

ADA ~ 2013



The 2013 version is:- gnat-gpl-2013-i686-pc-mingw32-bin.exe

It says you can select a folder into which to install it. Wrong answer, if you do that then the install fails. Just accept the default, which is annoying as it clutters the root directory, oh well.

Otherwise the following notes work for the 2013 version, however, there are a few subtle changes. Do not think you can simply create a new file, and then build, and then run it. You need to follow the key steps in the next few pages.

For graphics, "adagraph" was available:-

http://campus.murraystate.edu/academic/faculty/bob.pilgrim/245/programming4_1.html

however, it is no longer available. Another possibility was:-

<http://www.adapower.com/index.php?Command=Class&ClassID=AdaGraphics&Title=Graphics+Examples>

however its link to: OpenGLObry also fails.

Another option was found and in fact it is where the **main ADA system** is located:- :-

<http://libre.adacore.com/libre/>
<http://libre.adacore.com/tools/gtkada/>

This, when executed, also wants to build yet another folder or directory in the root area. I changed it to use the C:\GNAT\2013\ folder where the compiler was stored. The installation of this package takes a long time, so be patient.

This web page exists and has links to a **reference manual**:-

http://docs.adacore.com/gtkada-docs/gtkada_ug/_build/html/

<http://libre.adacore.com/download/configurations#>

Select your platform:

Use the check boxes to download multiple files or click directly on the links to download individual files.

2013

▼ GNAT 2013

- | | | |
|--|--------|--------------|
| <input type="checkbox"/> README.txt | 650 B | May 23, 2013 |
| <input type="checkbox"/> gnat-gpl-2013-i686-pc-mingw32-bin.exe | 118 MB | May 2, 2013 |

➤ [Sources](#)

➤ AJIS 2013

➤ ASIS 2013

➤ AUnit 2013

➤ AWS 2013

➤ GNATbench 2013

➤ GNATcoll 2013

▼ GtkAda 2013

- | | | |
|---|---------|-------------|
| <input checked="" type="checkbox"/> README.txt | 1.91 KB | May 3, 2013 |
| <input checked="" type="checkbox"/> gtkada-gpl-3.4.2-nt.exe | 23.2 MB | May 3, 2013 |

➤ [Sources](#)

➤ PolyORB 2013

➤ SPARK-HiLite GPL 2013

➤ Win32Ada 2013

➤ WPosix 2013

➤ XML/Ada 2013

main ADA system used
on Windows 8

graphics for ADA system
used on Windows 8

Refresher in getting stuff done in the IDE:-

1. The “procedure” and its “end” must match the source file name.

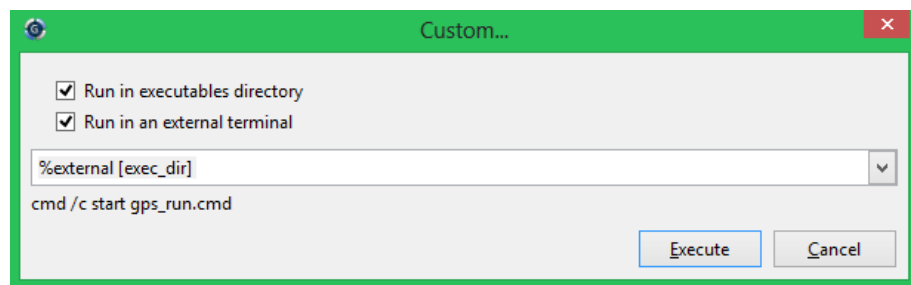
```
procedure adatest1 is
...
end adatest1;
```

2. To generate an executable, do the following:-

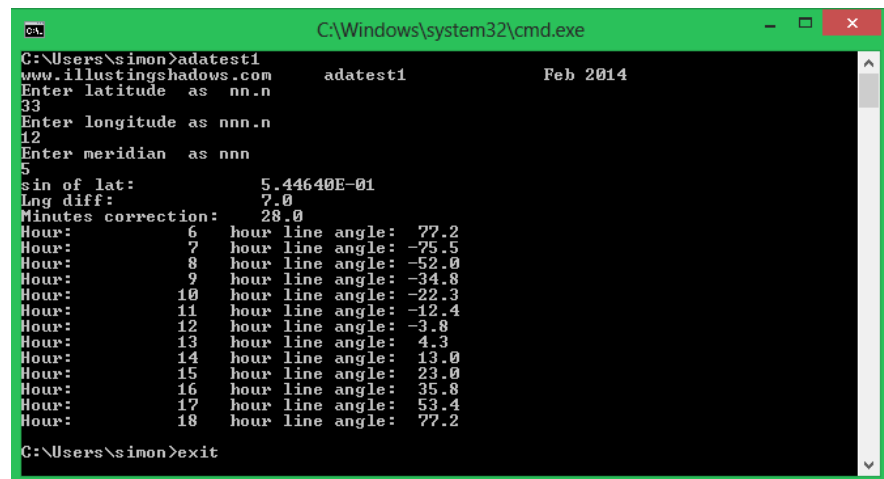
```
BUILD
PROJECT
BUILD <CURRENT FILE>
```

3. To execute the generated .exe file do:-

```
BUILD
RUN
```



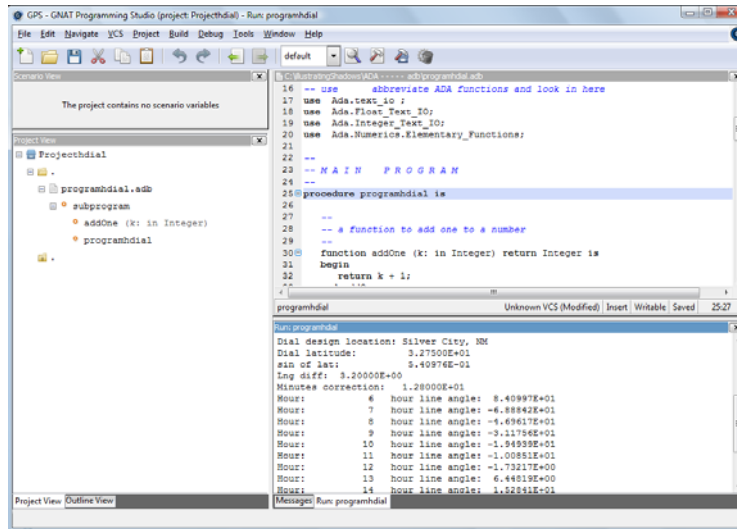
accept the defaults, and in the DOS window type in the programs .exe name:-



```
C:\Users\simon>adatest1
www.illustratingshadows.com      adatest1      Feb 2014
Enter latitude as nn.n
33
Enter longitude as nnn.n
12
Enter meridian as nnn
5
sin of lat:      5.44640E-01
Lng diff:      7.0
Minutes correction: 28.0
Hour:      6      hour line angle: 77.2
Hour:      7      hour line angle: -75.5
Hour:      8      hour line angle: -52.0
Hour:      9      hour line angle: -34.8
Hour:     10      hour line angle: -22.3
Hour:     11      hour line angle: -12.4
Hour:     12      hour line angle: -3.8
Hour:     13      hour line angle: 4.3
Hour:     14      hour line angle: 13.0
Hour:     15      hour line angle: 23.0
Hour:     16      hour line angle: 35.8
Hour:     17      hour line angle: 53.4
Hour:     18      hour line angle: 77.2
C:\Users\simon>exit
```

end type in EXIT to quit.

ADA ~ 2009



ADA PROJECT/PROGRAM STRUCTURE

Project
program

filename.gpr
file.adb

source
procedure

```
with Ada.Text_IO;
use Ada.text_io ;

procedure adahdial is
begin
  put_line("Hello World");
end adahdial;
```

WIKIPEDIA etc

[http://en.wikipedia.org/wiki/Ada_\(programming_language\)](http://en.wikipedia.org/wiki/Ada_(programming_language))
http://www.dmoz.org/Computers/Programming/Languages/Ada/Code_Samples/
<http://www.cs.fit.edu/~ryan/ada/programs/>
<http://www.adahome.com/Tutorials/>
<http://www.adahome.com/Tutorials/Lovelace>
http://pleac.sourceforge.net/pleac_ada/numbers.html

TO GET STARTED WITH ADA AS IN GNAT USING GCS

either bring up GCS and click on HELP

HELP

GNAT

NATIVE GNAT USERS GUIDE

ABOUT THIS GUIDE

1. Getting Started with GNAT
hullo world program

or follow through with the next few pages

FIRST ~ GET THE SYSTEM

There are several free ADA systems, three spring to mind, however unless you have a recent .NET system, the GPS GNAT option for x86-windows is the only choice. Registration is required but is extremely fast and simple.

WEB SITES for the GNU ADA system:

www.adacore.com

<http://libre.adacore.com/libre/>

Professional ADA

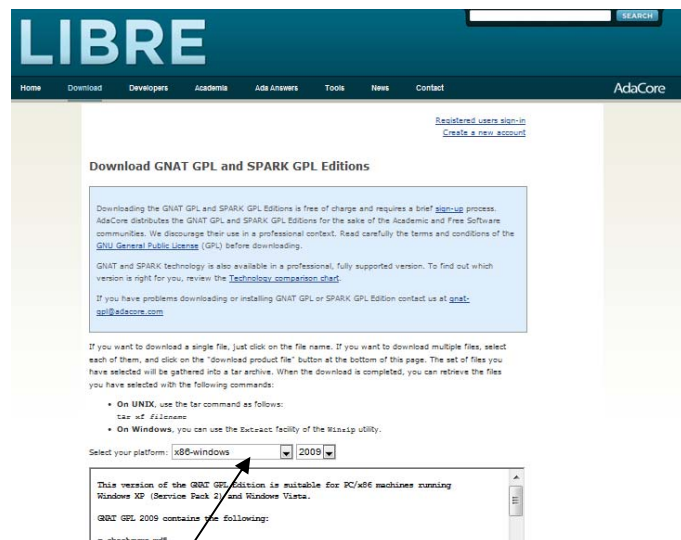
Free GNAT GPL from ADACORE
select GNAT GPL download for
a very quick signin

GNAT is the ADA support system
GPS is the editor

GNAT **A**DA **T**ranslator
GNAT **P**rogramming **S**tudio

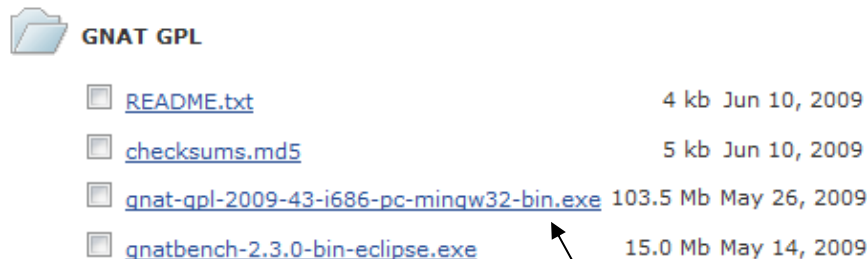
STEPS TO DOWNLOAD AND INSTALL GNAT

- 1 go to <https://libre.adacore.com/libre/download>



- 2 select x86-windows

Use the check boxes to download multiple files or click directly on the links to download individual files.



- 3 select gnat-gpl-2009-43-i686-pc-mingw32-bin.exe

- 4 download the file which is over 100mb

NOTE: do not select the DOTNET version which is half the size unless you have .NET. In fact, I installed my .NET I had working on Windows XP and the DOTNET would not install. The x86-windows version does not need .NET and installs first time.

- 5 The notes about these files are on the above web site and may read something like the following.

This version of the GNAT GPL Edition is suitable for PC/x86 machines running Windows XP (Service Pack 2) and Windows Vista.

GNAT GPL 2009 contains the following:

- checksums.md5
Contains the list of MD5 checksums for all the files in this distribution.

- gnat-gpl-2009-43-i686-pc-mingw32-bin.exe

This package contains the GPL Edition of GNAT, the Ada 2005 tool chain maintained by AdaCore, and includes GPS, a fully integrated IDE. It also includes full html documentation for both tools.

In order to install this package, double-click on it, and follow the instructions displayed on the screen. Note that you need Power User privileges in order to install this package.

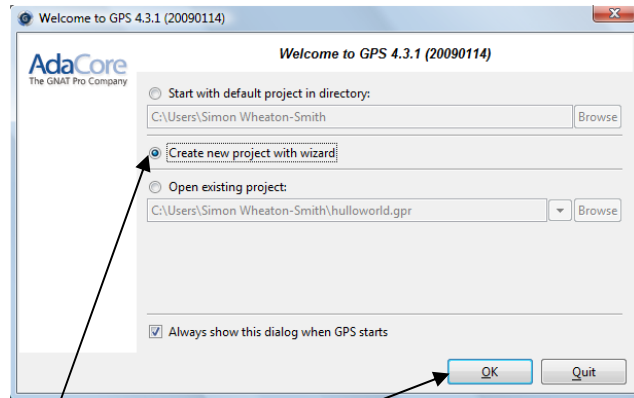
SECOND ~ WRITING A HULLO WORLD PROGRAM

As with most modern systems, the documentation is designed for English majors with a phd in compiler design. Helpful if you already know it. The online tutorials do not always reflect the GPS GNAT system, and don't help. So here is how to do a HULLO WORLD program.

- 1 after installing GPS GNAT, bring it up.

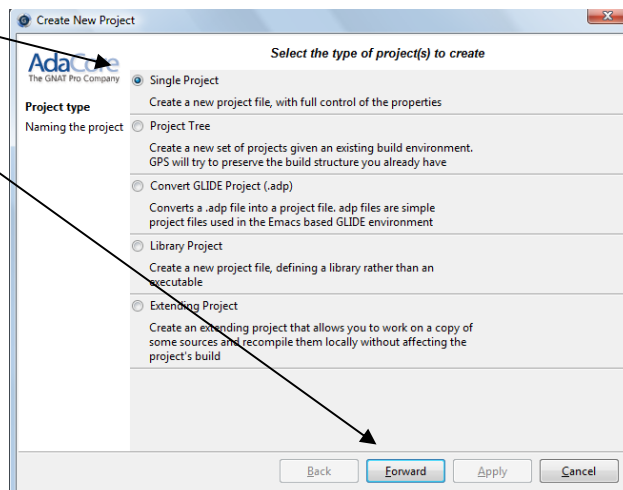


- 2 GPS stands for **G**NAT **P**ROGRAMMING **S**TUDIO



select CREATE NEW PROJECT WITH WIZARD and click OK

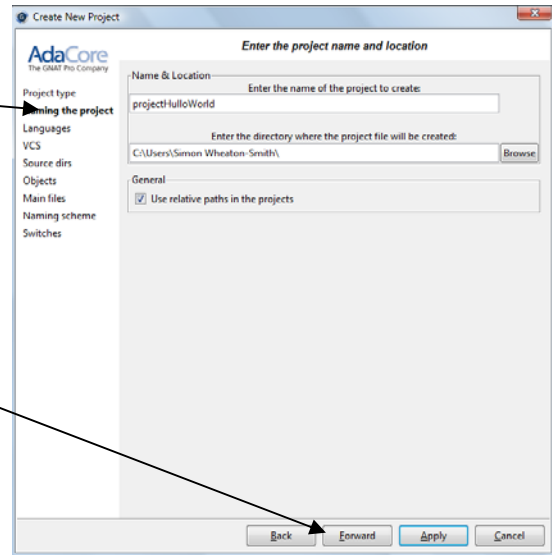
- 3 select SINGLE PROJECT
and click FORWARD



4 Enter a project name

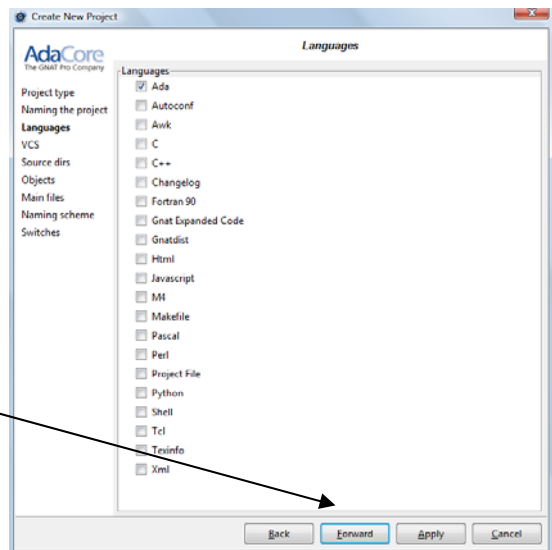
projectHulloWorld

click FORWARD



5 select ADA as the language

click FORWARD



6 as you click FORWARD check the folders where items will be placed, for simple programs you may want to save everything in one folder.

7 keep clicking FORWARD until the FORWARD is no longer an option, then APPLY

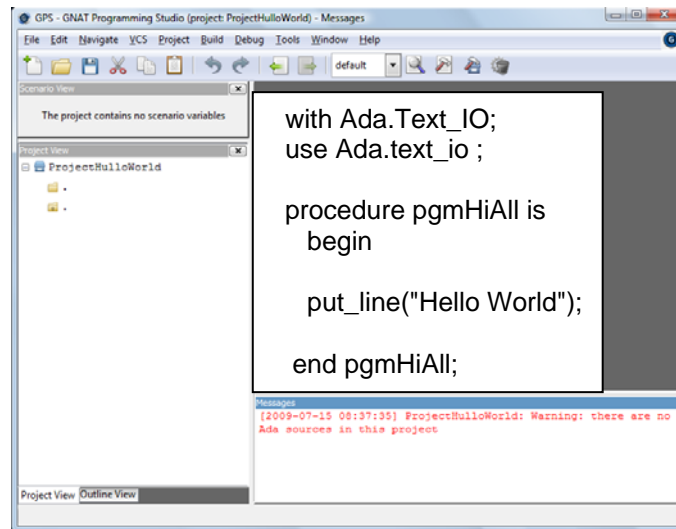
8 you now have the GPS GNAT main system ready.

Ignore the message like:

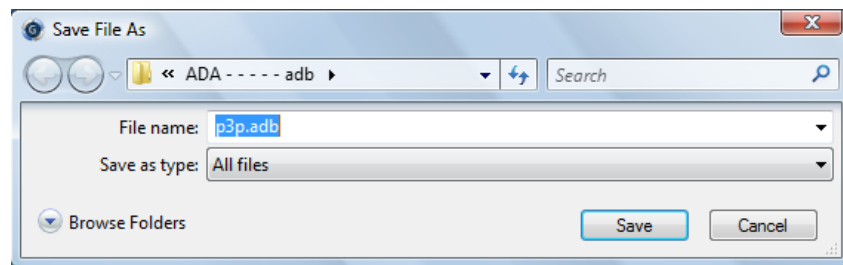
[2009-07-15 16:01:27] P3: Warning: there are no Ada sources in this project

since we will now correct that. **NOTE:** If the system finds an ADB file it will absorb it into the project, so use clean empty folders.

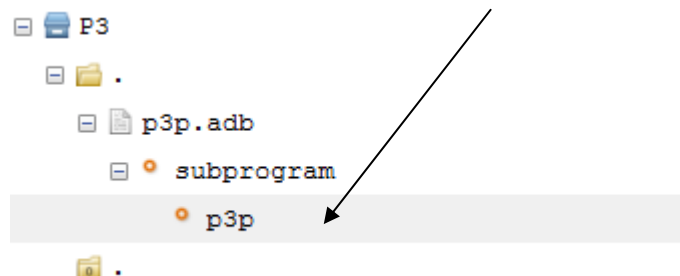
- 9 click FILE, then NEW. and paste the HULLO WORD code into the text editor



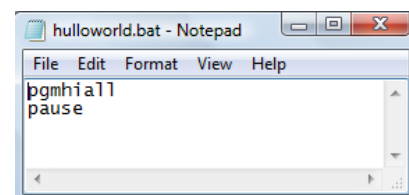
and SAVE, the system generates the file name from the PROCEDURE and the file type defaults to .ADB



and on the right hand side of the GCS menu, select down to this saved file



- 10 BUILD, PROJECT, BUILD<CURRENT FILE>
- 11 Assuming there were no errors, an EXE file was created
- 12 BUILD, RUN, CUSTOM and name the program as saved
—or—
make a short BAT file such as the following and run it.



A SUNDAL PROGRAM ~ textual or tabular output ~ the program

```
--
-- H O R I Z O N T A L      S U N D I A L      ADA LANGUAGE
--
-- Simon Wheaton-Smith July 2009
-- www.illustratingshadows.com
-- open source
-- GPS-GNAT, BUILD, PROJECT, BUILD <CURRENT FILE>
--      NOTE: BUILD ALL does not create EXE file
-- then      RUN, CUSTOM, enter the exe file name
-- GPS-GNAT  available from www.adacore.com (professional)
--          http://libre.adacore.com/libre (free version)
--
-- with      these libraries are needed
with Ada.Text_IO;           -- put etc
with Ada.Float_Text_IO;     -- float
with Ada.Integer_Text_IO;
with Ada.Numerics.Elementary_Functions; -- sin cos tan
with Ada.Text_IO.Editing;   -- FORMAT option

-- use      abbreviate ADA functions and look in here
use Ada.text_io ;
use Ada.Float_Text_IO;
use Ada.Integer_Text_IO;
use Ada.Numerics.Elementary_Functions;

--
-- M A I N      P R O G R A M
--
procedure programhdial is

    --
    -- a function to add one to a number
    --
    function addOne (k: in Integer) return Integer is
    begin
        return k + 1;
    end addOne;

    -- location for print out and it is string
    -- loc      : String (1..80);
    -- N        : Natural;

    -- dial latitude and longitude as float
    lat      : float ;
    lng      : float ;
    slat     : float ;

    -- legal meridian as integer which we convert to float
    refInt   : integer;
    ref      : float  ;
    dlng     : float  ;
    thra     : float  ;           -- tan of hour angle
    hla      : float  ;           -- hour line angle

    -- this is how we get clean formatted fixed point
    -- see: http://pleac.sourceforge.net/pleac_ada/numbers.html
    type Real is delta 0.1 digits 12;
    hlaF     : real    ;
    dlngF     : real    ;

    hr       : Natural;

    -- a header which could have been a literal
    msg1     : string (1..22) := "Lng diff:          " ;
    fl       : float;
```

```
--
-- the main program guts
--
begin

  put      ("www.illustratingshadows.com      ");
  put      ("programhdial   July 2009");
  put_line(" ");

  -- put_line("Enter dial location as text ");
  -- Get_Line (loc, N);

  put_line("Enter latitude  as nn.n ");
  Get      (lat);

  put_line("Enter longitude as nnn.n");
  Get      (lng);

  put_line("Enter meridian  as nnn ");
  Get      (refInt);      -- see: use Ada.Integer_Text_IO;
  ref      := float (refInt) ;

  -- say dial details
  slat      := sin(lat*2.0*3.1416/360.0);
  put      ("sin of lat:          ");
  put      (slat);
  put_line(" ");

  dlng      := lng - ref ;
  put      (msg1);
  -- see: http://pleac.sourceforge.net/pleac_ada/numbers.html
  dlngF := Real (dlng) ;
  put ( Real'Image(dlngF) );
  put_line(" ");

  put      ( "Minutes correction:  ");
  dlngF := Real (dlng*4.0) ;
  put ( Real'Image(dlngF) );
  put_line(" ");

  -- start the hour line loop
  hr := 6 ;
  loop
    put ("Hour: ");
    put ( hr);

    thra := tan( (float(hr) - (dlng/15.0) ) * 15.0 * 2.0 * 3.1416 / 360.0 ) ;
    fl   := thra * slat ;

    -- hla := arctan ( slat * thra ) ;
    hla := arctan(fl) * 360.0 / ( 2.0 * 3.1416 ) ;

    put ( "   hour line angle: ");

    hlaF := Real (hla) ;
    put ( Real'Image(hlaF) );

    put_line(" ");
    exit when hr = 18;
    hr := addOne (hr) ;      -- hr := hr + 1;
  end loop;
end programhdial;
```

A SUNDAL PROGRAM ~ textual or tabular output ~ the console log

```

programhdial
www.illustingshadows.com      programhdial    July 2009
Enter latitude as nn.n
32.75
Enter longitude as nnn.n
108.2
Enter meridian as nnn
105
sin of lat:                    5.40976E-01
Lng diff:                      3.1
Minutes correction:            12.7
Hour:        6    hour line angle:  84.0
Hour:        7    hour line angle: -68.8
Hour:        8    hour line angle: -46.9
Hour:        9    hour line angle: -31.1
Hour:       10    hour line angle: -19.4
Hour:       11    hour line angle: -10.0
Hour:       12    hour line angle:  -1.7
Hour:       13    hour line angle:   6.4
Hour:       14    hour line angle:  15.2
Hour:       15    hour line angle:  25.8
Hour:       16    hour line angle:  39.5
Hour:       17    hour line angle:  58.7
Hour:       18    hour line angle:  84.1
[2009-07-19 12:22:04] process terminated successfully (elapsed time:
08.96s)

```

E+00	times 1
E+01	times 10

COMPARABLE DATA FROM EXCEL

HORIZONTAL SUN DIAL			
Latitude (0-90)		32.75	
Longitude (0-180 + or -)		108.20	
Legal reference longitude		105.00	
			corr 12.8
TIME OF DAY		Horizontal hour line angles with long corr	
am	pm	am	pm
12.00	12.00	1.73	-1.73
11.50	0.50	5.84	2.33
11.00	1.00	10.09	6.45
10.50	1.50	14.59	10.73
10.00	2.00	19.49	15.28
9.50	2.50	24.95	20.26
9.00	3.00	31.18	25.81
8.50	3.50	38.42	32.17
8.00	4.00	46.96	39.58
7.50	4.50	57.08	48.34
7.00	5.00	68.88	58.71
6.50	5.50	82.09	70.75
6.00	6.00	-84.10	84.10
These have		longitude correction	