

Date

COLLABORATORS

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Chapter 1

Date

1.1 Date.doc

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GregorianDaySmaller()  
GregorianDiffDate()  
GregorianEaster()  
GregorianLeapYear()  
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GregorianToJD()  
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GSYearToJD()  
GYearToScaliger()  
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HeisDayGreater()  
HeisDaysAfterWeekday()  
HeisDaysBeforeWeekday()  
HeisDaySmaller()  
HeisDiffDate()  
HeisLeapYear()  
HeisMonthDays()  
HeisToJD()  
HeisWeek()  
HeisWeekday()  
HeisYearDays()  
HSYearToJD()  
HYearToScaliger()  
JDtoMJD()  
JDtoTime()  
JSYearToJD()  
JulianDayDiff()  
JulianDayGreater()  
JulianDaysAfterWeekday()
```

```
JulianDaysBeforeWeekday()  
JulianDaySmaller()  
JulianDiffDate()  
JulianLeapYear()  
JulianMonthDays()  
JulianToJD()  
JulianWeek()  
JulianWeekday()  
JulianYearDays()  
JYearToScaliger()  
LMT  
MJDtoJD()  
ScaligerYearToG()  
ScaligerYearToH()  
ScaligerYearToJ()  
SecToTime()  
TimeToJD()  
GregorianEaster()  
TimeToSec()  
TimeZoneFactor()
```

1.2 Date/--background--

NAME

Date -- This module was designed to help calc. calendar dates (V33)

FUNCTION

I now about the date routines in the Amiga-OS(TM), but I decided not to use them, because of their limited functionalities and of the portability of this Module!

NOTES

A tropical year is 365.2422 days! / 365d, 5h, 48min, 46sec
A moon month is 29.53059 days! / 29d, 12h, 44min, 2.9 sec
A moon phase is 7.38265 days!

(German) Books which helped me creating this:

Kleine Naturwissenschaftliche Bibliothek, Band 23
Ewige Kalender
A.W. Butkewitsch & M.S. Selikson
5. Auflage
Teubner, Leipzig 1974
ISBN 3-322-00393-0

Tag und Woche, Monat und Jahr: eine Kulturgeschichte des
Kalenders
Rudolf Wendorff
Westdeutscher, Opladen 1993
ISBN 3-531-12417-X

Kalender und Chronologie: Bekanntes & Unbekanntes aus der
Kalenderwissenschaft
Heinz Zemanek
4. Auflage
Oldenbourg, München 1987

ISBN 3-486-20447-5

Meyers Handbuch
über das Weltall
Karl Schaifers & Gerhard Traving
5. Auflage
Bibliographisches Institut Mannheim 1973
ISBN 3-411-00940-3

(English) Books which helped me creating this:

Mathematical Astronomy with a Pocket Calculator
Aubrey Jones Fras
unknown(first) Edition
David & Charles Newton Abbot, London 1978
ISBN 0-7153-7675-6

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POSSIBILITY OF SUCH DAMAGES.

ADDITIONAL INFORMATION

I have tried to make portable/usefull and I hope bugfree software for eternity - but this seems to be impossible (sorry!) :)
So I hope you will pay a fee for this.

AUTHOR

Kai Hofmann
Arberger Heerstraße 92
28307 Bremen
Germany
EMail: i07m@alf.zfn.uni-bremen.de
(no phone - I hate it!)

Bank account : 1203 7503
Account owner: Kai Hofmann
Bank code : 290 501 01
Bank name : Sparkasse in Bremen
Bank address : 28307 Bremen / Germany

THANK

Thanx are going to the following people:
Danial Armor - For his hint about the Oberon-2 SHORT
command
Heinz Zemanek - For his great book
Christian Schaefer - For spending time on this lib with his
Borland C++ 4.0 compiler
Rita Reichl - For correcting my bad english ;-)

1.3 Date/--history--

NAME

history -- This is the development history of the Date module

VERSION

\$VER: Date 33.088 (11.08.1994)

HISTORY

16.01.1994 - Procedures: JulianLeapYear, GregorianLeapYear &
HeisLeapYear initiated.
22.01.1994 - Procedures: JulianMonthDays, GregorianMonthDays,
HeisMonthDays, JulianYearDays, GregorianYearDays,
HeisYearDays, JulianDayDiff, GregorianDayDiff,
HeisDayDiff, JulianDaySmaller, GregorianDaySmaller,
HeisDaySmaller, JulianWeekday, GregorianWeekday,
HeisWeekday, JulianDaysBeforeWeekday,
GregorianDaysBeforeWeekday, HeisDaysBeforeWeekday,
JulianDaysAfterWeekday, GregorianDaysAfterWeekday,
HeisDaysAfterWeekday JulianDiffDate, FreeDate
initiated.
Types: Weekdays, Date, DatePtr initiated.
Vars of Gregorian reform initiated
(for changing to different countries)
23.01.1994 - Procedures: JulianDiffDate finished,

GregorianDiffDate, HeisDiffDate, JYearToScaliger,
GYearToScaliger, HYearToScaliger, ScaligerYearToJ,
ScaligerYearToG, ScaligerYearToH, JSYearToJD,
GSYearToJD, HSYearToJD, JDtoMJD, MJDtoJD, JulianToJD,
GregorianToJD, HeisToJD, TimeToJD, JDToTime, FreeTime
initiated.
Types: Time, TimePtr initiated.

28.01.1994 - Procedures: GregorianMoonAge, MoonMonthAge,
GregorianEaster initiated.

30.01.1994 - Procedures: JulianDiffDate, GregorianDiffDate,
HeisDiffDate, JDtoTime, GregorianEaster edited
(changing return value from ptr to VAL variables).
Procedures: FreeDate, FreeTime deleted.
Types: Date, DatePtr, Time, TimePtr deleted (not
longer needed, because of the procedure changes).
Procedures: GregorianMoonAge, GregorianEaster changed
year parameter from CARDINAL to INTEGER (this is more
consistent to the rest of the library).
Bugs removed: GregorianWeekday, HeisWeekday
(before removing, the weekday for leapyears was
wrong)
Procedure: GregorianEaster finished.

30.01.1994 - Ported to Oberon-2

31.01.1994 - Compiled with Oberon-2 V3.11

12.02.1994 - Procedures: TimeZoneFactor, LMT, TimeToSec, SecToTime
initiated.
Version-String installed :)

12.02.1994 - Starting translation to SAS C 6.51
Date.h translated

13.02.1994 - Continuation of C translation

17.02.1994 - New Oberon-2 Port, because yesterday Daniel Armor
gives me a small hint about the SHORT command
(I did not know about this!)

17.02.1994 - Small bug in Autodocs removed
making this text as Date/--history-- autodoc

17.02.1994 - Continuation of C translation

18.02.1994 - Finished with C translation

19.02.1994 - C bugs removed (thanx to SAS for helping a C Lamer
like me!), some optimizations done too.

19.02.1994 - Oberon-2 version compiled with V40.17 includes

21.02.1994 - Writing Modula-II testmodule
Vars for the begining of Heis calculation initiated.
Fixed small bugs in GregorianWeekday, HeisWeekday,
TimeToSec, SecToTime
Return-value of LMT changed to LONGINT!
Converting testmodule to Oberon-2

22.02.1994 - Converting testmodule to C

23.02.1994 - I noticed, that I forgot the 3 functions
JulianWeek, GregorianWeek, HeisWeek

24.02.1994 - Initiated the 3 forgotten functions

26.02.1994 - Initiating new GregorianEastern with Gauß-algorithms
but ONLY for 1900-2099!

27.02.1994 - Bug fixed in JulianWeekday
Bugs fixed in JulianDayDiff, GregorianDayDiff,
HeisDayDiff
JulianDayGreater, GregorianDayGreater,
HeisDayGreater Initiated.

02.03.1994 - Small bug fixed in HeisdayDiff
 Bugs from 27.02. fixed in Modula-II and Oberon-2
 versions
 I found the way to extend Gregorian Easter!
 Small bug fixed in JulianWeek, GregorianWeek,
 HeisWeek (~(M2) is not !(C))

05.03.1994 - Some internal bugs removed
 New internal procedures GregorianSB,
 GregorianJHSB, GregorianJHStartSB!
 Extending GregorianEaster :)

11.03.1994 - Things from 05.03. done in Modula-II and Oberon

12.03.1994 - If __SASC is defined autoinitialization instead of
 _DateInit will be used!

13.03.1994 - After studying the SAS C Manual again I decided to
 check for __SASC_650 instead of __SASC because of
 the available of priorities!
 Setting the priority of _DateInit for
 autoinitialization to 600!

15.03.1994 - Making Date as library

16.03.1994 - Some work on the Autodocs was done
 Eleminating OldGregorianEaster by comments
 (ANSI: STOP bad standards like that there are NO
 nestedcomments possible in C!!!)

19.03.1994 - Some work on the Autodocs was done in the M2 Code

20.03.1994 - Some work on the Autodocs was done in the Oberon Code

22.03.1994 - In JDtoMJD, MJD to JD an L was added to the constant
 In GregorianWeekday(), HeisWeekday(),
 JulianDiffDate(), GregorianDiffDate(),
 HeisDiffDate(), JDToTime() I have inserted
 conversions (found with Borland C++ 4.0)

24.03.1994 - Making SunOS4.1.3, SunOS5.3(Solaris2.3) &
 RS6000 AIX3.2.? binaries with gcc
 Eliminating nested commends by inserting a space
 between / and * (I hate this ANSI C standard
 feature for commends :)

27.03.1994 - Adding library register assignments to the autodocs

03.04.1994 - Small fixes for the SAS C++ Compiler
 Small bug fixed in the M2 version of GregorianEaster

04.04.1994 - Adding some 'static' keywords

10.04.1994 - Changing from Shareware to Gift Ware ;-)

02.08.1994 - Small fixes in the Autodocs (thanks to Rita Reichl
 for correcting my bad english ;-)

11.08.1994 - Again small fixes in the Autodocs!

1.4 Date/GregorianDayDiff

NAME

GregorianDayDiff -- Calculates the days between 2 dates. (V33)

SYNOPSIS

days := GregorianDayDiff(day1,month1,year1,day2,month2,year2);

PROCEDURE GregorianDayDiff(day1,month1 : SHORTINT; year1 : INTEGER;
 day2,month2 : SHORTINT; year2 : INTEGER) : LONGINT;

FUNCTION
 GregorianDayDiff gives you back the number of days between two specified dates.

INPUTS
 day1 - day of the first date
 month1 - month of the first date
 year1 - year of the first date
 day2 - day of the second date
 month2 - month of the second month
 year2 - year of the second date

RESULT
 days - The number of days between the two dates
 (positive if date1 <= date2).

EXAMPLE
 ...
 days := GregorianDayDiff(18,9,1970,22,1,1994);
 WriteString("Age of Kai Hofmann in days : ");
 WriteInt(days,10); WriteLn;
 ...

NOTES
 It is better only to use this function for years from -7 to 3200!

BUGS
 If you use one of the dates 5.10.1582 to 14.10.1582 you will get a wrong output, because these days don't exist!

SEE ALSO
 JulianDayDiff(), HeisDayDiff(), GregorianDaySmaller(),
 GregorianDayGreater(), GregorianMonthDays(), GregorianYearDays()

1.5 Date/GregorianDayGreater

NAME
 GregorianDayGreater -- Checks if date1 is greater than date2. (V33)

SYNOPSIS
 greater := GregorianDayGreater(day1,month1,year1,day2,month2,year2);

PROCEDURE GregorianDayGreater(day1,month1 : SHORTINT;
 year1 : INTEGER; day2,month2 : SHORTINT;
 year2 : INTEGER) : BOOLEAN;

FUNCTION
 GregorianDayGreater test if date1 is greater than date2.

INPUTS
 day1 - day of the first date
 month1 - month of the first date
 year1 - year of the first date
 day2 - day of the second date
 month2 - month of the second month

year2 - year of the second date

RESULT

greater - This is TRUE is date1 > date2 otherwise it's FALSE.

EXAMPLE

...

```
IF GregorianCalendar(18,9,1970,22,1,1994) THEN
```

```
  WriteString(">"); WriteLn;
```

```
ELSE
```

```
  WriteString("<="); WriteLn;
```

```
END;
```

...

NOTES

It is better only to use this function for years from -7 to 3200!

BUGS

No known bugs.

SEE ALSO

JulianDayGreater(), HeisDayGreater()

1.6 Date/GregorianCalendarDaysAfterWeekday

NAME

GregorianCalendarDaysAfterWeekday -- Returns the diff to wday after. (V33)

SYNOPSIS

```
days := GregorianCalendarDaysAfterWeekday(day,month,year,weekday);
```

```
PROCEDURE GregorianCalendarDaysAfterWeekday(day,month : SHORTINT;
  year : INTEGER; weekday : Weekdays) : SHORTINT;
```

FUNCTION

Returns the days to the weekday after the specified date.
So if you specify the 22.1.1994 (Saturday) and Thursday
you get back 5!

If you specify the 22.1.1994 and Saturday you get back 0
(the same day)!

INPUTS

day - day of the date

month - month of the date

year - year of the date

weekday - weekday to search for building difference

RESULT

days - The days after to the searched weekday.

EXAMPLE

...

```
days := GregorianCalendarDaysAfterWeekday(22,1,1994,Thursday);
```

...

NOTES

It is better to use this function only from -7 to 3200!

BUGS

See `GregorianWeekday()`!

SEE ALSO

`JulianDaysAfterWeekday()`, `HeisDaysAfterWeekday()`, `GregorianWeekday()`

1.7 Date/GregorianDaysBeforeWeekday

NAME

`GregorianDaysBeforeWeekday` -- Returns the diff to wday before. (V33)

SYNOPSIS

```
days := GregorianDaysBeforeWeekday(day,month,year,weekday);
```

```
PROCEDURE GregorianDaysBeforeWeekday(day,month : SHORTINT;
    year : INTEGER; weekday : Weekdays) : SHORTINT;
```

FUNCTION

Returns the days to the weekday before the specified date.
 So if you specify the 22.1.1994 (Saturday) and Thursday
 you get back 2!
 If you specify the 22.1.1994 and Saturday you get back 0
 (the same day)!

INPUTS

```
day      - day of the date
month    - month of the date
year     - year of the date
weekday  - weekday to search for building difference
```

RESULT

```
days - The days back to the searched weekday (1-7)
      - If you get back 8 an error occurs!
```

EXAMPLE

```
...
days := GregorianDaysBeforeWeekday(22,1,1994,Thursday);
...
```

NOTES

It is better to use this function only from -7 to 3200!

BUGS

See `GregorianWeekday()`!

SEE ALSO

`JulianDaysBeforeWeekday()`, `HeisDaysBeforeWekday()`, `GregorianWeekday()`

1.8 Date/GregorianDaySmaller

NAME
GregorianDaySmaller -- Checks if date1 is smaller than date2. (V33)

SYNOPSIS
smaller := GregorianDaySmaller(day1,month1,year1,day2,month2,year2);

PROCEDURE GregorianDaySmaller(day1,month1 : SHORTINT;
 year1 : INTEGER; day2,month2 : SHORTINT;
 year2 : INTEGER) : BOOLEAN;

FUNCTION
GregorianDaySmaller test if date1 is smaller than date2.

INPUTS
day1 - day of the first date
month1 - month of the first date
year1 - year of the first date
day2 - day of the second date
month2 - month of the second month
year2 - year of the second date

RESULT
smaller - This is TRUE is date1 < date2 otherwise it's FALSE.

EXAMPLE
...
IF GregorianDaySmaller(18,9,1970,22,1,1994) THEN
 WriteString("<"); WriteLn;
ELSE
 WriteString(">="); WriteLn;
END;
...

NOTES
It is better only to use this function for years from -7 to 3200!

BUGS
No known bugs.

SEE ALSO
JulianDaySmaller(),HeisDaySmaller()

1.9 Date/GregorianDiffDate

NAME
GregorianDiffDate -- Returns the diff date to another date. (V33)

SYNOPSIS
GregorianDiffDate(day,month,year,diffdays,dday,dmonth,dyear);

PROCEDURE GregorianDiffDate(day,month : SHORTINT;
 year,days : INTEGER; VAR dday,dmonth : SHORTINT;
 VAR dyear : INTEGER);

FUNCTION
Returns the date wich lies diffdays before/after the specified date.

INPUTS
day - day of the date
month - month of the date
year - year of the date
diffdays - difference to the date in days

RESULT
dday - Destination day
dmonth - Destination month
dyear - Destination year

EXAMPLE
...
GregorianDiffDate(23,1,1994,7,dday,dmonth,dyear);
...

NOTES
It is better to use this function only from -7 to 3200!

BUGS
unknown.

SEE ALSO
JulianDiffDate(), HeisDiffDate(), GregoriandayDiff(),
GregorianMonthDays()

1.10 Date/GregorianEaster

NAME
GregorianEaster -- Returns the date of eastern in a year (V33)

SYNOPSIS
GregorianEaster(year, dday, dmonth);

PROCEDURE GregorianEaster(year : INTEGER;
VAR dday, dmonth : SHORTINT);

FUNCTION
Returns the date of eastern for a specified year.

INPUTS
year - eastern is calculated for this year

RESULT
dday - day of easter-Sunday
dmonth - month of easter-Sunday

EXAMPLE
...
GregorianEaster(1994, dday, dmonth);
...

NOTES

Use this only for 1582 to 4100!

This is only a experimental version!

BUGS

In some years eastern lies one week behind!

SEE ALSO

GregorianMoonAge(), GregorianDaysAfterWeekday()

1.11 Date/GregorianLeapYear

NAME

GregorianLeapYear -- Checks if a year is a leap year. (V33)

SYNOPSIS

```
leapyear := GregorianLeapYear(year);
```

```
PROCEDURE GregorianLeapYear(year : INTEGER) : BOOLEAN;
```

FUNCTION

GregorianLeapYear checks if a year is a leap year.

For years after 1582 all years devideable by 4 are leap years, without years devideable by 100, but years devideable by 400

are leap years again!

For years before 1582 see JulianLeapYear().

INPUTS

year - The year which should be checked (from -32768 to 32767)

I think only values from -7 to 3200 are valid, because of the variant that was done on -8 by Augustus!

RESULT

leapyear - TRUE if the year is a leap year, otherwise false.

EXAMPLE

```
...
IF GregorianLeapYear(1994) THEN
  WriteString("leap year!");
ELSE
  WriteString("no leap year!");
END;
WriteLn;
...
```

NOTES

A year is 365.2425 days long!

Use this function only for values from -7 to 3200!

BUGS

No known bugs.

SEE ALSO

JulianLeapYear(), HeisLeapYear()

1.12 Date/GregorianMonthDays

NAME

GregorianMonthDays -- Gives back the number of days of a month. (V33)

SYNOPSIS

```
days := GregorianMonthDays(month,year);
```

```
PROCEDURE GregorianMonthDays(month : SHORTINT;  
    year : INTEGER) : SHORTINT;
```

FUNCTION

GregorianMonthDays gives you back the number of days a month in a specified year has.

For the year 1582 and the month 10 there are only 21 days, because of the Gregorian-reform 10 days are delete from the month (for more – look out for books about this!)

INPUTS

month – The month from wich you want to get the number of days.
year – The year in which the month is.

RESULT

days – The number of days the month uses, or 0 if you use a wrong month.

EXAMPLE

```
...  
days := GregorianMonthDays(1,1994);  
WriteString("Days of January 1994 : ");  
WriteCard(days,2); WriteLn;  
...
```

NOTES

Use this function only for years from -7 to 3200!

BUGS

If the reform in a country is not in the same month an error will occur!

SEE ALSO

GregorianLeapYear(), JulianMonthDays(), HeisMonthDays()

1.13 Date/GregorianMoonAge

NAME

GregorianMoonAge -- Returns the age of the moon (V33)

SYNOPSIS

```
ep := GregorianMoonAge(day,month,year);
```

```
PROCEDURE GregorianMoonAge(day,month : SHORTINT;  
    year : INTEGER) : SHORTINT;
```

FUNCTION
Returns the age of the moon on a specified date.

INPUTS
day - For this day the age is calculated.
month - For this month the age is calculated.
year - For this year the age is calculated.

RESULT
ep - The age of the moon on the specified date.

EXAMPLE
...
ep := GregorianMoonAge(18,9,1994);
...

NOTES
Use this only for 1582 to 4100!
This is only a experimental version!

BUGS
unknown.

SEE ALSO
MoonMonthAge(), GregorianEP()

1.14 Date/GregorianToJD

NAME
GregorianToJD -- Returns the JD for a date. (V33)

SYNOPSIS
jd := GregorianToJD(day,month,year);

PROCEDURE GregorianToJD(day,month : SHORTINT;
year : INTEGER) : LONGINT;

FUNCTION
Returns the JD for a Gregorian date.

INPUTS
day - day of the date to convert
month - month of the date to convert
year - year of the date to convert

RESULT
jd - This is the JD

EXAMPLE
...
jd := GregorianToJD(23,1,1994);
...

NOTES
It is better to use this function only from -7 to 3200!

BUGS
unknown.

SEE ALSO
JulianToJD(), HeisToJD(), GSYearToJD(), GYearToScaliger(),
GregorianDayDiff()

1.15 Date/GregorianWeek

NAME
GregorianWeek -- Gets the weeknumber of a specified date. (V33)

SYNOPSIS
weeknr := GregorianWeek(day,month,year);

PROCEDURE GregorianWeek(day,month : SHORTINT;
year : INTEGER) : SHORTINT;

FUNCTION
GregorianWeek gets the weeknumber for a specified date.

INPUTS
day - day of the date
month - month of the date
year - year of the date

RESULT
week - This is the number of the week the specified date lies in.
If the first day in a new year is a Friday, Saturday or
Sunday, this would be the last week of the last year!
If the 29.12. is a Monday, the 30.12. is a Monday or a Tuesday,
the 31.12. is a Monday, Tuesday or a Wednesday this is the
first week of the next year!

EXAMPLE
...
weeknr := GregorianWeek(4,10,1582);
...

NOTES
It is better only to use this function for years from 0 to 3000!

BUGS
For years < 0 errors could occur.

SEE ALSO
JulianWeek(), HeisWeek(), GregorianWeekday(), GregorianDayDiff(),
GregorianDaySmaller()

1.16 Date/GregorianWeekday

NAME
 GregorianWeekday -- Gets the weekday of a specified date. (V33)

SYNOPSIS
 weekday := GregorianWeekday(day,month,year);

PROCEDURE GregorianWeekday(day,month : SHORTINT;
 year : INTEGER) : Weekday;

FUNCTION
 GregorianWeekday gets the weekday for a specified date.

INPUTS
 day - day of the date
 month - month of the date
 year - year of the date

RESULT
 weekday - This result is of type:
 Weekdays = (dayerr,Monday,Tuesday,Wednesday,Thursday,Friday,
 Saturday,Sunday);
 dayerr will show you, that an error occurs!

EXAMPLE
 ...
 weekday := GregorianWeekday(22,1,1994);
 IF weekday = dayerr THEN
 ...
 END;
 ...

NOTES
 It is better only to use this function for years from -7 to 3200!
 In this version dayerr will only occur for the lost days :)

BUGS
 It's not possible to use years < 0 (for more see JulianWeekday()).

SEE ALSO
 JulianWeekday(),HeisWeekday(),GregorianDaySmaller(),
 GregorianLeapYear()

1.17 Date/GregorianYearDays

NAME
 GregorianYearDays -- Gives back the number of days in a year. (V33)

SYNOPSIS
 days := GregorianYearDays(year);

PROCEDURE GregorianYearDays(year : INTEGER) : INTEGER;

FUNCTION
 GregorianYearDays gives you back the number of days in

a specified year.

INPUTS

year - The year in which to count the days.
(I think its better not to use years before -7!)

RESULT

days - The number of days the year uses.

EXAMPLE

```
...
days := GregorianYearDays(1994);
WriteString("Days of 1994 : ");
WriteCard(days,3); WriteLn;
...
```

NOTES

It is better only to use this function for years from -7 to 3200!

BUGS

No known bugs.

SEE ALSO

GregorianMonthDays(), JulianYearDays(), HeisYearDays()

1.18 Date/GSYearToJD

NAME

GSYearToJD -- Calcs the JD from a Scaliger year. (V33)

SYNOPSIS

```
jd := GSYearToJD(syear);
```

```
PROCEDURE GSYearToJD(syear : INTEGER) : LONGINT;
```

FUNCTION

Returns the Julianday of a Scaliger year.

INPUTS

syear - Scaliger year

RESULT

jd - The Julianday

EXAMPLE

```
...
jd := GSYearToJD(4800);
...
```

NOTES

It is better to use this function only from 4707 to 7981!

BUGS

unknown.

SEE ALSO
JSYearToJD(), HYearToJD()

1.19 Date/GYearToScaliger

NAME
GYearToScaliger -- Returns the year as Scaliger year. (V33)

SYNOPSIS
syear := GYearToScaliger(year);

PROCEDURE GYearToScaliger(year : INTEGER) : INTEGER;

FUNCTION
Returns the Scaliger year.

INPUTS
year - Gregorian year

RESULT
syear - The Scaliger year

EXAMPLE
...
syear := GYearToScaliger(1994);
...

NOTES
It is better to use this function only from -7 to 3200!

BUGS
unknown.

SEE ALSO
JYearToScaliger(), HYearToScaliger()

1.20 Date/HeisDayDiff

NAME
HeisDayDiff -- Calculates the days between 2 dates. (V33)

SYNOPSIS
days := HeisDayDiff(day1, month1, year1, day2, month2, year2);

PROCEDURE HeisDayDiff(day1, month1 : SHORTINT; year1 : INTEGER;
day2, month2 : SHORTINT; year2 : INTEGER) : LONGINT;

FUNCTION
HeisDayDiff gives you back the number of days between
two specified dates.

INPUTS

```

day1    - day of the first date
month1  - month of the first date
year1   - year of the first date
day2    - day of the second date
month2  - month of the second month
year2   - year of the second date

```

RESULT

days - The number of days between the two dates
(positive if date1 <= date2).

EXAMPLE

```

...
days := HeisDayDiff(18,9,1970,22,1,1994);
WriteString("Age of Kai Hofmann in days : ");
WriteInt(days,10); WriteLn;
...

```

NOTES

It is better only to use this function for years from -7 to 8000!

BUGS

If you use on of the dates 5.10.1582 to 14.10.1582 you will get a wrong output, because this days don't exist!

SEE ALSO

JulianDayDiff(),GregorianDayDiff(),HeisDaySmaller(),HeisDayGreater(),
HeisMonthDays(),HeisYearDays()

1.21 Date/HeisDayGreater

NAME

HeisDayGreater -- Checks if date1 is greater than date2. (V33)

SYNOPSIS

```
greater := HeisDayGreater(day1,month1,year1,day2,month2,year2);
```

```
PROCEDURE HeisDayGreater(day1,month1 : SHORTINT; year1 : INTEGER;
    day2,month2 : SHORTINT; year2 : INTEGER) : BOOLEAN;
```

FUNCTION

HeisDayGreater test if date1 is great than date2.

INPUTS

```

day1    - day of the first date
month1  - month of the first date
year1   - year of the first date
day2    - day of the second date
month2  - month of the second month
year2   - year of the second date

```

RESULT

greater - This is TRUE is date1 > date2 otherwise it's FALSE.

EXAMPLE

```

...
IF HeisDaySmaller(18,9,1970,22,1,1994) THEN
  WriteString(">"); WriteLn;
ELSE
  WriteString("<="); WriteLn;
END;
...

NOTES
It is better only to use this function for years from -7 to 8000!

BUGS
No known bugs.

SEE ALSO
JulianDayGreater(),GregorianDayGreater()

```

1.22 Date/HeisDaysAfterWeekday

```

NAME
HeisDaysAfterWeekday -- Returns the diff to the wday after. (V33)

SYNOPSIS
days := HeisDaysAfterWeekday(day,month,year,weekday);

PROCEDURE HeisDaysAfterWeekday(day,month : SHORTINT;
  year : INTEGER; weekday : Weekdays) : SHORTINT;

FUNCTION
Returns the days to the weekday after the specified date.
So if you specify the 22.1.1994 (Saturday) and Thursday
you get back 5!
If you specify the 22.1.1994 and Saturday you get back 0
(the same day)!

INPUTS
day      - day of the date
month    - month of the date
year     - year of the date
weekday  - weekday to search for building difference

RESULT
days - The days after to the searched weekday.

EXAMPLE
...
days := HeisDaysAfterWeekday(22,1,1994,Thursday);
...

NOTES
It is better to use this function only from -7 to 8000!

BUGS
See HeisWeekday()!

```

SEE ALSO
JulianDaysAfterWeekday(),GregorianDaysAfterWeekday(),HeisWeekday()

1.23 Date/HeisDaysBeforeWeekday

NAME
HeisDaysBeforeWeekday -- Returns the diff to wday before. (V33)

SYNOPSIS
days := HeisDaysBeforeWeekday(day,month,year,weekday);

PROCEDURE HeisDaysBeforeWeekday(day,month : SHORTINT;
year : INTEGER; weekday : Weekdays) : SHORTINT;

FUNCTION
Returns the days to the weekday before the specified date.
So if you specify the 22.1.1994 (Saturday) and Thursday
you get back 2!
If you specify the 22.1.1994 and Saturday you get back 0
(the same day)!

INPUTS
day - day of the date
month - month of the date
year - year of the date
weekday - weekday to search for building difference

RESULT
days - The days back to the searched weekday (1-7)
If you get back 8 an error occurs!

EXAMPLE
...
days := HeisDaysBeforeWeekday(22,1,1994,Thursday);
...

NOTES
It is better to use this function only from -7 to 8000!

BUGS
See HeisWeekday()!

SEE ALSO
JulianDaysBeforeWeekday(),GregorianDaysBeforeWeekday(),HeisWeekday()

1.24 Date/HeisDaySmaller

NAME
HeisDaySmaller -- Checks if date1 is smaller than date2. (V33)

SYNOPSIS
smaller := HeisDaySmaller(day1,month1,year1,day2,month2,year2);

```
PROCEDURE HeisDaySmaller(day1,month1 : SHORTINT; year1 : INTEGER;
    day2,month2 : SHORTINT; year2 : INTEGER) : BOOLEAN;
```

```
FUNCTION
HeisDaySmaller test if date1 is smaller than date2.
```

```
INPUTS
day1    - day of the first date
month1  - month of the first date
year1   - year of the first date
day2    - day of the second date
month2  - month of the second month
year2   - year of the second date
```

```
RESULT
smaller - This is TRUE is date1 < date2 otherwise it's FALSE.
```

```
EXAMPLE
...
IF HeisDaySmaller(18,9,1970,22,1,1994) THEN
    WriteString("<"); WriteLn;
ELSE
    WriteString(">="); WriteLn;
END;
...
```

```
NOTES
It is better only to use this function for years from -7 to 8000!
```

```
BUGS
No known bugs.
```

```
SEE ALSO
JulianDaySmaller(),GregorianDaySmaller()
```

1.25 Date/HeisDiffDate

```
NAME
HeisDiffDate -- Returns the date for a diff to another date. (V33)
```

```
SYNOPSIS
HeisDiffDate(day,month,year,diffdays,dday,dmonth,dyear);
```

```
PROCEDURE HeisDiffDate(day,month : SHORTINT; year,days : INTEGER;
    VAR dday,dmonth : SHORTINT; VAR dyear : INTEGER);
```

```
FUNCTION
Returns the date wich lies diffdays before/after the specified date.
```

```
INPUTS
day      - day of the date
month    - month of the date
year     - year of the date
diffdays - difference to the date in days
```

```

    RESULT
    dday    - Destination day
    dmonth  - Destination month
    dyear   - Destination year

    EXAMPLE
    ...
    HeisDiffDate(23,1,1994,7,dday,dmonth,dyear);
    ...

    NOTES
    It is better to use this function only from -7 to 8000!

    BUGS
    unknown.

    SEE ALSO
    JuliandiffDate(),GregorianDiffdate(),HeisDayDiff(),HeisMonthDays()

```

1.26 Date/HeisLeapYear

```

    NAME
    HeisLeapYear -- Checks if a year is a leap year. (V33)

    SYNOPSIS
    leapyear := HeisLeapYear(year);

    PROCEDURE HeisLeapYear(year : INTEGER) : BOOLEAN;

    FUNCTION
    HeisLeapYear checks if a year is a leap year.
    For years after 1582 see GregorianLeapYear(),
    The correction from N. Heis says, that all years devideable by
    3200 are no longer leap years!
    For years before 1582 see JulianLeapYear

    INPUTS
    year - The year which should be checked (from -32768 to 32767)
           I think only values from -7 to 8000 are valid, because of
           the variant that was done on -8 by Augustus!

    RESULT
    leapyear - TRUE if the year is a leap year, otherwise false.

    EXAMPLE
    ...
    IF HeisLeapYear(1994) THEN
        WriteString("leap year!");
    ELSE
        WriteString("no leap year!");
    END;
    WriteLn;
    ...

```

NOTES

A year is now 365.2421875 days!

Use this function only for values from -7 to 8000!

BUGS

No known bugs.

SEE ALSO

JulianLeapYear(),GregorianLeapYear()

1.27 Date/HeisMonthDays

NAME

HeisMonthDays -- Gives back the number of days of a month. (V33)

SYNOPSIS

```
days := HeisMonthDays(month,year);
```

```
PROCEDURE HeisMonthDays(month : SHORTINT;  
    year : INTEGER) : SHORTINT;
```

FUNCTION

HeisMonthDays gives you back the number of days a month in a specified year has.

For the year 1582 and the month 10 there are only 21 days, because of the Gregorian-reform 10 days are delete from the month (for more - look out for books about this!)

INPUTS

month - The month from wich you want to get the number of days.

year - The year in which the month is.

RESULT

days - The number of days the month uses, or 0 if you use a wrong month.

EXAMPLE

```
...  
days := HeisMonthDays(1,1994);  
WriteString("Days of January 1994 : ");  
WriteCard(days,2); WriteLn;  
...
```

NOTES

Use this function only for years from -7 to 8000!

BUGS

See GregorianMonthDays!

SEE ALSO

HeisLeapYear(),JulianMonthDays(),GregorianMonthDays()

1.28 Date/HeisToJD

NAME

HeisToJD -- Returns the JD for a date. (V33)

SYNOPSIS

```
jd := HeisToJD(day,month,year);
```

```
PROCEDURE HeisToJD(day,month : SHORTINT;  
    year : INTEGER) : LONGINT;
```

FUNCTION

Returns the JD for a Heis date.

INPUTS

day - day of the date to convert
month - month of the date to convert
year - year of the date to convert

RESULT

jd - This is the JD

EXAMPLE

```
...  
jd := HeisToJD(23,1,1994);  
...
```

NOTES

It is better to use this function only from -7 to 3268!

BUGS

unknown.

SEE ALSO

JulianToJD(),GregorianToJD(),HYearToJD(),HYearToScaliger(),
HeisDayDiff()

1.29 Date/HeisWeek

NAME

HeisWeek -- Gets the weeknumber of a specified date. (V33)

SYNOPSIS

```
weeknr := HeisWeek(day,month,year);
```

```
PROCEDURE HeisWeek(day,month : SHORTINT;  
    year : INTEGER) : SHORTINT;
```

FUNCTION

HeisWeek gets the weeknumber for a specified date.

INPUTS

day - day of the date
month - month of the date

year - year of the date

RESULT

week - This is the number of the week the specified date lies in.
 If the first day in a new year is a Friday, Saturday or Sunday, this would be the last week of the last year!
 If the 29.12. is a Monday, the 30.12. is a Monday or a Tuesday, the 31.12. is a Monday, Tuesday or a Wednesday this is the first week of the next year!

EXAMPLE

...

```
weeknr := HeisWeek(4,10,1582);
```

...

NOTES

It is better only to use this function for years from 0 to 8000!

BUGS

For years < 0 errors could occur.

SEE ALSO

JulianWeek(), GregorianWeek(), HeisWeekday(), HeisDayDiff(), HeisDaySmaller()

1.30 Date/HeisWeekday

NAME

HeisWeekday -- Gets the weekday of a specified date. (V33)

SYNOPSIS

```
weekday := HeisWeekday(day,month,year);
```

```
PROCEDURE HeisWeekday(day,month : SHORTINT;
  year : INTEGER) : Weekday;
```

FUNCTION

HeisWeekday gets the weekday for a specified date.

INPUTS

day - day of the date
 month - month of the date
 year - year of the date

RESULT

weekday - This result is of type:
 Weekdays = (dayerr, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday);
 dayerr will show you, that an error occurs!

EXAMPLE

...

```
weekday := HeisWeekday(22,1,1994);
```

```
IF weekday = dayerr THEN
```

...

```
END;  
...
```

NOTES

It is better only to use this function for years from -7 to 8000!
In this version dayerr will only occur for the lost days :)

BUGS

It is not possible to use year < 0 (see JulianWeekday() for more).

SEE ALSO

JulianWeekday(), GregorianWeekday(), HeisDaySmaller(), HeisLeapYear()

1.31 Date/HeisYearDays

NAME

HeisYearDays -- Gives back the number of days in a year. (V33)

SYNOPSIS

```
days := HeisYearDays(year);
```

```
PROCEDURE HeisYearDays(year : INTEGER) : INTEGER;
```

FUNCTION

HeisYearDays gives you back the number of days in
a specified year.

INPUTS

year - The year in which to count the days.
(I think its better not to use years before -7!)

RESULT

days - The number of days the year uses.

EXAMPLE

```
...  
days := HeisYearDays(1994);  
WriteString("Days of 1994 : ");  
WriteCard(days,3); WriteLn;  
...
```

NOTES

It is better only to use this function for years from -7 to 8000!

BUGS

No known bugs.

SEE ALSO

HeisMonthDays(), JulianYearDays(), GregorianYearDays()

1.32 Date/HSYearToJD

```
NAME
HYearToJD -- Calcs the JD from a Scaliger year. (V33)

SYNOPSIS
jd := HYearToJD(syear);

PROCEDURE HYearToJD(syear : INTEGER) : LONGINT;

FUNCTION
Returns the Julianday of a Scaliger year.

INPUTS
syear      - Scaliger year

RESULT
jd - The Julianday

EXAMPLE
...
jd := HYearToJD(6700);
...

NOTES
It is better to use this function only from 4707 to 7981!
In this version only GYearToJD() is called, because the
Scaliger period is only valid to 3268

BUGS
unknown.

SEE ALSO
JYearToJD(), GYearToJD()
```

1.33 Date/HYearToScaliger

```
NAME
HYearToScaliger -- Returns the year as Scaliger year. (V33)

SYNOPSIS
syear := HYearToScaliger(year);

PROCEDURE HYearToScaliger(year : INTEGER) : INTEGER;

FUNCTION
Returns the Scaliger year.

INPUTS
year      - Heis year

RESULT
syear - The Scaliger year

EXAMPLE
...
```

```
syear := HYearToScaliger(1994);  
...  
  
NOTES  
It is better to use this function only from -7 to 8000!  
  
BUGS  
The Scaliger period is defined to 3268!!!.  
  
SEE ALSO  
JYearToScaliger(), GYearToScaliger()
```

1.34 Date/JDtoMJD

```
NAME  
JDtoMJD -- Switches from JD to MJD. (V33)  
  
SYNOPSIS  
mjd := JDtoMJD(jd);  
  
PROCEDURE JDtoMJD(jd : LONGINT) : LONGINT;  
  
FUNCTION  
Returns the Modified Julianday of a Julianday.  
  
INPUTS  
jd - Julianday  
  
RESULT  
mjd - The Modified Julianday  
  
EXAMPLE  
...  
mjd := JDtoMJD(2449354);  
...  
  
NOTES  
none  
  
BUGS  
Only use this function for jd > 2400001, because mjd is only  
defined for this, otherwise system will crash!  
  
SEE ALSO  
MJDtoJD()
```

1.35 Date/JDToTime

```
NAME  
JDToTime -- Returns the real time for a JD time. (V33)  
  
SYNOPSIS
```

```

JDToTime(jd,rhour,rmin,rsec);

PROCEDURE JDToTime(jd : REAL; VAR rhour,rmin,rsec : SHORTINT);

    FUNCTION
Returns the real time for a JD time.

    INPUTS
jd - JD time

    RESULT
rhour - 24 hour real time
rmin  - real minutes
rsec  - real seconds

    EXAMPLE
...
JDToTime(0.76543,rhour,rmin,rsec);
...

    NOTES
none.

    BUGS
If jd is > 0 (including days) there will be occur arithmetic bugs!

    SEE ALSO
TimeToJD()

```

1.36 Date/JSYearToJD

```

NAME
JSYearToJD -- Calcs the JD from a Scaliger year. (V33)

SYNOPSIS
jd := JSYearToJD(syear);

PROCEDURE JSYearToJD(syear : INTEGER) : LONGINT;

    FUNCTION
Returns the Julianday of a Scaliger year.

    INPUTS
syear      - Scaliger year

    RESULT
jd - The Julianday

    EXAMPLE
...
jd := JSYearToJD(4800);
...

    NOTES
It is better to use this function only from 4707 to 6295!

```

BUGS
unknown.

SEE ALSO
GSYearToJD(), HYearToJD()

1.37 Date/JulianDayDiff

NAME
JulianDayDiff -- Calculates the days between 2 dates. (V33)

SYNOPSIS
days := JulianDayDiff(day1, month1, year1, day2, month2, year2);

PROCEDURE JulianDayDiff(day1, month1 : SHORTINT; year1 : INTEGER;
day2, month2 : SHORTINT; year2 : INTEGER) : LONGINT;

FUNCTION
JulianDayDiff gives you back the number of days between
two specified dates.

INPUTS
day1 - day of the first date
month1 - month of the first date
year1 - year of the first date
day2 - day of the second date
month2 - month of the second month
year2 - year of the second date

RESULT
days - The number of days between the two dates
(positive if date1 <= date2).

EXAMPLE
...
days := JulianDayDiff(18, 9, 1970, 22, 1, 1994);
WriteString("Age of Kai Hofmann in days : ");
WriteInt(days, 10); WriteLn;
...

NOTES
It is better only to use this function for years from -7 to 1582!

BUGS
No known bugs.

SEE ALSO
GregorianDayDiff(), HeisDayDiff(), JulianMonthDays(), JulianYearDays()

1.38 Date/JulianDayGreater

```

NAME
JulianDayGreater -- Checks if date1 is greater than date2. (V33)

SYNOPSIS
greater := JulianDayGreater(day1,month1,year1,day2,month2,year2);

PROCEDURE JulianDayGreater(day1,month1 : SHORTINT; year1 : INTEGER;
    day2,month2 : SHORTINT; year2 : INTEGER) : BOOLEAN;

FUNCTION
JulianDayGreater test if date1 is greater than date2.

INPUTS
day1    - day of the first date
month1  - month of the first date
year1   - year of the first date
day2    - day of the second date
month2  - month of the second month
year2   - year of the second date

RESULT
greater - This is TRUE is date1 > date2 otherwise it's FALSE.

EXAMPLE
...
IF JulianDayGreater(18,9,1970,22,1,1994) THEN
    WriteString(">"); WriteLn;
ELSE
    WriteString("<="); WriteLn;
END;
...

NOTES
It is better only to use this function for years from -7 to 1582!

BUGS
No known bugs.

SEE ALSO
GregorianDayGreater(),HeisDayGreater()

```

1.39 Date/JulianDaysAfterWeekday

```

NAME
JulianDaysAfterWeekday -- Returns the diff to the wday after. (V33)

SYNOPSIS
days := JulianDaysAfterWeekday(day,month,year,weekday);

PROCEDURE JulianDaysAfterWeekday(day,month : SHORTINT;
    year : INTEGER; weekday : Weekdays) : SHORTINT;

FUNCTION
Returns the days to the weekday after the specified date.

```

So if you specify the 22.1.1994 (Saturday) and Thursday you get back 5!
 If you specify the 22.1.1994 and Saturday you get back 0 (the same day)!

INPUTS

day - day of the date
 month - month of the date
 year - year of the date
 weekday - weekday to search for building difference

RESULT

days - The days after to the searched weekday.

EXAMPLE

```
...
days := JulianDaysAfterWeekday(22,1,1994,Thursday);
...
```

NOTES

It is better to use this function only from -7 to 1582!

BUGS

See JulianWeekday()!

SEE ALSO

GregorianDaysAfterWeekday(), HeisDaysAfterWeekday(), JulianWeekday()

1.40 Date/JulianDaysBeforeWeekday

NAME

JulianDaysBeforeWeekday -- Returns the diff to the wday before. (V33)

SYNOPSIS

```
days := JulianDaysBeforeWeekday(day,month,year,weekday);
```

```
PROCEDURE JulianDaysBeforeWeekday(day,month : SHORTINT;
  year : INTEGER; weekday : Weekdays) : SHORTINT;
```

FUNCTION

Returns the days to the weekday before the specified date.
 So if you specify the 22.1.1994 (Saturday) and Thursday you get back 2!
 If you specify the 22.1.1994 and Saturday you get back 0 (the same day)!

INPUTS

day - day of the date
 month - month of the date
 year - year of the date
 weekday - weekday to search for building difference

RESULT

days - The days back to the searched weekday (0-6)
 If you get back 8 an error occurs!

```

EXAMPLE
...
days := JulianDaysBeforeWeekday(22,1,1994,Thursday);
...

NOTES
It is better to use this function only from -7 to 1582!

BUGS
See JulianWeekday()!

SEE ALSO
GregorianDaysBeforeWeekday(), HeisDaysBeforeWeekday(), JulianWeekday()

```

1.41 Date/JulianDaySmaller

```

NAME
JulianDaySmaller -- Checks if date1 is smaller than date2. (V33)

SYNOPSIS
smaller := JulianDaySmaller(day1,month1,year1,day2,month2,year2);

PROCEDURE JulianDaySmaller(day1,month1 : SHORTINT; year1 : INTEGER;
    day2,month2 : SHORTINT; year2 : INTEGER) : BOOLEAN;

FUNCTION
JulianDaySmaller test if date1 is smaller than date2.

INPUTS
day1    - day of the first date
month1  - month of the first date
year1   - year of the first date
day2    - day of the second date
month2  - month of the second month
year2   - year of the second date

RESULT
smaller - This is TRUE is date1 < date2 otherwise it's FALSE.

EXAMPLE
...
IF JulianDaySmaller(18,9,1970,22,1,1994) THEN
    WriteString("<"); WriteLn;
ELSE
    WriteString(">="); WriteLn;
END;
...

NOTES
It is better only to use this function for years from -7 to 1582!

BUGS
No known bugs.

```

SEE ALSO
GregorianDaySmaller(), HeisDaySmaller()

1.42 Date/JulianDiffDate

NAME
JulianDiffDate -- Returns the date for a diff to another date. (V33)

SYNOPSIS
JulianDiffDate(day, month, year, diffdays, dday, dmonth, dyear);

PROCEDURE JulianDiffDate(day, month : SHORTINT; year, days : INTEGER;
VAR dday, dmonth : SHORTINT; VAR dyear : INTEGER);

FUNCTION
Returns the date wich lies diffdays before/after the specified date.

INPUTS
day - day of the date
month - month of the date
year - year of the date
diffdays - difference to the date in days

RESULT
dday - Destination day
dmonth - Destination month
dyear - Destination year

EXAMPLE
...
JulianDiffDate(23, 1, 1994, 7, dday, dmonth, dyear);
...

NOTES
It is better to use this function only from -7 to 1582!

BUGS
unknown.

SEE ALSO
GregorianDiffDate(), HeisDiffDate(), JulianDayDiff(), JulianMonthDays()

1.43 Date/JulianLeapYear

NAME
JulianLeapYear -- Checks if a year is a leap year for jj. (V33)

SYNOPSIS
leapyear := JulianLeapYear(year);

PROCEDURE JulianLeapYear(year : INTEGER) : BOOLEAN;

```

FUNCTION
JulianLeapYear checks if a year is a leap year in the julian calendar
For years after Chr. it checks if the year is devideable by 4.
For years before Chr. a leap year must have a modulo 4 value of 1

INPUTS
year - The year which should be checked (from -32768 to 32767)
      I think only values from -7 to 1582 are valid, because of
      the variant that was done on -8 by Augustus!

RESULT
leapyear - TRUE if the year is a leap year, otherwise false.

EXAMPLE
...
IF JulianLeapYear(1994) THEN
    WriteString("leap year!");
ELSE
    WriteString("no leap year!");
END;
WriteLn;
...

NOTES
A year is 365.25 days long!
Use this function only for values from -7 to 1582!

BUGS
No known bugs.

SEE ALSO
GregorianLeapYear(),HeisLeapYear()

```

1.44 Date/JulianMonthDays

```

NAME
JulianMonthDays -- Gives back the number of days of a month. (V33)

SYNOPSIS
days := JulianMonthDays(month,year);

PROCEDURE JulianMonthDays(month : SHORTINT;
    year : INTEGER) : SHORTINT;

FUNCTION
JulianMonthDays gives you back the number of days a month in
a specified year has.

INPUTS
month - The month from wich you want to get the number of days.
year - The year in which the month is.

RESULT
days - The number of days the month uses, or 0 if you use
a wrong month.

```

```
EXAMPLE
...
days := JulianMonthDays(1,1994);
WriteString("Days of January 1994 : ");
WriteCard(days,2); WriteLn;
...

NOTES
It is better only to use this function for years from -7 to 1582!

BUGS
No known bugs.

SEE ALSO
JulianLeapYear(),GregorianMonthDays(),HeisMonthDays()
```

1.45 Date/JulianToJD

```
NAME
JulianToJD -- Returns the JD for a date. (V33)

SYNOPSIS
jd := JulianToJD(day,month,year);

PROCEDURE JulianToJD(day,month : SHORTINT;
    year : INTEGER) : LONGINT;

FUNCTION
Returns the JD for a Julian date.

INPUTS
day      - day of the date to convert
month    - month of the date to convert
year     - year of the date to convert

RESULT
jd - This is the JD

EXAMPLE
...
jd := JulianToJD(23,1,1994);
...

NOTES
It is better to use this function only from -7 to 1582!

BUGS
unknown.

SEE ALSO
GregorianToJD(),HeisToJD(),JSYearToJD(),JYearToScaliger(),
JulianDayDiff()
```

1.46 Date/JulianWeek

NAME

JulianWeek -- Gets the weeknumber of a specified date. (V33)

SYNOPSIS

```
weeknr := JulianWeek(day,month,year);
```

```
PROCEDURE JulianWeek(day,month : SHORTINT;  
    year : INTEGER) : SHORTINT;
```

FUNCTION

JulianWeek gets the weeknumber for a specified date.

INPUTS

day - day of the date
month - month of the date
year - year of the date

RESULT

week - This is the number of the week the specified date lies in.
If the first day in a new year is a Friday, Saturday or Sunday, this would be the last week of the last year!
If the 29.12. is a Monday, the 30.12. is a Monday or a Tuesday, the 31.12. is a Monday, Tuesday or a Wednesday this is the first week of the next year!

EXAMPLE

```
...  
weeknr := JulianWeek(4,10,1582);  
...
```

NOTES

It is better only to use this function for years from 0 to 1582!

BUGS

For years < 0 errors could occur.

SEE ALSO

GregorianWeek(), HeisWeek(), JulianWeekday(), JulianDayDiff(), JulianDaySmaller()

1.47 Date/JulianWeekday

NAME

JulianWeekday -- Gets the weekday of a specified date. (V33)

SYNOPSIS

```
weekday := JulianWeekday(day,month,year);
```

```
PROCEDURE JulianWeekday(day,month : SHORTINT;  
    year : INTEGER) : Weekday;
```

FUNCTION

JulianWeekday gets the weekday for a specified date.

INPUTS

day - day of the date
 month - month of the date
 year - year of the date

RESULT

weekday - This result is of type:
 Weekdays = (dayerr,Monday,Tuesday,Wednesday,Thursday,Friday,
 Saturday,Sunday);
 dayerr will show you, that an error occurs!

EXAMPLE

```
...
weekday := JulianWeekday(4,10,1582);
IF weekday = dayerr THEN
...
END;
...
```

NOTES

It is better only to use this function for years from 0 to 1582!
 In this version no dayerr will occur!

BUGS

For years < 0 errors could occur, or systemcrashes(?).

SEE ALSO

GregorianWeekday(),HeisWeekday()

1.48 Date/JulianYearDays

NAME

JulianYearDays -- Gives back the number of days in a year. (V33)

SYNOPSIS

```
days := JulianYearDays(year);
```

```
PROCEDURE JulianYearDays(year : INTEGER) : INTEGER;
```

FUNCTION

JulianYearDays gives you back the number of days in a specified year.

INPUTS

year - The year in which to count the days.

RESULT

days - The number of days the year uses.

EXAMPLE

```
...
days := JulianYearDays(1994);
WriteString("Days of 1994 : ");
```

```
WriteCard(days,3); WriteLn;
...

NOTES
It is better only to use this function for years from -7 to 1582!

BUGS
No known bugs.

SEE ALSO
JulianMonthDays(),GregorianYearDays(),HeisYearDays()
```

1.49 Date/JYearToScaliger

```
NAME
JYearToScaliger -- Returns the year as Scaliger year. (V33)

SYNOPSIS
syear := JYearToScaliger(year);

PROCEDURE JYearToScaliger(year : INTEGER) : INTEGER;

FUNCTION
Returns the Scaliger year.

INPUTS
year      - Julian year

RESULT
syear - The Scaliger year

EXAMPLE
...
syear := JYearToScaliger(1582);
...

NOTES
It is better to use this function only from -7 to 1582!

BUGS
unknown.

SEE ALSO
GYearToScaliger(),HYearToScaliger()
```

1.50 Date/LMT

```
NAME
LMT -- Calculates your local time in your timezone (V33)

SYNOPSIS
secs := LMT(secs,meridian,pos);
```

```

PROCEDURE LMT(secs : LONGINT; meridiandegree,
              posdegree : REAL) : LONGINT;

FUNCTION
Calculates your Local Mean Time of you place!

INPUTS
secs      - Seconds of the running day (hours*3600+min*60+sec)
meridian  - Degrees of your timezone-meridian
pos       - Degrees of your place

RESULT
secs - Local seconds of the running day

EXAMPLE
...
secs := LMT(76080,15.0,8.923055556);
...

NOTES
none

BUGS
No errorcheck, if you put in valid degrees (-180 to +180)

SEE ALSO

```

1.51 Date/MJDtoJD

```

NAME
MJDtoJD -- Switches from MJD to JD. (V33)

SYNOPSIS
jd := MJDtoJD(mjd);

PROCEDURE MJDtoJD(mjd : LONGINT) : LONGINT;

FUNCTION
Returns the Julianday of a Modified Julianday.

INPUTS
mjd - Modified Julianday

RESULT
jd - The Julianday

EXAMPLE
...
jd := JDtoMJD(49353);
...

NOTES
none

```

BUGS
unknown.

SEE ALSO
MJDtoJD()

1.52 Date/ScaligerYearToG

NAME
ScaligerYearToG -- Returns the Scaliger year as Gregorian year. (V33)

SYNOPSIS
year := ScaligerYearToG(syear);

PROCEDURE ScaligerYearToG(syear : INTEGER) : INTEGER;

FUNCTION
Returns the Gregorian year of a Scaliger year.

INPUTS
syear - Scaliger year

RESULT
year - The Gregorian year

EXAMPLE
...
year := ScaligerYearToG(6400);
...

NOTES
It is better to use this function only from 4707 to 7981!

BUGS
unknown.

SEE ALSO
ScaligerYearToJ(), ScaligerYearToH()

1.53 Date/ScaligerYearToH

NAME
ScaligerYearToH -- Returns the Scaliger year as Heis year. (V33)

SYNOPSIS
year := ScaligerYearToH(syear);

PROCEDURE ScaligerYearToH(syear : INTEGER) : INTEGER;

FUNCTION
Returns the Heis year of a Scaliger year.

```
INPUTS
syear      - Scaliger year

RESULT
year - The Heis year

EXAMPLE
...
year := ScaligerYearToH(7000);
...

NOTES
It is better to use this function only from 4707 to 7981!

BUGS
unknown.

SEE ALSO
ScaligerYearToJ(), ScaligerYearToG()
```

1.54 Date/ScaligerYearToJ

```
NAME
ScaligerYearToJ -- Returns the Scaliger year as Julian year. (V33)

SYNOPSIS
year := ScaligerYearToJ(syear);

PROCEDURE ScaligerYearToJ(syear : INTEGER) : INTEGER;

FUNCTION
Returns the Julian year of a Scaliger year.

INPUTS
syear      - Scaliger year

RESULT
year - The Julian year

EXAMPLE
...
year := ScaligerYearToJ(4800);
...

NOTES
It is better to use this function only from 4707 to 6295!

BUGS
unknown.

SEE ALSO
ScaligerYearToG(), ScaligerYearToH()
```

1.55 Date/SecToTime

NAME

SecToTime -- Returns the time from seconds (V33)

SYNOPSIS

SecToTime(secs, hour, min, sec);

PROCEDURE SecToTime(secs : LONGINT; VAR hour, min, sec : SHORTINT);

FUNCTION

Gives you back the time from the specified seconds

INPUTS

secs - Time in seconds

RESULT

hour - hours (0-23)

min - minutes (0-59)

sec - seconds (0-59)

EXAMPLE

...

SecToTime(76860, hour, min, sec);

...

NOTES

Don't forget to convert 24h time to AM/PM time if needed!

BUGS

No errorcheck, if you use a valid time

SEE ALSO

TimeToSec()

1.56 Date/TimeToJD

NAME

TimeToJD -- Returns the JD for a time. (V33)

SYNOPSIS

jd := TimeToJD(hour, min, sec);

PROCEDURE TimeToJD(hour, min, sec : SHORTINT) : REAL;

FUNCTION

Returns the JD for a specified time.

INPUTS

hour - hour of the time to convert

min - minute of the time to convert

sec - sec. of the time to convert

RESULT

jd - This is the JD time

EXAMPLE

```
...
jd := TimeToJD(16,33,0);
...
```

NOTES

none

BUGS

There is no check, if the specified time is a valid time!

SEE ALSO

JDToTime()

1.57 Date/GregorianEaster

NAME

GregorianEaster -- Returns the date of eastern in a year (V33)

SYNOPSIS

GregorianEaster(year, dday, dmonth);

PROCEDURE GregorianEaster(year : INTEGER;
VAR dday, dmonth : SHORTINT);

FUNCTION

Returns the date of eastern for a specified year.

INPUTS

year - eastern is calculated for this year

RESULT

dday - day of easter-Sunday
dmonth - month of easter-Sunday

EXAMPLE

```
...
GregorianEaster(1994, dday, dmonth);
...
```

NOTES

Use this only for 1900 to 2099!

Tested for 1977-1994! But this formula is from Gauß - so it must be correct :)

BUGS

None.

SEE ALSO

GEP(), GregorianJHSB()

1.58 Date/TimeToSec

NAME

TimeToSec -- Returns the time in seconds (V33)

SYNOPSIS

```
secs := TimeToSec(hour,min,sec);
```

```
PROCEDURE TimeToSec(hour,min,sec : SHORTINT) : LONGINT;
```

FUNCTION

Gives you back the time in seconds

INPUTS

hour - hours you want (0-23)
min - minutes you want (0-59)
sec - seconds you want (0-59)

RESULT

secs - Time in seconds

EXAMPLE

```
...  
secs := TimeToSec(21,15,00);  
...
```

NOTES

Don't forget to convert AM/PM time to 24h time!

BUGS

No errorcheck, if you use a valid time

SEE ALSO

SecToTime()

1.59 Date/TimeZoneFactor

NAME

TimeZoneFactor -- Returns the value you have to add to GMT time (V33)

SYNOPSIS

```
addhours := TimeZoneFactor(degrees);
```

```
PROCEDURE TimeZoneFactor(degree : SHORTINT) : SHORTINT;
```

FUNCTION

This gives you the hours you have to add to GMT time, specified on the fact, that a timezone is 15 degrees and that GMT is centered on 0 degrees!

INPUTS

degrees - Position of timezone you live in (from -180 to +180)

RESULT

addhours - Time to add to GMT time to get your locale zone time
(-12 to +12)

EXAMPLE

```
...  
addhours := TimeZoneFactor(-8);  
...
```

NOTES

none

BUGS

No errorcheck, if you put in valid degrees (-180 to +180)
Only full degrees are supportet, keep sure that you
round in the right way for 0.x degree places
I am not sure about the correct +/- behaviour!!!

SEE ALSO