moon where as Krishna paksha covers the time period from the full moon where Sukla paksha stops to the next new moon.

Purnimanta Lunisolar calendar

This calendar takes place from the time when a full moon starts to another. It is named after amanta month that occurs two weeks later. The purnimanta lunisolar month starts a fortnight before the first new moon of an amanta month and ends in the middle of that same amanta month.

While an amanta month can occur totally outside the solar month it is named after, this purnimanta month will always occupy half or more of the solar month.

Note: we realized that the first month, Chaitra, of the year in Indian Calendar and the year does not begin in the same time and day. The year begins in the middle, that is, about the 15th day of the first lunar month (Chaitra) leading in counting the Krushna paksha of Chaitra in the previous year. The year begins with the start of Sukla paksha of Chaitra.

Tithi

The lunar cycle begins with the new month and then it enters to a crescent phase and ends with the full moon. This whole cycle will last for approximately 15 days. After the 15 days, the moon will reach the waning phase before it enters the new moon phase.

According to the Hindu lunar calendar, the crescent lunar phase fortnight is called the “Shukla Paksha”. The waning phase is known as “Krushna Paksha”. “Shukla Paksha” changes from 0⁰ to 180⁰ and the “Krushna Paksha” changes from 180⁰ to 0⁰. Therefore, if we divide the 180⁰ to 15 parts in which 1 part represents 1 day, each part represents 12⁰. This 12⁰ portion represents the angular distance between the moon and the sun. Hence, 1 lunar day is 12⁰. However, it must be noted that according to Kepler’s Law, the angular velocity of moon in its elliptical orbit around the Earth continuously varies, the length of a lunar day or tithi also varies accordingly. Hence, the tithi can extend over one day or it can be skipped of two tithis happened one day.

Panchang

It is the traditional 5 part Hindu calendar comprising civil day, day of the week, stellar position of the moon, yoga and karana which is based on the lunar phase.

Panchang literally means “five parts”. “Panch” means five while “ang” means parts. It is the traditional 5 part Hindu calendar comprising civil day, day of the week, stellar position of the moon, yoga and karana which is based on the lunar phase.

The people in India have always measured time using the scientific and spiritual calendar Panchang. The Panchang determines festivals that celebrate and honour the legends and gods of India. It evokes the universe using mathematical calculations which can predict weather, epidemics, personal fortune and events.

The Panchang uses lunar month to calculate and measure time. The lunar months used have their names reveal the secret path of constellations and stars. The face of Aamvasya, the new moon, ushers in a new month.

For Hindus, Panchang is more, much more than determining time in India. It is essential for their religion and lives. The Panchang is used to forecast the spiritual way of a person on his journey towards god.

The 60 year cycle and the Jovian periods in the Tamil calendar

The Tamil calendar follows a sixty year cycle which is similar to the sixty year cycle in the Chinese calendar. The ancient Indian astronomers, through many years of observation, found out that Jupiter actually took twelve years to revolve around the sun.

They also observed that in the course of the twelve years, Jupiter passed in the same sequence through the same zodiacal constellations as the sun did in a twelve month cycle. Actually, Jupiter did not take exactly twelve years to revolve around the sun. Jupiter only takes about 11.86 years to revolve around the sun. Therefore, twelve years was actually an approximation rather than a precise figure. However, although twelve years is not the precise duration of time it took for Jupiter to revolve round the sun once, ancient Indian astronomers use this approximated value to extend to a unit of five cycles, also known as the sixty year cycle of Jupiter. The ancient Indian astronomers thought that Jupiter takes about sixty years (5 revolutions around the sun) to come back to its original position (relative to the zodiacal constellations). Thus, they formulated the sixty year cycle in that after each period of sixty years, they would start with the same naming of the year again, just as the way Jupiter returns to the same position (relative to the zodiacal constellations) as it first started out. This sixty year cycle system was used in Indian calendars from the 6th century AD onwards. Each revolution of Jupiter around the sun was also known as one Jovian period (1 Jovian period = 12 years) and therefore there are actually five Jovian periods in a sixty year cycle. However, in actual fact, it takes Jupiter about 83.02 years to return to its original position, that is, about 7 revolutions around the sun (11.86 X 7 = 83.02 years)

The following table lists the cycle of sixty year names:

| No. | Name | in English | Year |
|-----|-------------------|-------------|------------|
| 1 | பிரபவ | Prabhava | 1987--1988 |
| 2 | விபவ | Vibhava | 1988--1989 |
| 3 | சுகல | Sukla | 1989--1990 |
| 4 | பிரமோதுத | Pramodhudha | 1990--1991 |
| 5 | பிரசோற்பத்தி | Prajorpati | 1991--1992 |
| 6 | ஆங்கீரச | Angirasa | 1992--1993 |
| 7 | ஸ்ரீமுக | Srimukha | 1993--1994 |
| 8 | பவ | Bhava | 1994--1995 |
| 9 | யுவ | Yuva | 1995--1996 |
| 10 | தாது | Dhatu | 1996--1997 |
| 11 | ஈஸவர | Isvara | 1997--1998 |
| 12 | வேகுதானிய | Vehudhanya | 1998--1999 |
| 13 | பிரமாதி | Pramathi | 1999--2000 |
| 14 | விக்கிரம | Vikrama | 2000--2001 |
| 15 | விஷ் ^௧ | Vishu | 2001--2002 |
| 16 | சித்திரபானு | Chitrabanu | 2002--2003 |
| 17 | சுபானு | Subanu | 2003--2004 |
| 18 | தாரண | Tarana | 2004--2005 |
| 19 | பார்த்திப | Parthiba | 2005--2006 |
| 20 | விய | Viya | 2006--2007 |
| 21 | சர்வசித்து | Sarvajit | 2007--2008 |
| 22 | சர்வதாரி | Sarvadhari | 2008--2009 |
| 23 | விரோதி | Virodhi | 2009--2010 |
| 24 | விக்ருதி | Viruti | 2010--2011 |

| | | | |
|----|--------------|--------------|------------|
| 25 | கர | Kara | 2011--2012 |
| 26 | நந்தன | Nandana | 2012--2013 |
| 27 | வீஜய | Vijaya | 2013--2014 |
| 28 | ஜய | Jaya | 2014--2015 |
| 29 | மன்மத | Manmatha | 2015--2016 |
| 30 | துன்முகி | Dhunmuki | 2016--2017 |
| 31 | ஹேவிளம்பி | Hevilambi | 2017--2018 |
| 32 | விளம்பி | Vilambi | 2018--2019 |
| 33 | விகாரி | Vikari | 2019--2020 |
| 34 | சார்வரி | Sarvari | 2020--2021 |
| 35 | பிலவ | Plava | 2021--2022 |
| 36 | சுபகிருது | Subakrit | 2022--2023 |
| 37 | சோபகிருது | Sobakrit | 2023--2024 |
| 38 | குரோதி | Krodhi | 2024--2025 |
| 39 | விசுவாசுவ | Visuvasuva | 2025--2026 |
| 40 | பராபவ | Parabhava | 2026--2027 |
| 41 | பிலவங்க | Plavanga | 2027--2028 |
| 42 | கிலக | Kilaka | 2028--2029 |
| 43 | சௌமிய | Saumya | 2029--2030 |
| 44 | சாதாரண | Sadharana | 2030--2031 |
| 45 | விரோதிகிருது | Virodhikritu | 2031--2032 |
| 46 | பரிதாபி | Paridhabi | 2032--2033 |
| 47 | பிரமாதீச | Pramadhisa | 2033--2034 |
| 48 | ஆனந்த | Ananda | 2034--2035 |
| 49 | ராட்சச | Rakshasa | 2035--2036 |
| 50 | நள | Nala | 2036--2037 |
| 51 | பிங்கள | Pingala | 2037--2038 |
| 52 | காளயுக்தி | Kalayukti | 2038--2039 |
| 53 | சித்தார்த்தி | Siddharthi | 2039--2040 |
| 54 | ரௌத்திரி | Raudri | 2040--2041 |
| 55 | துன்மதி | Dunmati | 2041--2042 |
| 56 | துந்துபி | Dundubhi | 2042--2043 |
| 57 | ருத்ரோத்காரி | Rudhrodhgari | 2043--2044 |
| 58 | ரக்தாட்சி | Raktakshi | 2044--2045 |
| 59 | குரோதன | Krodhana | 2045--2046 |
| 60 | அட்சய | Akshaya | 2046--2047 |

Naming Months

Although there are various Indian calendars, most of them have something in common: the name of the months. Indian months are either named after the Nakshatras or it is named after the Rasis.

Naming months based on Nakshatras

This system is used for both solar and lunisolar calendars. The names of the months are derived from the star groups also known as the asterisms which are along the ecliptic. Although the ecliptic is divided into 27 (in some cases 28) lunar stations, only 15 are taken into consideration when naming the months. Therefore, when a certain full moon occurs near a lunar asterism the month is named after it. It can be observed from the table below that the months the Aashaadha, Bhaadrapada and Phalguni are related to the nakshatras Purva and Uttara. The Indian lunar year starts on a new moon day. The 12 lunar months are:

| Nakshatra | Name of Month |
|--------------------------------|----------------------|
| Chitra | Chaitra |
| Visakha | Vaisakha |
| Jyestha | Jyaistha |
| Aashaadha (Purva and Uttara) | Aashaadha |
| Sravana | Sraavana |
| Bhaadrapada (Purva and Uttara) | Bhaadrapada |
| Asvini | Asvayuja |
| Krittika | Kaarthika |
| Mrugasira | Maaghasira |
| Pushyami | Pausa |
| Maghaa | Maagha |
| Phalguni (Purva and Uttara) | Phalguna |

Naming months based on Rasis

Only solar months follow this system. As mentioned in the earlier section on the Indian Solar calendar, the panchang is determined by the samkranti. Since panchang is the first day of the month, when the Sun moves into a rasi arc, the month is named after the rasi. The naming is done in Sanskrit (similar to the name of rasi) and Malayalam.

| Rasi / In Sanskrit | In Malayalam |
|---------------------------|---------------------|
| Mesha | Medam |
| Vrshava | Edavam |
| Mithuna | Midhunam |
| Karkata | Karitaka |
| Simha | Chingam |
| Kanya | Kanni |
| Tula | Thulam |
| Vrischika | Vrischikam |
| Dhanus | Dhanu |
| Makara | Makaram |
| Kumbha | Kumbham |
| Mina | Minam |

Length of Months

The length of the months are based on the duration the sun takes to travel from the beginning of samkranti to the end of the same samkranti in the solar calendar which is about 30-31 days.

In the lunisolar calendar the length of the month is the time taken from a new moon to new moon (amanta month) or from a full moon to a full moon (purnimanta month).

As different systems are used, there are variations in days as can be seen in the table below.

| Months in the North Indian Hindu Calendar | | Months in the Tamil Hindu Calendar | |
|---|-------------|------------------------------------|-------------|
| Month | No. of Days | Month | No. of Days |
| Chaitra | 30 | Chiththirai | 31 |
| Vaisakha | 31 | Vaikasi | 31 |
| Jyaistha | 31 | Aani | 32 |
| Ashaadha | 31 | Aadi | 31 |
| Sraavana | 31 | Aavani | 31 |
| Bhaadrapada | 31 | Purattasi | 31 |
| Asvayuja | 30 | Aippasi | 29/30 |
| Kaarthika | 30 | Karthigai | 29/30 |
| Maarghasira | 30 | Margazhi | 29 |
| Pausa | 30 | Thai | 29/30 |
| Maagha | 30 | Maasi | 29/30 |
| Phalguna | 30 | Panguni | 31 |

Naming Days

The naming of the days is based on the lunar system. A lunar month starts at the time when the visible planets (i.e. Sun, Mercury, Moon, Mars, Venus, Jupiter and Saturn) are in conjunction. Hence, the naming of the days is also related to these planets.

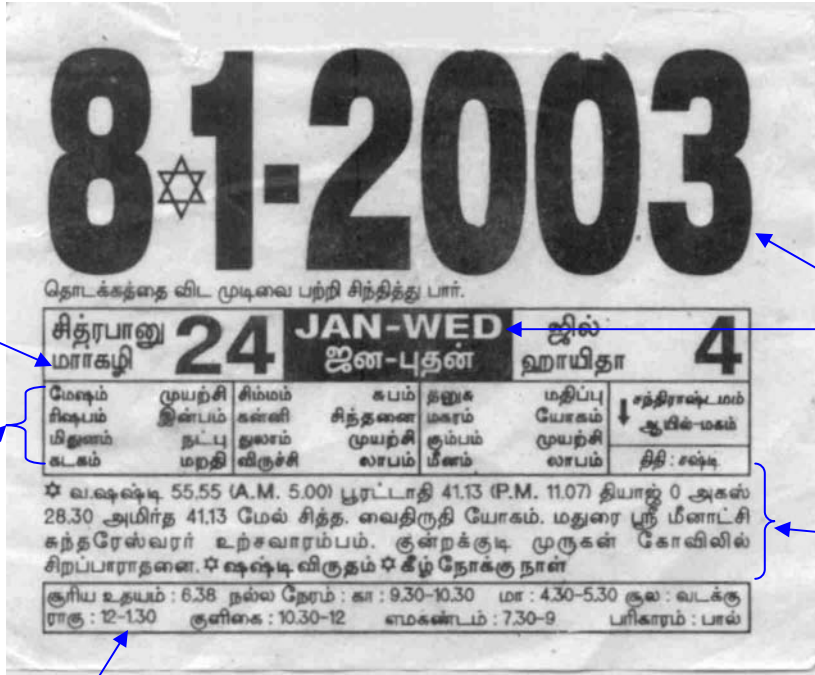
The table below shows the naming of days and how it is related to the planets.

| Western Days | Names in Sanskrit, in Hindu Calendar | Names in the Tamil Calendar |
|----------------------------|--------------------------------------|-----------------------------|
| Sunday (day of Sun) | Ravivara or Adityavara | Nyaayitrukizhamai |
| Monday (day of Moon) | Chandravara or Somavara | Thingatkizhamai |
| Tuesday (day of Mars) | Mangalavara or Bhaumavara | Sevvaaikizhamai |
| Wednesday (day of Mercury) | Buddhavara or Saumyavara | Budhankizhamai |
| Thursday (day of Jupiter) | Brihaspatvara or Guruvara | Vyaazhankizhamai |
| Friday (day of Venus) | Sukravara | Vellikizhamai |
| Saturday (day of Saturn) | Sanivara | Sanikizhamai |

- An insert is attached to give a better view of the above explanation.

Insert

| Rasi | Nakshatra | Name of Lunar Month | Name of Solar month | Tamil Month Names |
|-------------|------------------|----------------------------|----------------------------|--------------------------|
| Mesha | Chitra | Chaitra | Vaisakha | Chiththirai |
| Vrshava | Visakha | Vaisakha | Jyaistha | Vaikasi |
| Mithuna | Jyestha | Jyaistha | Ashaadha | Aani |
| Karkata | Aashaadha | Aashaadha | Sraavana | Aadi |
| Simha | Sravana | Sraavana | Bhaadrapada | Aavani |
| Kanya | Bhaadrapada | Bhaadrapada | Asvayuja | Purattasi |
| Tula | Asvini | Asvayuja | Kaarthika | Aippasi |
| Vrischika | Krittika | Kaarthika | Maarghasira | Karthigai |
| Dhanus | Mrugasira | Maaghasira | Pausa | Margazhi |
| Makara | Pushyami | Pausa | Maagha | Thai |
| Kumbha | Maghaa | Maagha | Phalguna | Maasi |
| Mina | Phalguni | Phalguna | Chaitra | Panguni |



Indicates the month of the Tamil Calender.

Indicates the day on the Western Calender.

This section is like a horoscope section and it tells us things like we should put in effort in what we do for the day etc.

This box indicates the auspicious and inauspicious time of the day.

This part of the calender is the religious part. It states the god which we should focus on and also indicates the type of fasting that should be practised.

Some Symbols:

● -Ammavasai (New moon)

○ -Purnammi (Full Moon)

As can be seen from the above calender section, the Hindu pay great attention to auspicious and inauspicious days and times. In a day, some hours are considered auspicious while others are not. Usually the Wednesdays and Saturdays are unlucky and also the dark half of the month (time of the waning moon) is also considered unlucky. Leap months and days containing lost lunar days are also considered inauspicious. Auspicious days occur during solar and lunar eclipses and during planetary conjunctions

Indian holidays

In most Indian holidays, it is dependent on the lunar date. Festivals are mostly celebrated on the day a specified lunar day at the current at sunrise. The rest of the holidays may depend on the phase of the moon at noon, sunset or midnight. Some lunar holidays require that the specified day to be current at noon rather than sunrise. Therefore, the lunar day in question begins at least 1/15 of a day before the sunset of one day and ends before the sunset of the next, the corresponding holiday is celebrated on the first day.

It is known that the certain hours, days and months are more auspicious than others. Wednesday and Saturday are known to be unlucky as it is in the dark half of each month. Leap months and civil days containing the lost lunar days re considered as inauspicious. Actual and computed solar and lunar eclipses and planetary conjunctions are usually auspicious.

| Number | In English | English day | Celestial body |
|--------|--------------------|-------------|----------------|
| 1 | Nyaayitru-kizhamai | Sunday | Sun |
| 2 | Thingat-kizhamai | Monday | Moon |
| 3 | Sevvaai-kizhamai | Tuesday | Mars |
| 4 | Budhan-kizhamai | Wednesday | Mercury |
| 5 | Vyaazha-kizhamai | Thursday | Jupiter |
| 6 | Velli-kizhamai | Friday | Venus |
| 7 | Sani-kizhamai | Saturday | Saturn |

The motion of the seven heavenly bodies is described by the combinations of the circular motions which are the cycles and epicycles. To find the true position of the sun and moon, we need to adjust their mean longitudes by the contribution of the epicycle. The heavenly bodies were assumed in the main circle, deferent, and be “pulled” in one direction or the other by “winds” and “cords of air” originating on the epicycle.

There are many Indian festivals being celebrated by the Indians every year due to the wide variety of Indian calendars. Since we are doing a project which focuses on the Tamil calendar, we shall focus on the festivals celebrated in the Tamil calendar. We decided to focus on the three major and most widely celebrated festivals namely, Thai Poesam, Tamil New Year (Subanu Varusha Pirappu) and Deepavali.

Thai Poesam

Thai Poesam is an annual festival celebrated on the day of star ‘Poesam’ around Pournami (Full Moon) in the Tamil month of ‘Thai’ (January 14- February 14) at all the Murugan temples. From the name “Thai Poesam”, ‘Thai’ refers to the name of the month in the Tamil calendar and ‘Poesam’ is the name of the eighth star among the twenty-seven stars in the Hindu astrological system.

The legend of the festival begins like this: There was a demon called Tharakasuran who had been causing a lot of troubles to the rishis and saints. There was a man called Lord

Muruga who had been instructed by his parents Lord Shiva and Parvati to destroy the demon. His father, Lord Shiva gave him eleven weapons and his mother gave him a 'vel' to destroy the demon. He managed to destroy the demon on the Poosam Nakshatra day in the Tamil month of Thai. That is why Thai Poosam is celebrated on that day in all Murugan temples every year.

The Tamil New Year (Subanu Varusha Pirappu)

The "birth" or the beginning of a new year in the Tamil calendar is known as "Varusha Pirappu". The start of the Tamil New Year is when the sun approaches and reaches the zodiac, Medam (Aries) which is in the month of Sithrai or Chithirai (corresponding to mid April to mid May in the Gregorian Calendar). The revolution of the earth around the sun means that the sun would enter all the 12 signs of the zodiac every year.

The Tamil New Year is celebrated on the first day of the first month of the year. The first month of the year in the Tamil calendar is called Sithrai or Chithirai. This month usually falls around the middle of the Gregorian month of April. There are twelve months in the Tamil calendar just as there are twelve months in the Gregorian calendar. The Tamil New Year usually falls on the 13th or 14th of April (mid April) in the Gregorian calendar. This is because the sun will approach and reach the zodiac, Medam (Aries) around the 13th or 14th of April. Chithirai (or Sithrai) is chosen as the first month of the Tamil calendar because it is the month after the March Equinox.

In ancient Hindu folklore, Lord Brahma created the Universe on the Tamil New Year's day. Thus, during the Tamil New Year's day is deemed as an auspicious day to start new ventures and mark a new beginning. It is also a day to invoke upon God's blessing for the year ahead. The celebrations for the Tamil New Year includes a morning worship (puja) to Suryan, the Sun God, and the children seek blessings from their parents and elders. The rest of the day is spent on visiting relatives and friends, exchanging gifts and New Year greetings.

Deepavali

The commemoration of the 4-day festival may fall anywhere between October 15 and November 15 each year. A selected almanac is used to determine the date every year. In order to estimate the date on which Deepavali falls in subsequent years using an already-determined Deepavali date from the previous year, we can either add 19 to or subtract 11 from that known date. If adding 19 brings us to a date which is past November 15, then we should subtract 11 instead, to bring us to the date of Deepavali for the following year. We may also work this way—if subtracting 11 brings us to a date which falls before October 15, then 19 should have been added instead.

The 1st day of the festival marks the conquering of the powerful demon Naraka by Lord Krishna and his wife Satyabhama, on the 2nd day a ritual for Goddess Lakshmi is performed because this is when she is believed to be in a benevolent mood and would

thus fulfill the wishes of her devotees. The 3rd day marks the day that god Bali would rule over Bhuloka as permitted by Lord Vishnu, and lastly, the 4th day commemorates the return of Ram from his exile after killing Ravana. People celebrate by having sisters inviting their brothers home for a celebration.

Comments:

We decided to work on the subject of the Indian calendar because after surfing the Net and reading through the topics of past year projects by students who did GEK 1506 last year, we found out that very few groups attempted to work on this topic. Thus we had the urge to stir up this one, encouraged by the fact that one of our members, Melissa, could do some Tamil-English translation as we go along.

Just like in any other project, we faced some challenges during this one. While pouring through the relevant notes (or so we thought then) that we had downloaded from the Net and scanning through reference books from the library, we were stumped by the immense amount of data regarding the Indian calendar. We had absolutely no idea how far deep in we should venture for this project. It was a 50-50 do-or-die we were taking at all times—to add in a certain piece of information which would add to the readers' bank of fascinating knowledge, or to add it in and let it be pushed aside as confusing junk, take up space and annoy the readers. Finally, we used this as a guideline—Put together pieces of sub-topical information that would flow as a whole and be comprehensively accessible to any readers who may be a layman in terms of Indian Calendars. Otherwise, the whole purpose of having such a portfolio would be defeated.

During the process, we sought to read through the material, understand as much as we could, and then write out what we know into simple English, without compromising on the details. This proved to be the major challenge we faced because some theories were explained using Tamil jargons, besides simple Tamil. For the jargons, it was like reading a passage which had all the key words replaced with blanks! Even for some theories which were explained totally in English, it sometimes was like grasping a general idea of the theory, but not the full one. We had discussions on things we could not figure out to clear up some doubts, and did further research for a certain sub-topics a few times before we got a better idea of them.

We would say that the process of this project was everything—mind-boggling because we were stuck at some points, really funny because of a lot of comic relief, tiring because of our long days, but overall we had a great time because of the camaraderie and enthusiasm of all group members, especially when we stayed late in school in the Students' Lounge and were the only occupants there after it got very late. Together, we learnt a great about the ancient Indian style of creating a calendar, although we know that there is an even greater deal we haven't yet discovered.

References:

<http://www.indoindians.com/calendar.hmt>
<http://www.math.nus.edu.sg/aslasksen>
www.indiaexpress.com/rangoli/deepavali.html
<http://www.boloji.com/astro/00321.htm>
<http://gowealthy.com/scripts/printpage.asp?aid=790>
<http://www.cs.utk.edu/~siddhart/tamilnadu/CAL/index.html>
<http://webexhibits.org/calendars/calendar-indian.html>
<http://www.questia.com>
<http://www.mcn.org/greatbear/backarticles/article3.html>
<http://www.diagnosis2012.co.uk/new4.htm#tibet>
<http://tamilcooking.homestead.com/files/tamilnewyear.htm>

Calendrical Calculations: The Millennium Edition
by Edward M. Reingold, Nachum Dershowitz
Microsoft Encarta 98 Encyclopedia Deluxe Edition

This project was done by Group 16 which consists of the following members:

- Quek Ngee Mien
- Quek Yi Ling
- Woo Su Fen
- Neo Miao Chin
- Durgahshree Melissa D/O Tharm
- Zheng Minghui

