GW-Basic - Before you start

Dear reader:

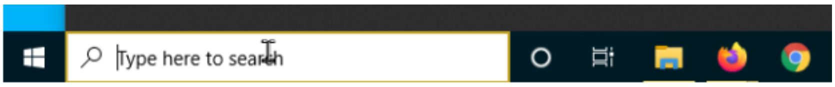
- First of all, we provide a description of the operation of the programs with sample results in .PDF files - all of this to quickly find out whether the program is worth your interest.
- Separately we give the program codes in text files (extension .TXT) - easy to read immediately and, at the same time, to convert them to GW-Basic codes (extension .BAS).

PC-Basic installation

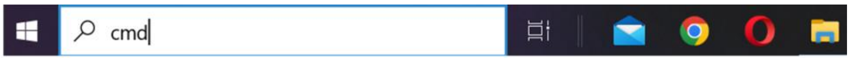
PC-Basic is a free, very good GW-Basic emulator. While the original, latest version of GW-Basic is impossible to invoke on a new type of computers (I have it working on a Toshiba from 1997 with a Pentium II processor and the EGA graphics card), PC-Basic does not have these limitations.

Loading PC-basic on a computer with the Windows 10 operating sysyem - how I did it (you can do it differently):

1) In a box where is a hand lens symbol and a phrase: 'Type here to search'...

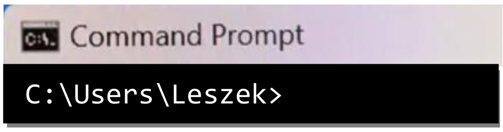


... type **cmd** (after a word: **C**o**M**man**D**).



```
cmd
```

2) [Enter]

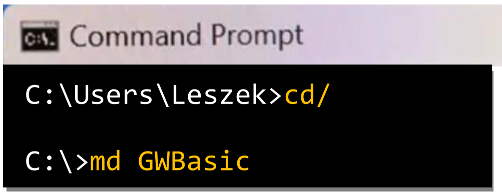


```
C:\Users\Leszek>
```

3) type here: **cd/**

4) [Enter]
You are in the 'root directory'.

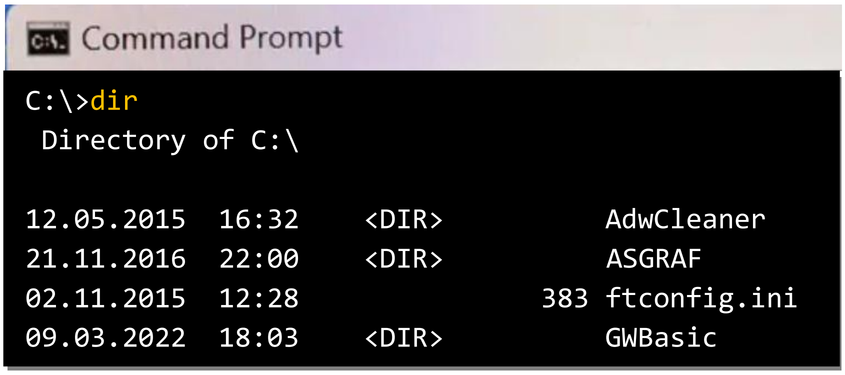
5) Create/Make directory **GWBasic** in this 'root directory': After **C:\>** type **md GWBasic** ('md' after **M**ake **D**irectory).



```
C:\Users\Leszek>cd/

C:\>md GWBasic
```

6) [Enter]

7) You will see again **C:\>** and nothing more. You may doubt the operation of the last command. To be sure that the **GWBasic** directory exists, type after **C:\>** **dir** ('dir' after a word: **DIR**ectory).

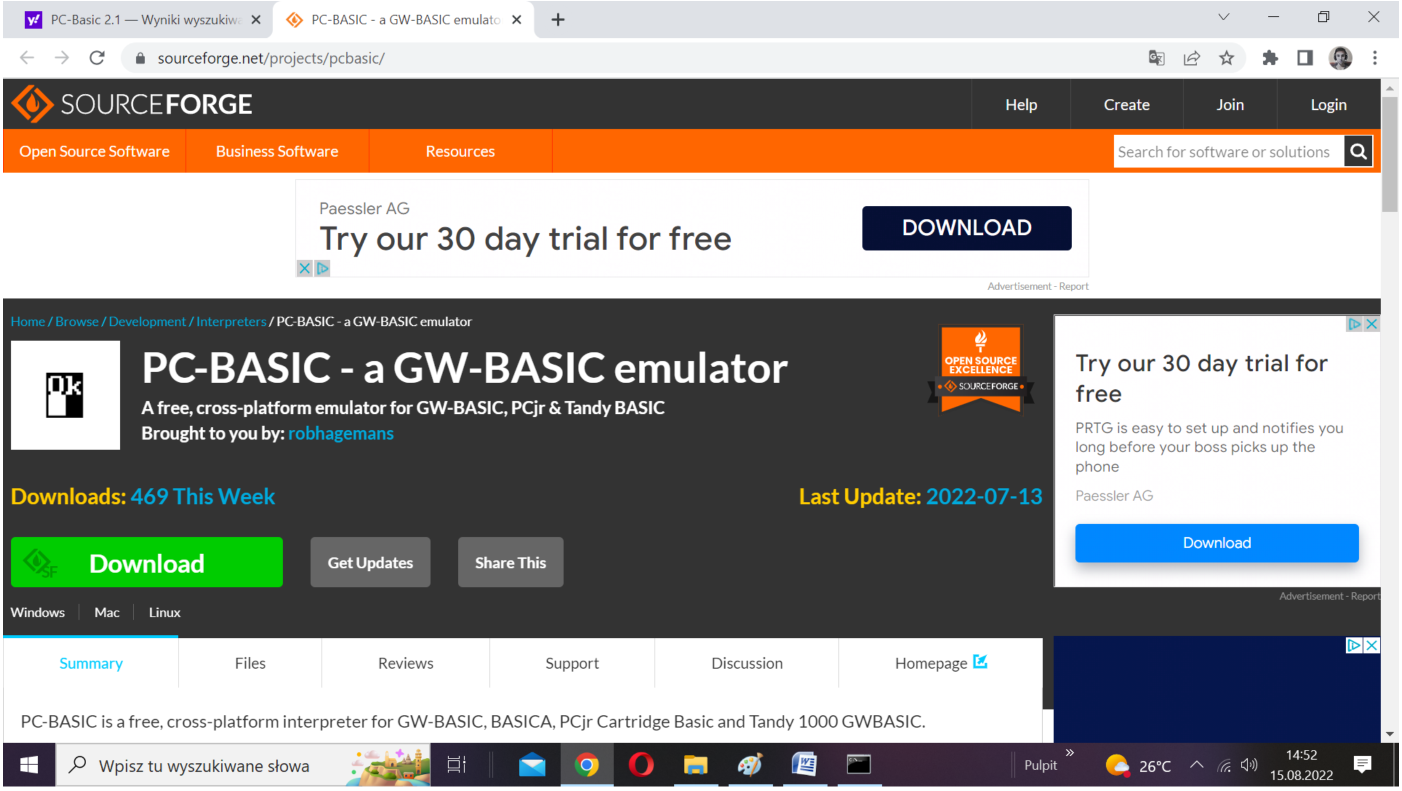


```
C:\>dir
 Directory of C:\

12.05.2015  16:32    <DIR>          AdwCleaner
21.11.2016  22:00    <DIR>          ASGRAF
02.11.2015  12:28               383 ftconfig.ini
09.03.2022  18:03    <DIR>          GWBasic
```

The created 'GWBasic' directory can be seen here in the fourth position from the top.

8) Go to the website:

https://sourceforge.net/projects/pcbasic/



PC-BASIC - a GW-BASIC emulator

A free, cross-platform emulator for GW-BASIC, PCjr & Tandy BASIC

Brought to you by: robhagemans

Try our 30 day trial for free

PRTG is easy to set up and notifies you long before your boss picks up the phone

Paessler AG

Download

PC-BASIC is a free, cross-platform interpreter for GW-BASIC, BASICA, PCjr Cartridge Basic and Tandy 1000 GWBASIC.

9) Click Download on the green background.

10) Follow the instructions and remember to install the program in the directory **C:\>GWBasic**.

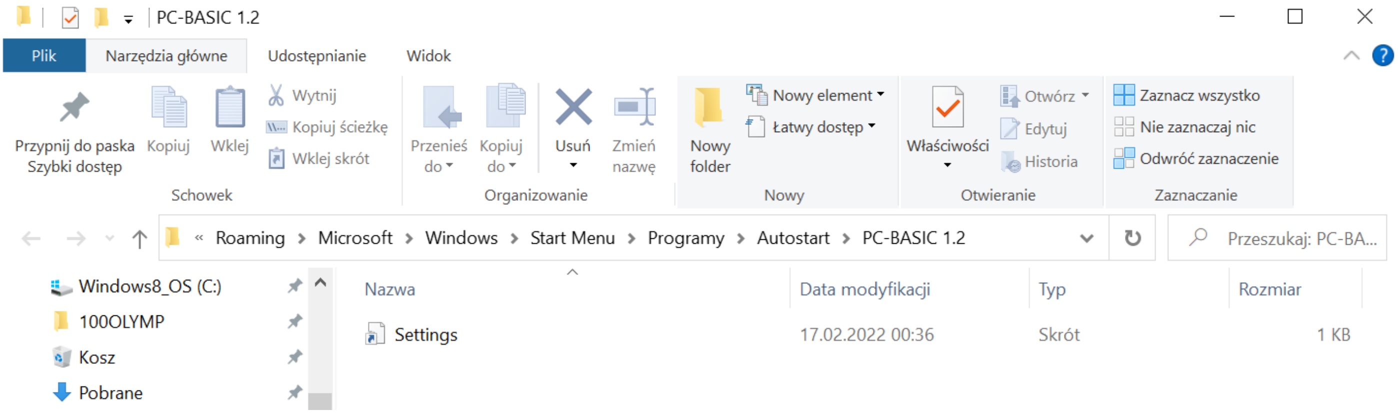
PC-BASIC is absolutely free and it is almost identical to my original GW-Basic, which I bought together with an IBM PC (Intel 80283 processor) in 1991.

Note: If you have an old computer running at most Pentium II processor, you can load GW-Basic on it (maybe you already have it preloaded) from the website (*GW-Basic 3.23, The Last Official Release*).
On the Internet you will also find *GW-Basic User's Guide*, e.g.:
https://gw-basic.netlify.app/files/tuts/gw-man/index.html

It may turn out that the programs presented here, work faster on an old Pentium II processor (e.g. my Toshiba from year 1997) than on a new 64-bits one. This is always a result of using emulators of programming languages compared to the original versions of these languages.

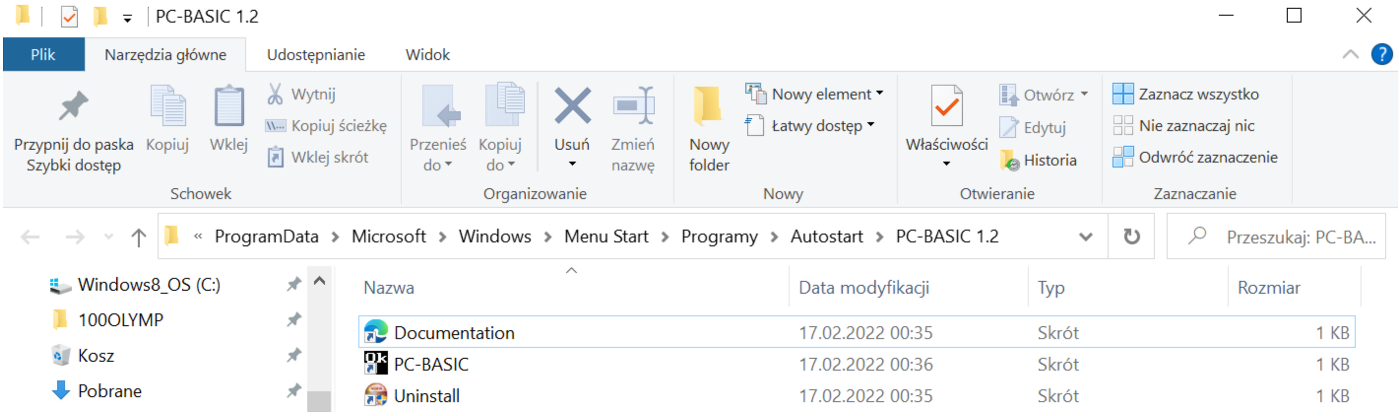
- - - - - - - - - - - - - - - -

After a successful PC-Basic installation, two directory screens will appear every time you turn your computer on:



« Roaming › Microsoft › Windows › Start Menu › Programy › Autostart › PC-BASIC 1.2

Nazwa	Data modyfikacji	Typ	Rozmiar
Settings	17.02.2022 00:36	Skrót	1 KB



« ProgramData › Microsoft › Windows › Menu Start › Programy › Autostart › PC-BASIC 1.2

Nazwa	Data modyfikacji	Typ	Rozmiar
Documentation	17.02.2022 00:35	Skrót	1 KB
PC-BASIC	17.02.2022 00:36	Skrót	1 KB
Uninstall	17.02.2022 00:35	Skrót	1 KB

Since these are only elements that trigger applications, they can be removed because the applications themselves are not removed this way.

A few other issues remain:

1. How to exchange a text file (with the extension **.TXT**, e.g. a notepad file) into a GW-Basic file (with the extension **.BAS**) and vice versa (GW-Basic code into a text file)? Note: There is a minor inaccuracy in the PC-Basic documentation on the Internet!
2. Where is the best place to put existing GW-Basic programs? They have an extension **.BAS**.
3. How to start the GW-Basic editor? You can start the program right from the editor.
4. How to install a codepage you are like to have? By default, the English codepage **437** is loaded with the GW-Basic editor. What can I do to load, for example, the Polish codepage (**852**)? Note: There is a trick involved with this!
5. How to load a program into the GW-Basic editor? Only one program can be loaded at a time.
6. How to enter non-English national characters (e.g. German ß, ä, ë, ö, ü etc) to a program code? Why some of these letters look different in Notebook (file with the extension .TXT) than in GW-Basic editor (files with the extension .BAS)?
7. How to quit the editor and thus exit PC-Basic?
8. Is it possible to compile the **.BAS** file to an executable, i.e. one that could be copied to another computer and run with one click (all GW-Basic environment data would already be in this file)?

Answers:

1. How to exchange a text file (with the extension .TXT, e.g. a notepad file) into a GW-Basic file (with the extension .BAS) and vice versa (GW-Basic code into a text file)?

Why are files with both .TXT and .BAS extensions important? Answer: When you make corrections to a program or write new interesting program, you can easily change the GW-Basic code into a text file , e.g. to send it to others.

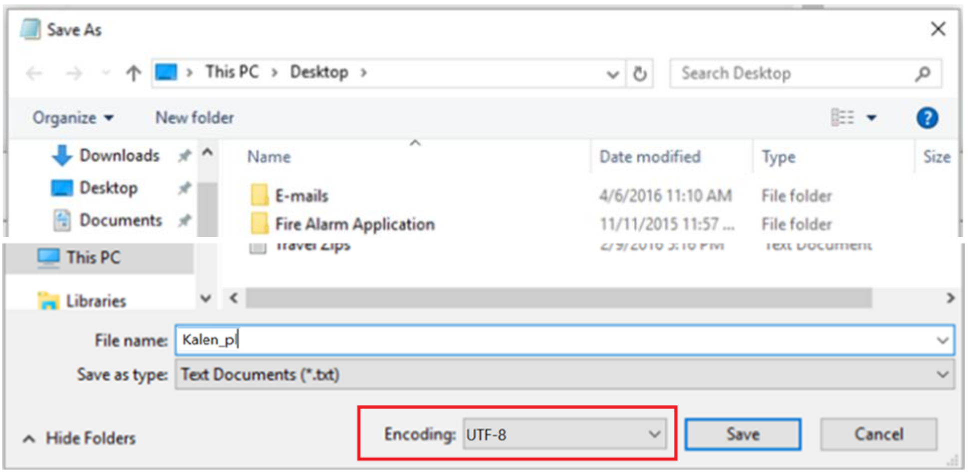
Note:

1. I assume that your loaded PC-Basic is in C:\GWBasic. If you have downloaded PC-Basic elsewhere, please exchange the following instructions accordingly.
2. It is better to have working program codes directly in this directory (C: \ GWBasic). Then, when loading these programs into the editor, you do not need to enter their access path.
3. Remember that the file names in GW-Basic cannot exceed 8 characters (I will use the word *name* below).

Procedure of writing .TXT files into C:\GWBasic directory and exchange these .TXT files into .BAS ones:

1. Copy the code *name*.TXT to the notepad, e.g. on the desktop.

   Important note: When you are going to use non-English characters (ą, ę, etc), the text file must be saved with the UTF-8 option.



File name: Kalen_pl

Save as type: Text Documents (*.txt)

Encoding: UTF-8

<-- The "Save as" box

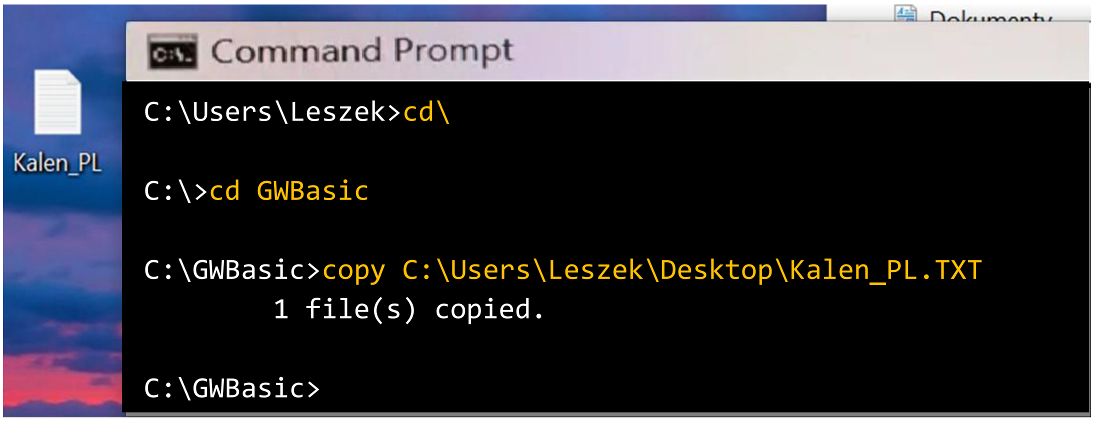
2. Run **cmd** (command prompt, as described above)

3. Go to the **C:\GWBasic** directory

4. Enter:

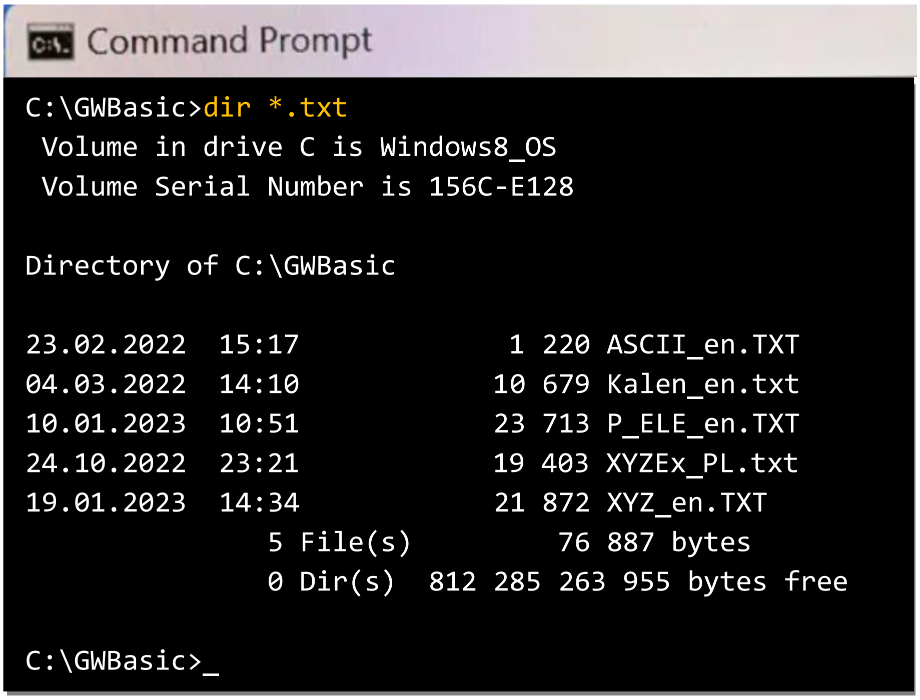
```
copy C:\Users\   (Your ID inside the computer)  \Desktop\name.TXT
```

Below is an example of copying the **"Kalen_PL.txt"** file to the **GWBasic** directory. (Translation: '**Kalen**darz' --> '**Calen**dar')



```
C:\Users\Leszek>cd\

C:\>cd GWBasic

C:\GWBasic>copy C:\Users\Leszek\Desktop\Kalen_PL.TXT
        1 file(s) copied.

C:\GWBasic>
```

This way you can enter all other codes into the **C:\GWBasic** directory and check their existence there:



```
C:\GWBasic>dir *.txt
 Volume in drive C is Windows8_OS
 Volume Serial Number is 156C-E128

Directory of C:\GWBasic

23.02.2022  15:17             1 220 ASCII_en.TXT
04.03.2022  14:10            10 679 Kalen_en.txt
10.01.2023  10:51            23 713 P_ELE_en.TXT
24.10.2022  23:21            19 403 XYZEx_PL.txt
19.01.2023  14:34            21 872 XYZ_en.TXT
               5 File(s)         76 887 bytes
               0 Dir(s)  812 285 263 955 bytes free

C:\GWBasic>_
```

2. Where is the best place to put existing GW-Basic programs? They have the .BAS extension.

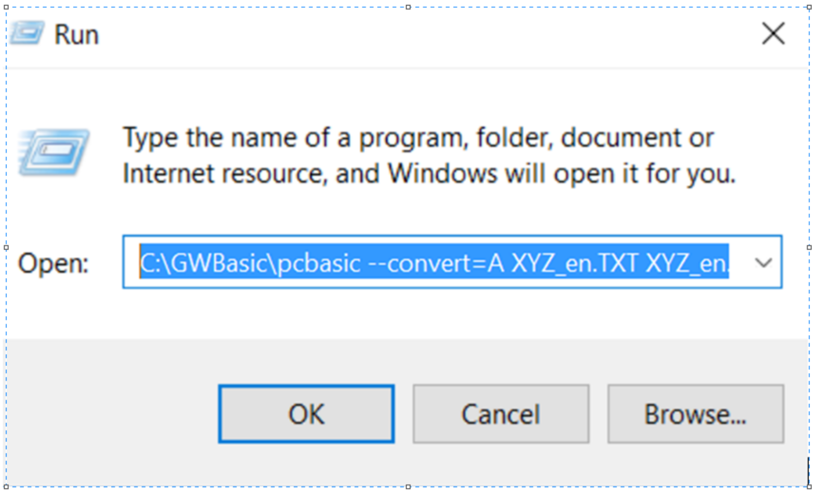
Now you need to exchange the .TXT file (it will be not deleted) with a .BAS file which will be in the same directory (**C:\GWBasic**). Remember: Names cannot exceed 8 characters.

- Where we wrote '**cmd**' before, now we write '**Run**' and we enter in the box:

```
      C:\GWBasic\pcbasic --convert=A name.TXT name.BAS
```

example:

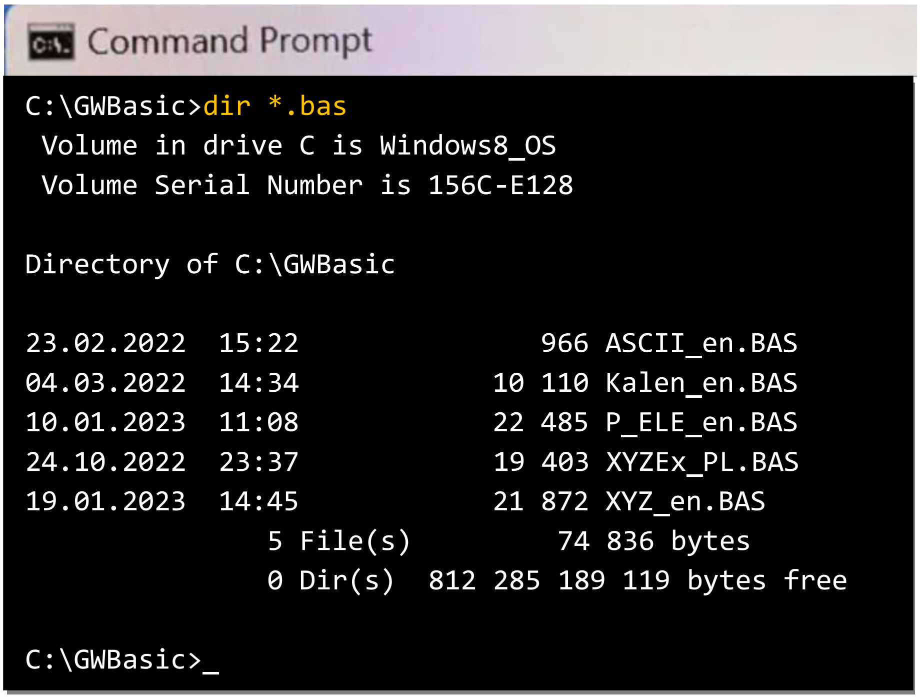
```
      C:\GWBasic\pcbasic --convert=A XYZ_en.TXT XYZ_en.BAS
```



Run
Type the name of a program, folder, document or Internet resource, and Windows will open it for you.
Open:
C:\GWBasic\pcbasic --convert=A XYZ_en.TXT XYZ_en.
OK
Cancel
Browse...

<-- The "Run" box

And this way with each file of our interest and then we check their existence:



Command Prompt

```
C:\GWBasic>dir *.bas
 Volume in drive C is Windows8_OS
 Volume Serial Number is 156C-E128

Directory of C:\GWBasic

23.02.2022  15:22               966 ASCII_en.BAS
04.03.2022  14:34            10 110 Kalen_en.BAS
10.01.2023  11:08            22 485 P_ELE_en.BAS
24.10.2022  23:37            19 403 XYZEx_PL.BAS
19.01.2023  14:45            21 872 XYZ_en.BAS
               5 File(s)         74 836 bytes
               0 Dir(s)  812 285 189 119 bytes free

C:\GWBasic>_
```

You can convert (e.g. after extending its code) the **.BAS** file back to a **.TXT** file

Attention:

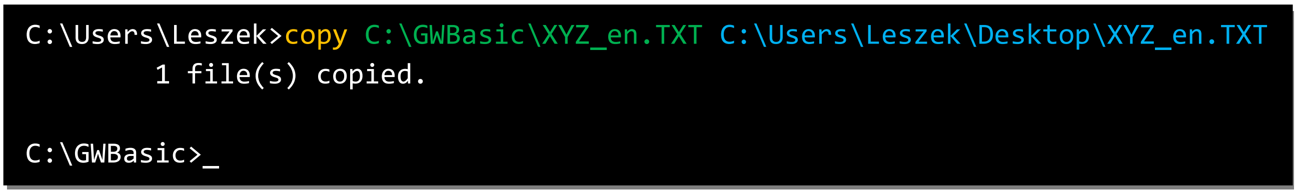
There is a minor inaccuracy in the PC-Basic documentation on the Internet!

To convert a tokenised or protected file to plain text you could use, for example:

pcbasic --convert=A PROGRAMP.BAS PROGRAMA.BAS

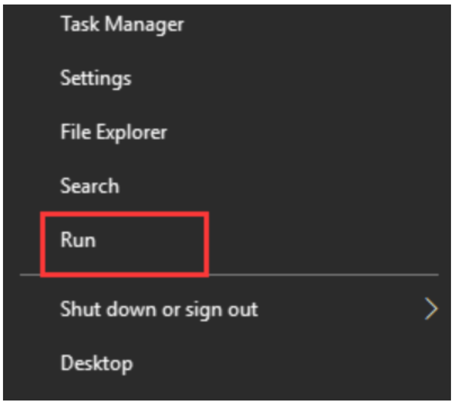
Should be: pcbasic --convert=A PROGRAMP.BAS PROGRAMA.**TXT**

And copy it to the desktop. Instruction (especially colored) you can enter at any level. Example:



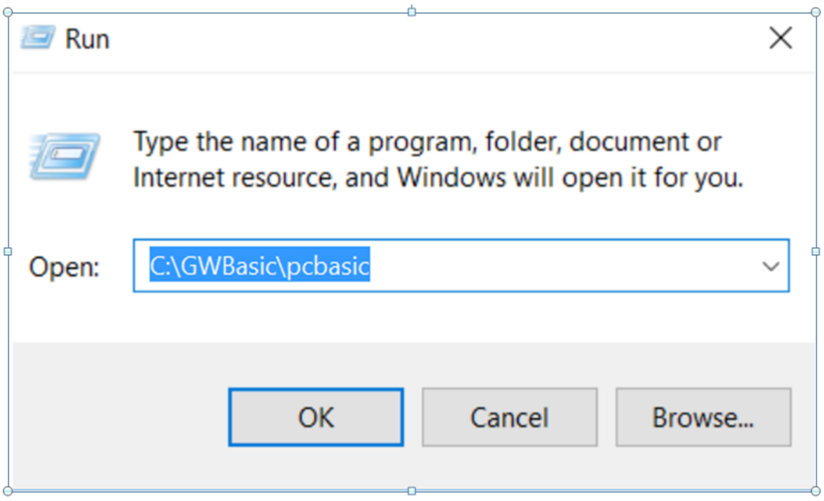
```
C:\Users\Leszek>copy C:\GWBasic\XYZ_en.TXT C:\Users\Leszek\Desktop\XYZ_en.TXT
        1 file(s) copied.

C:\GWBasic>_
```

3. How to start the GW-Basic editor?



In the same box as we are used recently ("Run") we type:

C:\GWBasic\pcbasic

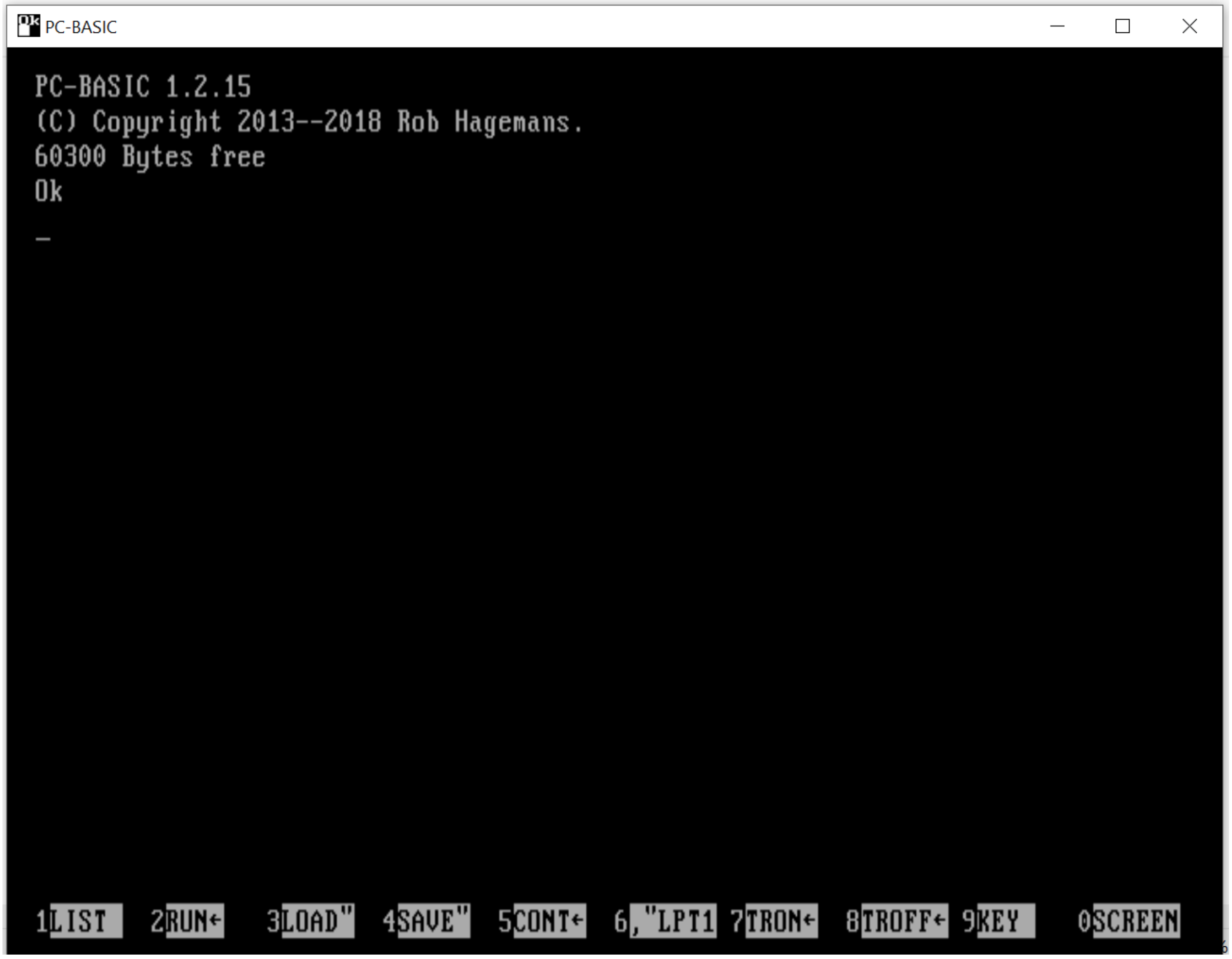


Type the name of a program, folder, document or Internet resource, and Windows will open it for you.

Open: C:\GWBasic\pcbasic

<-- The "Run" box

[Enter] and we automatically have the GW-Basic editor:



```
PC-BASIC 1.2.15
(C) Copyright 2013--2018 Rob Hagemans.
60300 Bytes free
Ok

_











1LIST   2RUN←   3LOAD"  4SAVE"  5CONT←  6,"LPT1 7TRON←  8TROFF← 9KEY    0SCREEN
```

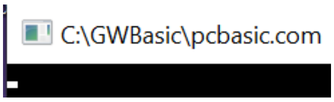
Now, we immediately ask ourselves: What codepage do we have here?

From the PC-Basic documentation:

> Codepage 437 - This table shows the characters that are produced by the 256 single-byte code points when the DOS Latin USA codepage **437 is loaded, which is the default**.

So we have opened the 'English' editor, without the possibility of entering e.g. Polish characters such as ą, ę, ł ...

Note:
When starting PC-Basic, the following screen appears one second earlier:



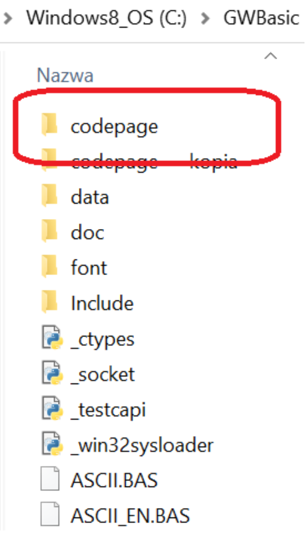
Don't close it. Just don't worry about it. This image will disappear while exiting GW-Basic editor (two images: the editor picture and this one will disappear the same time).

4. How to install a codepage you need?

By default, the English codepage **437** is loaded with the GW-Basic editor. What can I do to load, for example, the Polish codepage (**852**)? Note: There is a trick involved with this!

Follow below idea to install your codepage (e.g. Spanish).

There is a directory of available code pages (**codepage**) in the same place where we have loaded the programs with the .BAS extension:

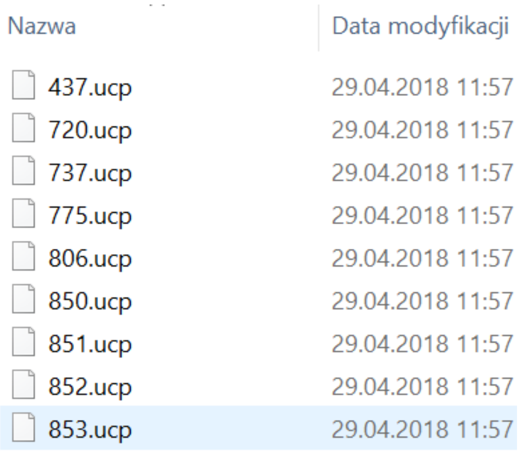


› Windows8_OS (C:) › GWBasic

Nazwa

- codepage
- codepage – kopia
- data
- doc
- font
- Include
- _ctypes
- _socket
- _testcapi
- _win32sysloader
- ASCII.BAS
- ASCII_EN.BAS

It contains the available code pages:

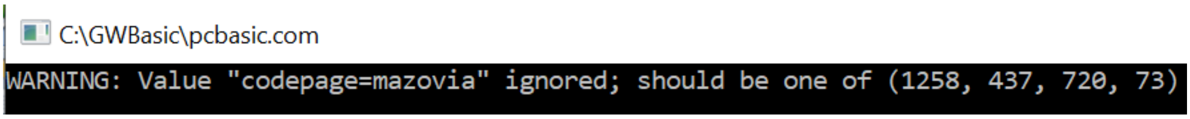


Nazwa	Data modyfikacji
437.ucp	29.04.2018 11:57
720.ucp	29.04.2018 11:57
737.ucp	29.04.2018 11:57
775.ucp	29.04.2018 11:57
806.ucp	29.04.2018 11:57
850.ucp	29.04.2018 11:57
851.ucp	29.04.2018 11:57
852.ucp	29.04.2018 11:57
853.ucp	29.04.2018 11:57

But when I run PC-Basic with the Polish codepage option (according to the PC-Basic manual):

```
    C:\GWBasic\pcbasic --codepage=852
```

I see a warning telling me that my command has failed:

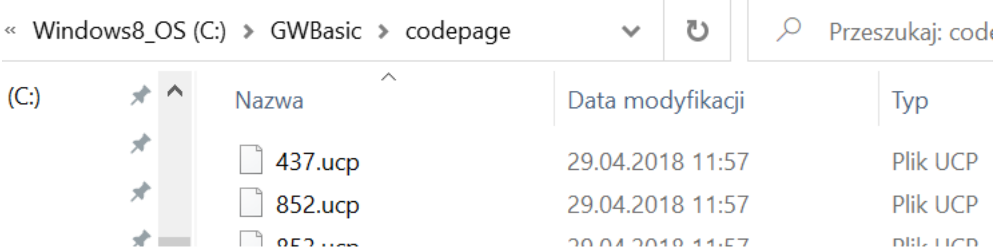


C:\GWBasic\pcbasic.com

```
WARNING: Value "codepage=mazovia" ignored; should be one of (1258, 437, 720, 73)
```

These are the first, only four, sorted 'codepages'!

So I'm removing averything from **`C:\GWBasic\codepage`** between 437 and 852
(just in case I have copied the original **`codepage`** to **`codepage - copy`**).

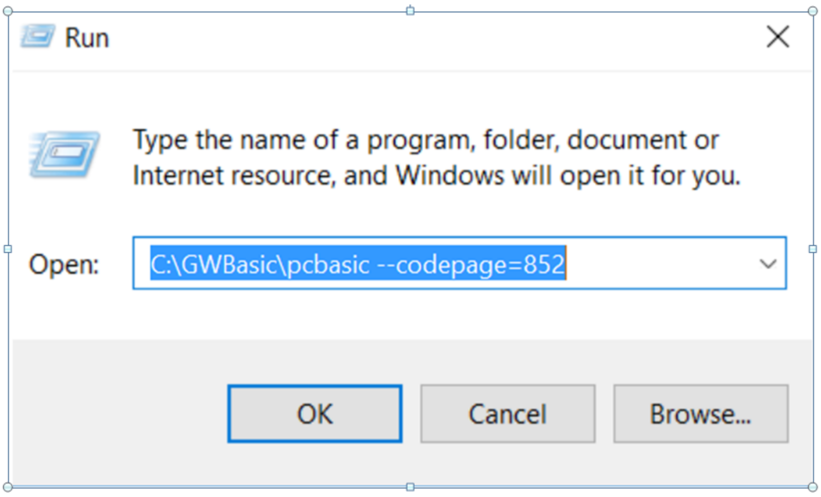


« Windows8_OS (C:) › GWBasic › codepage

Nazwa	Data modyfikacji	Typ
437.ucp	29.04.2018 11:57	Plik UCP
852.ucp	29.04.2018 11:57	Plik UCP

Now:

```
C:\GWBasic\pcbasic --codepage=852
```



Type the name of a program, folder, document or Internet resource, and Windows will open it for you.

Open: C:\GWBasic\pcbasic --codepage=852

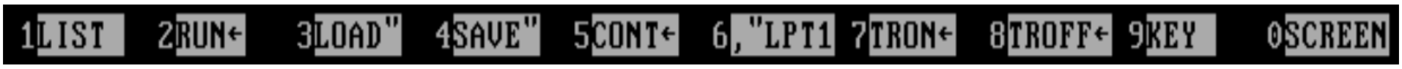
<-- The "Run" box

It will give us an editor screen with the possibility of entering Polish characters - although we do not know immediately whether Polish characters are actually available. Only starting the program ASCII_PL.BAS (or ASCII_EN.BAS) will give us this certainty.

5. How to load a program into the GW-Basic editor?

Note: There are examples below of using Polish (non-English) codepage to show the foreign characters usage.

The most important function keys from the list at the bottom of the editor:



```
1LIST  2RUN←  3LOAD"  4SAVE"  5CONT←  6,"LPT1  7TRON←  8TROFF←  9KEY   0SCREEN
```

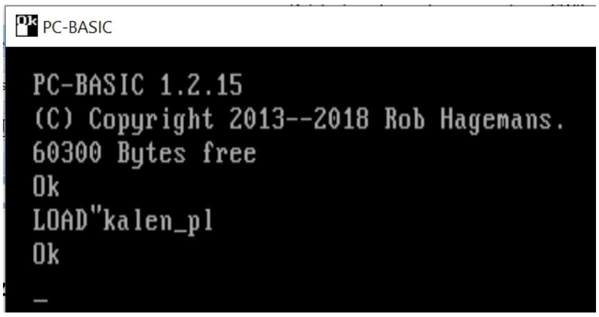
are in a sequence of them use:

[F3] LOAD - to load a program into the editor.

Example:

Loading the Polish calendar **Kalen_pl.bas** (letters are not case sensitive)

1. Press the function key [F3] - **LOAD"** will appear
2. Type **`kalen_pl`**
3. [Enter]



```
PC-BASIC 1.2.15
(C) Copyright 2013--2018 Rob Hagemans.
60300 Bytes free
Ok
LOAD"kalen_pl
Ok
_
```

The program has been loaded (so far, we just have to believe it that it was loaded).

After **LOAD "kalen_pl** we do not type **.BAS** because for the loaded program it must be the extension **.BAS**.

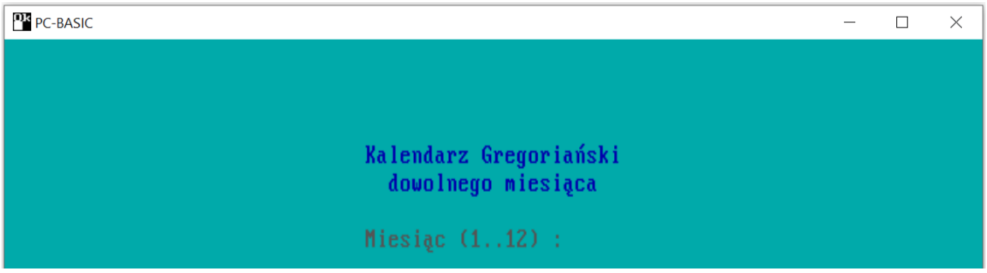
We don't need to close the name with an apostrophe (**"**) because the application will do it itself.

[F2] RUN - to run the loaded program (only one can be loaded and active - the last one) so pressing [F2] automatically starts the program.

Example:

To run the last loaded (kalen_pl.bas) program.

- Press the function key [F2] and we immediately see:



```
Kalendarz Gregoriański
 dowolnego miesiąca

Miesiąc (1..12) :
```

By the way, we can see that the Polish codepage (852) works (characters ń, ą).

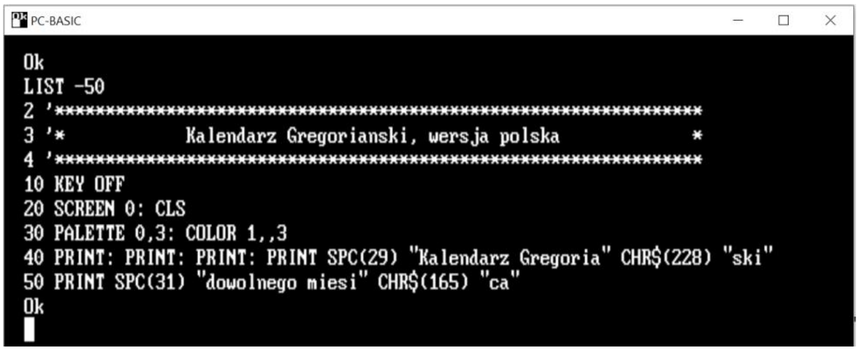
[F1] LIST - to see a listing (code) of the loaded program

Examples (we have to be in the editor, so we have to exit the running program - my programs must run to the end until an option, how to exit the program, appears at the bottom of the screen).

Example 1: Press [F1] and [Enter] - the code listing is scrolled down to its end.

Example 2: Press [F1] and type, for example, **—50**

We'll see lines from the first to the 50th inclusive.

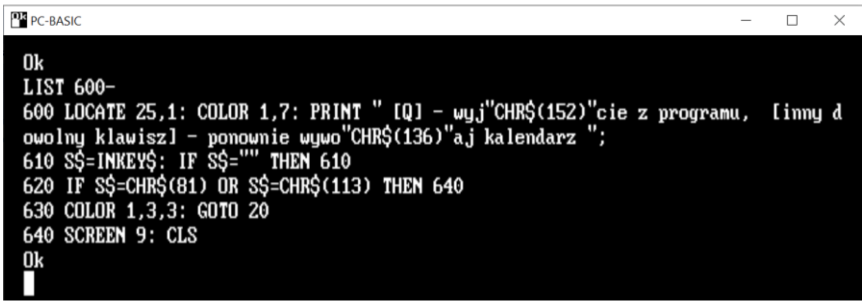


```
Ok
LIST -50
2 '*****************************************************************
3 '*            Kalendarz Gregorianski, wersja polska              *
4 '*****************************************************************
10 KEY OFF
20 SCREEN 0: CLS
30 PALETTE 0,3: COLOR 1,,3
40 PRINT: PRINT: PRINT: PRINT SPC(29) "Kalendarz Gregoria" CHR$(228) "ski"
50 PRINT SPC(31) "dowolnego miesi" CHR$(165) "ca"
Ok
█
```

Nota bene: CHR$(165) is an ASCII character number 165 of the Polish code page, means 'ą'.

Example 3: Press [F1] and type, for example, **600—**

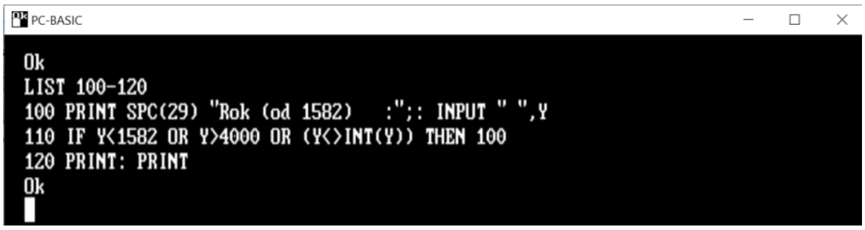
We will see lines from number 600 to the end of the program:



```
Ok
LIST 600-
600 LOCATE 25,1: COLOR 1,7: PRINT " [Q] - wyj"CHR$(152)"cie z programu,  [inny d
owolny klawisz] - ponownie wywo"CHR$(136)"aj kalendarz ";
610 S$=INKEY$: IF S$="" THEN 610
620 IF S$=CHR$(81) OR S$=CHR$(113) THEN 640
630 COLOR 1,3,3: GOTO 20
640 SCREEN 9: CLS
Ok
█
```

Example 4: Press [F1] and type, for example, `100–120`

We will see lines from number 100 to 120 inclusive:



```
Ok
LIST 100-120
100 PRINT SPC(29) "Rok (od 1582)   :";: INPUT " ",Y
110 IF Y<1582 OR Y>4000 OR (Y<>INT(Y)) THEN 100
120 PRINT: PRINT
Ok
█
```

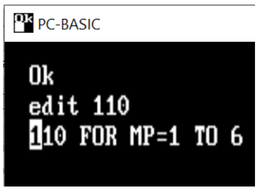
Nata bene: Above is a code that asks for the year and it must be between 1582 (year of adoption of the Gregorian Calendar) and 4000. The astronomers have to 1 day 'artificially' added someday around year 4000 - please, see an explanation: lines 1022 and 1023 of the program either **kalen_en** or **kalen_pl**.

Line 120 is like [Enter] twice in MSWord.

To be honest, you don't need to use the function keys for the above purposes, but you can type these few characters from the keyboard. For example, instead of [F1] it is enough to type **list"**, or instead of [F2] type **run**, etc.

Therefore, the lack of space for the word **EDIT** (next to **1LIST 2RUN<-** etc) should not surprised you. If you want to edit e.g. line no. 110, type:

edit 110



```
Ok
edit 110
110 FOR MP=1 TO 6
```

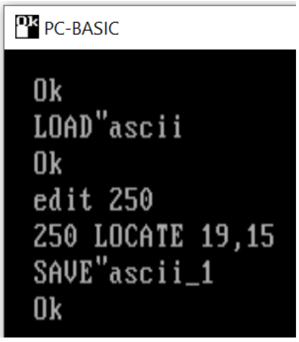
and here you can change something. [Enter] accepts the changes.

As long as the changes are not saved, the changed program will be valid only <u>until exiting GW-Basic</u>.

[F4]   SAVE   - to save the code

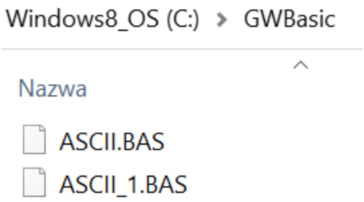
Until you save your changes to the open program listing, reopening the program will yield the code unchanged.

To save the changes, press [F4] (or type `save"`) and then give the name up to 8 characters without writing the extension (.BAS) because the application will give that extension itself.



```
Ok
LOAD"ascii
Ok
edit 250
250 LOCATE 19,15
SAVE"ascii_1
Ok
```

and we have it in our catalog:



Windows8_OS (C:) > GWBasic

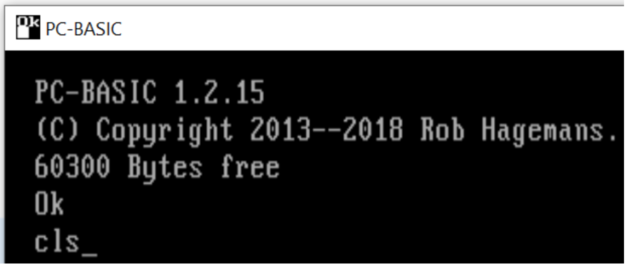
ASCII.BAS
ASCII_1.BAS

If we give the program the same name that the program is loaded, the changes will overwrite the file without warning !

A few additional important remarks about the coding, i.e. what you should know about GW-Basic at the beginning.

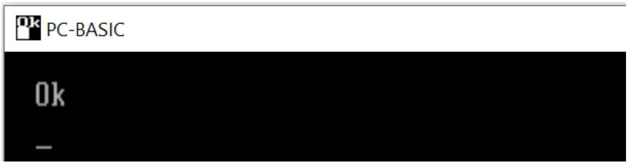
1) **CLS** - clear the screen

To clear the editor screen, type **CLS** and [Enter]



```
PC-BASIC 1.2.15
(C) Copyright 2013--2018 Rob Hagemans.
60300 Bytes free
Ok
cls_
```

we always are getting this:

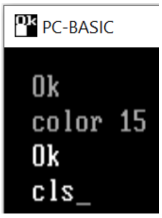


```
Ok
_
```

By the way: It is good to change lightgrey characters (default) into white ones, leaving the background black. You can change 'screen mode' (**SCREEN 0** is default) as well as color of characters (foreground), background and border (syntax is: **COLOR** [*foreground*][,[*background*][,*border*]]). The default statement is **COLOR 7,0,0**. Please see *GW-Basic User's Guide* (chapter 7, page 28) for details.

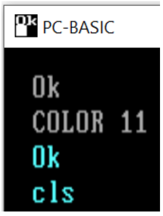
Colors - they numbers are the same as for Turbo C++
Why are they numbered this way? Because on a monochrome monitor they are getting brighter and brighter.

0 - BLACK	4 - RED	8 - DARKGRAY	12 - LIGHTRED
1 - BLUE	5 - MAGENTA	9 - LIGHTBLUE	13 - LIGHTMAGENTA
2 - GREEN	6 - BROWN	10 - LIGHTGREEN	14 - YELLOW
3 - CYAN	7 - LIGHTGRAY	11 - LIGHTCYAN	15 - WHITE



```
Ok
color 15
Ok
cls_
```

or

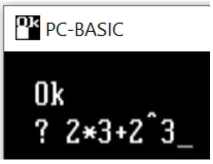


```
Ok
COLOR 11
Ok
cls
```

or other color you like.

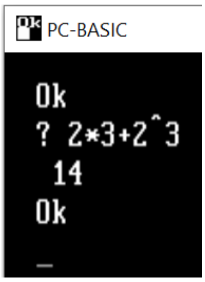
2) **GW-Basic as a calculator**

Example: Assume that I want to have a result of an arithmetic expression: $\mathbf{2*3+2^3}$



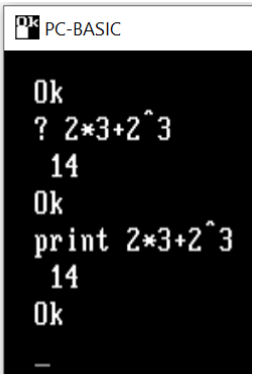
```
Ok
? 2*3+2^3_
```

[Enter]



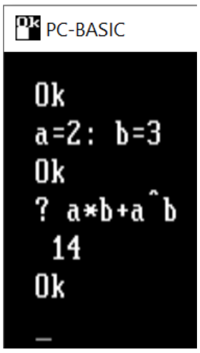
```
Ok
? 2*3+2^3
 14
Ok
_
```

The question mark (**?**) replaces the word **PRINT**



```
Ok
? 2*3+2^3
 14
Ok
print 2*3+2^3
 14
Ok
_
```

Or for an algebraic expression **$a*b+a^b$**, where **a=2** and **b=3.** Colon (:) separates statements to not write them on the seoparate lines.

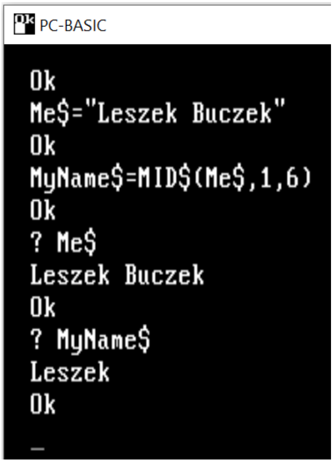


```
Ok
a=2: b=3
Ok
? a*b+a^b
 14
Ok
_
```

3) **Variables and their types are not declared** (the exception is an array of more than 10 elements).

However, the names of character variables (strings) and the names of their functions end with a dollar sign ($), e.g.

```
Me$="Leszek Buczek"          <-- Me$ and MyName$  are my strings
MyName$=MID$(Me$,1,6)        <-- MID$ is a built-in function - in this case, from the string Me$ six
                                 characters will be selected starting with the first character.
```



```
Ok
Me$="Leszek Buczek"
Ok
MyName$=MID$(Me$,1,6)
Ok
? Me$
Leszek Buczek
Ok
? MyName$
Leszek
Ok

_
```

In many programs, numeric variables have a percent sign (%)* at the end of them names. I do not follow that convention.

In GW-Basic you will find a lot in common with the basics of other languages, for example, "R" or "Python" what will allow you to understand the evolution of programming languages.

- - - - - - - - - -

* The following book is a good example of this:
Alan R. Miller, Professor of Metallurgy, New Mexico Institute of Mining and Technology: *BASIC PROGRAMS for Scientists and Engineers*, SYBEX, First Edition 1981, ISBN 089588-073-3

6. How to enter non-English national characters (e.g. German ß, ä, ë, ö, ü etc) to a program code?

Each ASCII character corresponds to a number. Code page 437, which is the default page, already has national German characters, but the schema below is general for all code pages:
- PRINT CHR$(132) <-- prints the letter ä,
- Holding the [left ALT] button while entering the digits of the numeric block (on the right side of the keyboard) and pressing successively: 1, 3, 2 and then releasing the [left ALT] key <-- also prints the letter ä

To see all available characters:

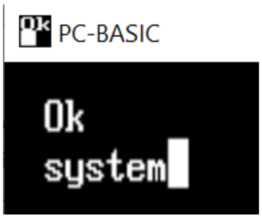
- ➢ Run PC Basic:
  C:\GWBasic\pcbasic --codepage= *Your code page*
- ➢ and run program ASCII_EN.BAS
  - ○ LOAD "ASCII_EN
  - ○ RUN

Why some of these non-English national characters look different in Notebook (file with the extension .TXT) than in GW-Basic editor (files with the extension .BAS)?

When we convert a . BAS file (.BAS will be not deleted!) into .TXT, we notice that non-English national characters in a text file (with the extension .TXT) show strange symbols.
Even it seems to us that we have the same codepage in DOS and in Microsoft Office package, these codepages differ from each other, despite the fact that they are dedicated to the same country. Therefore, for example, sorting in MSWord or Excel may give different results than sorting in a programming language (e.g. any sort method in 'C') or in DOS.
Don't worry about it. During conversion, the character symbols are copied (numbers of ASCII), not the characters themselves. So:
`C:\GWBasic\pcbasic --convert=A` ***program_name*.BAS *program_name*.TXT** <-- will transform, for example, Polish 'ą' into a strange sign in the Notbook, but...
`C:\GWBasic\pcbasic --convert=A` ***program_name*.TXT *program_name*.BAS** <-- ... .TXT back to .BAS - this strange sign becomes 'ą'.

7. How to quit the editor and thus exit PC-Basic?

Exit from GW-Basic back to the Windows:
After **OK**, type the word **system** (GW-Basic is not case sensitive).



```
Ok
system
```

[Enter]

8. Is it possible to compile the .BAS file to an executable, e.g. create ASCII.EXE based on ASCII.BAS file ?

GW-Basic alone cannot do that. The same PC-Basic. Don't try anything like this ~~C:\GWBasic\pcbasic --convert=A Kalen_pl.BAS Kalen_pl.EXE~~ ! I did it and my computer crashed - keyboard and mouse have stopped working - I had to turn off the computer by holding the on/off button for 5 seconds.

In my opinion, it is not a deal trying to create an execution file in PC-Basic.
After all, these codes are for learning programming languages and only if you really want to have an execution file, you can easily convert each of these programs into, for example, a 'C' language code and then make an execution file out of it.