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-- C. A. R. Hoare

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-- C. W. Wendte

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Š•Š „, •f" -™‡<^f †•, f" ~ •| (E'æ••f~.

j †^ Ž, ...', ^††^ Ž™E ', "—<^f •• †f^ †•<^Ž> <f-...†•‡E ' ŽŠ••^ ...Ž> ~ E C æ E C++ †•<^<, Ž•<^f ^Ž... <E‡ ŽE' ^• ^ ŽŠ••^, 'f^ Ž^, "••f'†^ <E C æ <E C++ •• †f^ ' ŽŠ••^ Ž™E †fŽ" •f™ EŽ™Ž™'f•<æ~ •~ (•E^•f" ... " Š•f" ^~ •EŽ^•æ 0 " ^f 1) „, (E•f†™Ž™fŠ‡<~ †^ †•<^Ž> <f•<æ †• •f" —™, ~ •E†^•~ " ^f •ŽfŽ™' ~. „ <^† <, „•< <™ Ž, ...', ^††^,™ •E‡ <E~ ^†<f', "—f <™ Ž, ...', ^††^ •<E †‡æ†E " ^f ^, „••f †^ <™ <, „•f.

≥ Python, ^Ž... <E‡ " ŽŽE, •• „, •f" -<^f †•<^ŽŠ<<f•E •• •E^•f" ... ^, „••™. ' ŽŽ" Ž...f•†Ž†<™ Ž, ...', ^††^ ^Ž' •E«•~ ^Ž... <™‡ ŽE' ^™ " Š•f" ^. Š•> <•, f" ", E Python †•<^<, Ž•f <™‡ ŽE' ^™ " Š•f" ^ •• †f^ •†•f"†••E †™, —æ Ž™E™‡™†™ -<^f bytecode " ^f †•<^ <™ †•<^—, " -f •<E ' ŽŠ••^ <™E EŽ™Ž™'f•<æ " ^f †•<^ <™ <, „•f. „ Ž™ ^E<„, •<E‡ Ž, ^††^<f" ...<E<^ " " †•f <E „, æ•E <E~ Python Ž™Ž« Žf™ •«™ŽE ^—™« •• „, •f" -<^f †^ ^†E•E„••< 'f^ <E †•<^ŽŠ<<f•E <™E Ž,™', "††^<™~, <E •«†••E †• <f~ " ^<" ŽŽEŽ~ ŸfŸŽ™æ"•~, ".ŽŽ, ".ŽŽ. ' E<„ •Ž•E~ " " †•f <^ Ž,™', "††^<^ <E~ Python •| ^f, •<f" —™, E<" ^—™« †Ž™, ••< ^ŽŽ" †^ ^†<f', " 3•< <™ Ž, ...', ^††^ Python Ž™E —<f" | ^<• •• †~† " ŽŽ™ EŽ™Ž™'f•<æ " ^f †^ •™EŽ 3•f <f ^ŽŽ" !

•†Šfj•f†•†•Š, •< Ž

≥ Python EŽ™•<E, •••f <„™ <™ •f^•f" ^•f™•<, •—æ Ž,™', ^††^<f†... (procedure-oriented) ...™ " ^f <™‡ ^†<f"•f†•†™•<, •—æ Ž,™', ^††^<f†... (object-oriented). <™ •†%•†%•†'†'Ž...†' " E„...%„%„%Ž†' •—, <™ Ž, ...', ^††^ •™‡••<f Ž™†> •• •f^•f" ^••~ æ •E†^, <æ•f~™f™Ž™•~ ••† •†^f <Ž™<• " ŽŽ™ ^Ž... •Ž†^„, (E•f†™Ž™fæ•f†^ "™††" <f^ ^Ž... Ž,™', "††^<^. <f~ %—Ž†^†•†—•'Ž...†'†„ ' ŽŠ••~, <™ Ž,™', "††^<^ •™‡™‡†<f Ž™†> •• ^†<f"•†•†^ <^™Ž™•^ •E†•E" —™E† •••™† †^ " ^f Ž•f<™E, 'f" ...<E<^ . ≥ Python „•f †~† Ž™Ž« f•„E, ... ^ŽŽ" Ž™Ž« ^ŽŽ... <,„Ž™ 'f^ ^†<f"•f†•†™•<, •—æ Ž,™', ^††^<f†..., •f•f" ...<^† •E' ", •†<^f†•†•' " Ž•~ ' ŽŠ••~ ...Ž> ~ E C++ æ E Java.

Š'•j ŠE•f†~

' † „, •f" -••<• †^ „, ••f†™ "™††" <f " Š•f" ^†^ <, „•f Ž™Ž« ', æ'™, ^æ^† Ž, Ž•f †^ „•<• †^ "™††" <f •†... ^Ž' ..., f‡†™E Ž™E †^ †E‡ •†^f ^†™f" <„, <„<• †Ž™, ••<• †^ Ž,™', ^††^<••<• •••†™ <™ "™††" <f •• C æ C++ " ^f †•<^ †^ <™ „, (E•f†™Ž™f••<• ^Ž... <™ Python Ž, ...', ^††^ •~.

Š†•‡†~Š!•f†~

—Ž™, ••<• †^ •†>†^<Š••<• <E‡ Python †•^ •<^ Ž,™', "††^<^ •• C/C++ 'f^ †^ <™E~ •Š••<• •E†^<„<E<~ 'scripting' 'f^ <™E~ „, æ•<• •~.

Šj Š•Š^†††~f—f•• j•Ž

≥ E, ...<EŽE ŸfŸŽ™æ" (E <E~ Python •†^f Ž, ^††^<f" <•, "•<f^ . —Ž™, •• †^ •~ Ÿ™Eææ•f †^ " " †•<• •f" —™, ^ Ž, "††^<^ •••<f" †• " ^†™†f" ~ •—, "••f~, •E†f™E, '•^ <•†E, >•E~, •™"†~†™†" >†, ‡E†" <>•E, Ÿ"••f~ •••™† ‡>†, Ž•, fE' E<~ f•<™«„ CGI, FTP, email, XML, XML-RPC, HTML, ^, „•• WAV, „, EŽ<™', "—E•E, ' , ^—f" ~ •f•Ž—~ „, æ•<E (GUI -graphical user interfaces), Tk, " ^f " ŽŽ^ Ž, "††^<^ Ž™E •| ^, <™«‡<^f ^Ž... <™ •«<E†^ . ¶|E†Eæ••<• ...f ...Ž^ ^E<" •†^f •f^•f†^ ...Ž™<• •†^f •' " ^<•<E† ‡E E Python. ' E<„™†™†" -<^f —fŽ™•™—^ 'Batteries Included' <E~ Python.

ŠžfžŽ•...† ^Ž... <E‡ Ž, ...<EŽE ŸfŸŽ™æ" (E, EŽ", „™E† •f" —™, ~ " ŽŽ•~ ŸfŸŽ™æ"•~ E 3EŽæ~ Ž™f...<E<^ ~ ...Ž> ~ E wxPython ^[1], E Twisted ^[2], E Python Imaging Library ^[3] " ^f Ž™ŽŽ ~ " ŽŽ•~.

² Python •†f ž, ^'†^<f"†f^ •†f ž, ž^<f"œ "f f„E, ...<^<E 'ŽŠ••^, i „f <™ •> •<... •†f•†f•†f... ^ž...•™•E~ "f „^, ^" <E, f•<f"Š†ž™E "†™E† <E •†f™E, '•^ ž,™', ^††^<f•†™E > † •• Python •f••••<f"œ "f•«"™žE.

Šf^Š•...f Perl;

'†••† <™ |, ^<•œ•E, E Perl •†f†f^ ^"...†^•†f, •<f" f„E, œ, •†f™—fžœ~, ^†™f" <™« "Š•f" ^, •f•, ††f•«•††E 'ŽŠ••^ ž,™', ^††^<f•†™E.

'†•„^< ž,™•ž^œœ•f ž™< †^', "³•< †^†•"ž™ ž,™', ^††^•• Perl, †•••^< ^ž†œœ•f ^†œ <†•, Š<E•E ^ž...†...†™f •~! —• "žž^ ž...f^, < ž,™', "††^<^•• Perl •†f ž™ž« •«"™ž^...<†•†f†f", "f^E 'ŽŠ••^ •f^ž, žf••†f", " hacks "f•†f", f^•†ž™žŠ†ž™E "†™E† <E •†Ež•f" <™E~". ^<...™, ', œ'™, ^'•†<f††ž...™, E...<†^, „•••<†^', "—•†•^ž«<, ^ž,™', "††^<, "f†fž"> ^ž... <†ž ž,™•> žf"œ†™E •†žf, ••††™E, '•~†•"ž> †ž,™', ^††^< > †•• Perl 'f^ <E Yahoo!

†E' ", f†...†††† <† Perl, < ž,™', "††^<^•• Python •†f ••™E, ^žf™ ^žž", žf™ "^^, ", žf™ •«"™ž^•<E •†', ^—œ "f", ^žf™ "^^††E<" "f •«"™ž^•<E •†œ, E•E. €, ^'†^<f" ††††—> <† Perl "f <E „E•†™ž™fŠ "^^††, f†' f^•f"—™, ^ž, "††^<^žž" ...<†', "—> †ž ž,™', ^††^ž†<^, „•—> †^ <™ •" —<™†††† <™E~...,™E~ <E~ Python •žf•œ „f'•†f <...™ —f•f"œ'f^†††. ² Perl „f†ž™•<•<...^žžž" hacks "f^žž~", ž™E†™f"—f•^†††•†fE •f^††<, "•<f™ (^žž" ž™ž« <•, "•<f™) hack. ¥E•<E„Š~, E•ž•, „...††E Perl 6 ••—†<f††—, †f"^^ž™E Ÿ•ž<fŠ•f—'•†E<...<™†<™†^.

•™†††•f"..."f ž™ž« •††††f"..."žž•™† " <†^ž™E†††—> ...< „f E Perl, •†fE <•, "•<f^ ŸfŸž™œ" E CPAN [4] -E Comprehensive Perl Archive Network. ž~ Ež††•••<f "f <™...†††, ^†œ •†f†f†f'††f^•†žž™œ ^ž...^, †, Š†^<^ <E~ Perl "f •†f ž, ^'†^<f" •«"™ž™†^ "^^<†™œ•f "††•~ <™†'•œ™ "f <™ Ÿ"™~ <E~†ž™, ••†^ "†•<™<f•œž™<•'†††žž™ž™f•œ„E•†™ž™fŠ†<~^†E" <^, †, Š†^<^, i†^~ž... <™E~ž...™E~'f^ <™E~ž™™E~ E Perl „fž•, f••...•, •~ ŸfŸž™œ"•^ž... <E† Python •†f'f^<Ež", „f•Š "f ž™ž« ž•, f••...•,™ "f, ...^ž...•<f E Python. Š†<™«<™f^†E<—†•<f†^žž"—f†•<™™ž™†^†††††††ŠE, •œ, f™ž" < > † <E~ Python [5].

Šf^Š•...f Ruby;

'†••† <™ |, ^<•œ•E, E Ruby •†f†f^ ^"...†^•†f™—fžœ~, ^†™f" <™« "Š•f" ^, •f•, ††f•«•††E 'ŽŠ••^ ž,™', ^††^<f•†™E.

'†„E•†™ž™f•œ•œE <E Ruby "f•~^, •f, <...<„>, ^††f™ž^•~ž,™•†> †^•†f••••†^ <E „E•†™ž™f•œ•.

"f^ <™E~Ež...ž™ž™E~†††, Šž™E~ž™E •† <† „™E†„E•†™ž™fœ•f^"...†^"fž,™•ž^œ«††^ž™—••™E†††††††† Python œ Ruby, <...<•~ž,™•†> <† Python, "^^, "ž... <† "ž™žE <E~•E"™ž^•~††††E~. €,™•>žf" <™ Ÿ, œ^•«"™ž™†† "^^<†™œ> <E 'ŽŠ••^ Ruby, ^žž" ...ž™f™f"††, >ž™fž™E <† "^^ž^Ÿ^†™E†††††††† <†††™, —f" <E~'ŽŠ••~. ¥E•<E„Š~, 'Š••††f <...•™ <E„•, ...~.

Ÿf—†••f', •ž, ^††^Šf•Ščž

1>~†^•~•†f—, •f†^•f^Ÿ"•••<žž†™f•ž™E•^™f hackers ...ž>~™ ESR 'f^ <† Python:

% ± Eric S. Raymond •†f™•†', ^—~<™E"±"^^••, f"..."f <™žž—, f" "f•†f•ž•E~"••†™~ž™E ž, ...<†† <™†™,™E—f^ž—^™•f^%„. © f...<f E Python '††E^ž†††E <™E'ŽŠ••^ž,™', ^††^<f•†™E [6] ("„™, <^~'žf").'E<...<™", †,™œ<†Ež, ^'†^<f"œ†ž†E•Ež•> ^ž... <†ž, Š<E†™E•ž^—œ†•<† Python.

% ± Bruce Eckel •†f™•†', ^—~<††f"•††††Ÿfž>† Thinking in Java "f Thinking in C++. © f...<f "^^†" 'ŽŠ••^•††† "†††††Š•fžf™ž, ^'>'f"~^ž... <† Python. © f...<f E Python •†f•>~E†††E'ŽŠ••^E™ž™•^•<f"—f•<™†^"††f<ž, "††^<žf™•«"™ž^'f^<™žž,™', ^††^<f•œ. ¥f^Ÿ"•<.

⟨E† ŽŽæ, E •E† †<•E|æ <™E [7] (•<^ ^' 'Žf" ") 'f^ Ž•, f••...<•, •~ Ž•Ž<™† , •f•~.

% ± **Peter Norvig** •†^f †^~'†> •<... •E', ^~ ^~ <E~ Lisp " ^f ¥f•E¤E†<æ~ Ž™f...<E<^~ ^†~<E<æ••> † •<™
Google (•E„ ^, f•<Š <™† Guido van Rossum Ž™E †™E <™ ^† —•, • ^E<...). © •f ...<f E Python Ž" †<^ æ<^† †^
••> <•, f" ... "™††" <f <™E Google. —Ž™, •<• †^ <™ •ŽfY•Y^fŠ••<• ^E<... "™f<Š†<^~ <f~ ^' '•Ž••~ Google Jobs [8]
•<f~™Ž™•~ ^†^', " —•<f E '†Š•E <E~ Python > ~ ^Ž^f<™«†•†E 'f^ †E„ ^†f"™«~ Ž™' f•†f"™«.

€•, •Š~Ž Python 3.0

≥ Python 3.0 •†^f E † ^ "•™•E <E~ 'ŽŠ••^~. —•, f" ~—™, ~¤^ <E •••<• > ~ Python 3000 æ Py3K.

± "«, f™~ Ž...™~ 'f^†f^†•" ŽE † ^ "•™•E <E~ Python •†^f †^ ^Ž™†^~, E†¤™«† ...Ž~ <^†f", ™Ž, ™YŽæ†^<^ " ^f
•Ž~<Š†^<^ Ž™E •E••>, •«¤E" ^†† <^ „, ...†f^, " ^f †^ '†•f E 'ŽŠ••^~ " ...†^ Žf™ " ^¤^, æ.

' † æ•E „•<• ^, "•<... "Š•f" ^ •• Python 2.x, <...<• EŽ", „f†f^ •—, †™' æ Ž™E ¤^ •~ Y™E¤æ••f †^† <^<, 3•<•
<™† "Š•f" ^ ^Ž... 2.x •• 3.x [9] (••Ž•• ^ <^ ' 'Žf" ").

€•, f••...<•, •~ Ž•Ž<™† , •f•~ •<^ (...Ž™f™f •«†•••†™f •<^ ' 'Žf" "):

% Šf•^'>'æ <™E Guido van Rossum [10]

% •f ••†^f " ^†™«, f™ •<E† Python 2.6 [11] („ ^, ^" <E, f•<f" " Ž™E •†^f Ž™Ž« •f^—™, •<f" " ^Ž... Ž, ™E'™«†•†•~
"•...•f~ Python 2.x " ^f Ž™E Žf¤^†...<^<^ ¤^ •E†Ž•, fŽE—¤™«† •<E† Python 3.0)

% •f ••†^f " ^†™«, f™ •<E† Python 3.0 [12]

% ¬, ™†™•f" ' , ^††^ "•™•E~ <E~ Python 2.6 " ^f <E~ 3.0 [13]

% Python 3000 (E •Ž••E†E Ž••<^ ^Ž... Ž, ™«•f†...†•†•~ ^ŽŽ^, ^) [14]

% ¥f" —™, ^ •„ •f^ 'f^ <E† Python 3.0 [15]

% ® ^ <E~ Python (Ž•Ž<™†•, æ~ Ž••<^ ^ŽŽ^, Š†) [16]

• €, ™E'™«†•†™ • ŠŽ...†•†™

• €••> •<^ Ž•, f•„...†•†^

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Python el:ŠŽ; ^ŠŒ•Š^•~

' ‡ „•<• <Œ† Python 2.x œ•Œ •' " ^<•<Œ† ‡Œ, œ• „, •fŒ^a•Š[~]f ‡^ <Œ† ^Ž•' " ^<•<œ•<• 'f^ ‡^ •' " ^<•<œ•<• <Œ† Python 3.0. —Ž™, •<• ‡^ <f~ „•<• " ^f <f~ •«™ •' " ^<•<Œ† ‡~ <^Œ<...™,™†^.

Šf^ „, •Š•Ž Linux ; ^f BSD

' ‡ „, Œ•f†™Ž™f••<• ‡f^ •f†™†œ Linux ...Ž> ~ <™ Ubuntu, <™ Fedora, <™ OpenSUSE œ {•f•' " ^<• <Œ† •ŽfŽ™' œ •^~ ••Š}, œ ‡^ •«<Œ†^ BSD ...Ž> ~ <™ FreeBSD, <...< Žf††™<^<^ ‡^ „•<• œ•Œ •' " ^<•<Œ††ŒŒ <Œ† Python •<™ •«<Œ†" •^~.

'f^ ‡^ •Ž' |•<• ^† „•<• œ•Œ •' " ^<•<Œ† ‡Œ <Œ† Python •<™ Linux •^~ , ^†™•|•<• ‡^ Ž, ...', ^††^ "•Ž«—™Œ~ (...Ž> ~ <™ konsol e œ <™ gnome-termi nal) " ^f ŽŽŒ" <,™Ž™' œ•<• <Œ† •†<™Žœ python -V ...Ž> ~ ^†•<^f Ž^, ^" " <^.

```
$ python -V
Python 3.0b1
```

' ~†••œ•~

•™ \$ •†^f <™ prompt <™Œ "•Ž«—™Œ~ , •ŒŽ^•œ •"•• Ž™Œ ŽŽŒ" <,™Ž™' ••<• <f~ •†<™Ž~ . ¶|^ •†^f •f^—™ , •<f" ... ^†" Ž™' ^† •<f~ , Œ††••f~ <™Œ Ž•f<™Œ , 'f"™« •^~ •Œ•œ†<™~ ,™Ž...<• ‡^ ŒŽ™••f"†<• Ž" ‡^ <™ prompt ^ŽŽ" ‡• <™ •«†Ÿ™Ž™ \$.

' ‡ ••<• ‡•,f" ~ ŽŽŒ,™—™,••~ "•™•Œ~ ...Ž> ~ ^Œ<~ Ž™Œ —•†™†<^f Žf™ Ž"†> , <...< „•<• œ•Œ <Œ† Python •' " ^<•<Œ† ‡Œ.

^•<...™, ^† Ž", •<• ‡^ ‡œ†Œ†^ •^† "f^«<™:

```
$ python -V
bash: Python: command not found
```

•...<• •† „•<• •' " ^<•<Œ† ‡Œ <Œ† Python. ' Œ<... •†^f •| ^f , •<f" " ^Ž•œ†™ ^ŽŽ" ...f •«†^<™.

' ~†••œ•~

' ‡ „•<• œ•Œ •' " ^<•<Œ† ‡Œ <Œ† Python 2.x, <...< •™"f†" •<• python3 -V.

Œ' ^Œœ <Œ† Ž•, •Ž<• •Œ, ŒŽ", „™ŒŒ† •«™ <, ...Ž™f'f^ ‡^ •' " ^<•<œ•<• <Œ† Python 3.x •<™† ŒŽ™Ž™'f•œ •^~.

% —Ž™, •<• ‡^ ‡•<^'Ž> <<••<• <Œ† Python ^Ž... <™† ŽŒ' ^•™ "Š•f" ^ [1] " ^f ‡^ <Œ† •' " ^<•<œ•<•. ‡f™•Œ'••~ ‡•<^'ŽŠ<<f•Œ~ Ž^ , „™†<^f •<™†f•<...<™Ž™.

% —Ž™, •<• ‡^ •' " ^<•<œ•<• <^ •Œ^•f" " Ž^" <^ „, Œ•f†™Ž™fŠ†<^~ <™ •f^„f, f•œ Ž^" <^ ‡Ž™'f•†f"™« Ž™Œ •Œ†™•«•f <™ Ž•f<™Œ , 'f" ... •^~ •«<Œ†^ , ...Ž> ~ <™ apt-get •<™ Ubuntu/Debian " ^f •<f~ "ŽŽ~ •f^†™† ~ Linux Ž™Œ Ÿ^••—™†<^f •<™ Debian, <™ yum •<™ Fedora Linux, <™ pkg_add •<™ FreeBSD, " .ŽŽ. ŒŒ†•fŠ•<• ...<f ‡^ „, •f^•<•<• ‡f^ •«†•••Œ •<™ •f^••" <Œ™ 'f^ ‡^ „, Œ•f†™Ž™fœ••<• ^Œœ <Œ† ‡™•™. Š†^ŽŽ^" <f" " , ‡Ž™, •<• ‡^ " ^<•Ÿ" ••<• <^ •Œ^•f" " ^ , „••^ ^Ž... " " Ž™Œ ^ŽŽ™« , ‡^ <^ ^†f' , " 3•<• ‡•<• •<™† ŒŽ™Ž™'f•œ •^~ " ^f ‡^ <^ •' " ^<•<œ•<•.

Šf^ „, •Š•Ž Windows

Šžf• „ —•••<• <™ <http://www.python.org/download/releases/3.1/> „ ^ f „ ^ <• Ě „ • <• <Ě† žf™ ž, ... — ^ <Ě „ •™•Ě ^ ž... ^ Ě<...† <™† f•<...<™ž™, Ě™ž™• ^ ě<† Ě 3.1 ' f ^ 32 bit ^[2] „ ^ f Ě 3.1 ' f ^ 64 bit ^[3] ...<† ' „ —<Ě „ • ^ Ě<... <™ „ •†•†™. ' Ě<„ <^ ^, „••• ^ •†^ f †...†™ 13 MB <™™ž™•™ •†^ f ž™ž« †f„ ... •• • „ •Ě †• <f~ ž, f•••<•, ~ ' žš••• ž,™', ^††^ <f•†™« ě ž™' f•†f„ „. 2 • ' „ ^ <„ •<^ •Ě •†^ f ...ž> ~™ž™f™• ěž™<• „ žž™ ž™' f•†f„ ... ' f ^ Windows.

€,•••„

„ <† ^ ~ •™•• Ě •žž™' ě † ^ ž™•žž | •<•™ž™f• ěž™<• „ ž,™ ^ f, •<f„ „ • Ě•<^ <f„ „ †Ě† ^ ž™•žž | •<• „ ^† †! —, f„ „ ^ ž... ^ Ě<„ <^ • Ě•<^ <f„ „ †ž™, •† ^ ~ —†™«† „, ě•†^, „ ^ f•f„ „ <™ IDLE.

† † ^ †•f—,™† ' •™†... ~ •†^ f ...<f Ě žž•f™3 Ě—• ^ <† žžž> † <Ě~ Python ^ ž... <™† f•<...<™ž™' •†•<^ f ^ ž... „, ě•<• <† Windows. ° Ě•f„ „, ^ Ě<... •† ž, f', „ —f ...žž Ě <Ě† •f„ „ † ^ —™« • „••...† ...ž™f™f „, ě•<• Linux „™Ě† ě•Ě <Ě† Python • ' „ ^ <••<Ě† †Ě •<^ • Ě•<† ^ <„ <™Ě~ ^ ž... ž,™•žž™' ě.

DOS Prompt

' † ž•<• † †ž™,•••• † ^ „, Ě•†™ž™f•••• <Ě† Python ^ ž... <Ě ' , ^†† ě •†<™žš† <† Windows ž... <™ DOS prompt, <...• ě ž, ž•f † ^™,•••• <Ě †•<^žžĚ< ě•Ě•<† ^ <™ PATH „ ^ <„ žžžžž.

„ f ^ <^ Windows 2000, XP, 2003, žž< ě••• • <™ Control Panel -> System -> Advanced -> Environment Variables. Šžžž | • <Ě †•<^žžĚ< žž™Ě™†™† —•<^ f **PATH** •<Ě† †...<Ě ^ 'System Variables', †•<„ •žžž | • Edit „ ^ f ž,™••• <• <™ ; C:\Python30 †•<„ ^ ž... „, <f •†^ f ě•Ě ' , ^†† †™ •„•. ° Ě•f„ „, „, Ě•†™ž™f••• <™ „ ^ <„ žžžžž...†™† ^ —^ „ žž™Ě, „••...žž™Ě • ' „ ^ <^ • ě•<• <Ě† Python.

„ f ^ žžžžž...<•, ~ • „•••f~ <† Windows, ž,™••• <• <Ě† ^ „...žž™Ě ě•Ě ' , ^†† ě •<™ ^, „•™ C:\AUTOEXEC.BAT : 'PATH=%PATH%; C:\Python30' („> , ~ <^ •f• ^ > ' f„ „) „ ^ f •žžžžž...fžžžžž• <™ ••<Ě† ^ . „ f ^ <^ Windows NT, „, Ě•†™ž™f••• <™ ^, „•™ AUTOEXEC. NT.

Šf^ „, •Š•Ž Mac OS X

±f ž•, f•••<•,™f „, ě•<•~ Mac OS X ě ^ Ě,™Ě† <Ě† Python ě•Ě • ' „ ^ <••<Ě† †Ě •<^ • Ě•<† ^ <„ <™Ě~. ' †™•| • <™ Terminal . app „ ^ f žžžžž<„™ž™' ě••• python -V „ ^ f ^ „™ž™Ě ě••• <f~™•Ě'••• <™ žžžžž† <† ě† ^ ' f ^ <™ Linux.

' „†•Ě~

„ f ^ † ^ •••<Ě† ^ Linux, žžžžž†...<^ <^ „••• ě•Ě <Ě† Python • ' „ ^ <••<Ě† †Ě •<™ •••<Ě† „ • ^ . Ě• ^†•<•<Ě ž•,•žž> •Ě,†ž™,•••• † ^ <Ě† • ' „ ^ <^ • ě•••• ^ ž... <™ •f„•f, f•< ě ž„ <† žžžžž f•†f„™« žž™Ě • Ě†™•••f <Ě •f ^†™† ě • ^ . „ f ^ † ^ •••<Ě† ^ Windows, Ě • ' „ ^ <„ •<^ •Ě <Ě~ Python •†^ f <...•™ ••„™žžžž...•™ <™ „ ^ < Ě•† ^ <™Ě ^, „•™Ě • ' „ ^ <„ •<^ •Ě~ „ ^ f <™ •fžžžžž... „ žžžžž ž„ † <™Ě. Ě<™ •| ě~, ě ^ Ěžžžžž •™Ě† •...<f „•<• <Ě† Python • ' „ ^ <••<Ě† †Ě <™ •••<Ě† „ • ^ .

Ě<Ě • Ě† „•f ^, ě ^ ' , „ žžžžž† • <™ ž, šžžžž† ^ ž, ...' , ^†† ^ •• Python.

- €, ™ Ě' ™ « † • † ™ • Š ž ... † • † ™
- € • • > • < ^ ž • , f • „ ... † • † ^

References

- [1] <http://www.python.org/download/releases/3.0/>
 [2] <http://www.python.org/ftp/python/3.1/python-3.1.msi>
 [3] <http://www.python.org/ftp/python/3.1/python-3.1.amd64.msi>

Python el:Ÿ ^ ' , † Š ^ – † ^ Š ^

Š f • ^ ž ¨ ž

• Š, ^ ¨ ¨ • ™ « † • ž Š ~ † ž ™, ™ « † • † ^ < , † ™ Ě † • < ™ ž ^ , ^ • ™ • f ^ " ... ž , ... ' , ^ † † ^ " ^ • , • , Š ... † • ! " (Hello, World!) • < Ě † Python. ' Ě < ... ¨ ^ • ^ ~ • f • " † f ž Š ~ † ^ ' , " – • < , † ^ ^ ž ™ « Ě " • « • < • " ^ f † ^ < , „ • < • ž , ™ ' , " † † ^ < ^ Python.
 • ž " , „ ™ Ě † • « ™ < , ... ž ™ f ' f ^ † ^ „, Ě • f † ™ ž ™ f ¨ • • < • < Ě † Python Š • < • † ^ < , † • < • < ™ ž , ... ' , ^ † † " • ^ ~ : „, Ě • f † ™ ž ™ f Š † < ^ ~ < Ě † " ™ † • ... ž ^ < ™ Ě • f ^ • , ^ • < f " ™ « • f • , † Ě † • Ě < ¨ (interactive interpreter prompt) ¨ „, Ě • f † ™ ž ™ f Š † < ^ ~ † ^ ^ , „ • ™ ž Ě ' ^ ™ Ě " Š • f ^ (source code file). • Š, ^ ¨ ¨ • ™ « † • ž Š ~ „, Ě • f † ™ ž ™ f « † < ^ f ™ f • « ™ ^ Ě < ^ † ¨ ™ • ™ f.

¥ , • ~ Š ~ ž † • † • ... – ^ ž Š ¨ f • , † ~ † • " Š

Š " " f † ¨ • < • < ™ • f • , † Ě † • Ě < ¨ (interpreter) ^ ž ... < Ě ' , ^ † † ¨ • † < ™ ž Š † ž ž Ě " < , ™ ž ™ ' Š † < ^ ~ < Ě † • † < ™ ž ¨ python3 .
 ± f „, ¨ • < • ~ Windows, † ž ™, • • < • † ^ < , † • < • < ™ • f • , † Ě † • Ě < ¨ • • ' , ^ † † ¨ • † < ™ ž Š † ^ † „ • < • ™ , • • f < Ě † • < ^ ž ž Ě < ¨ ž • , f Ÿ " ž ž ™ † < ™ ^ PATH " ^ < " ž ž Ě ž ^ .
 Š " † „, Ě • f † ™ ž ™ f • • • < ™ IDLE , • ž ž † † • Start ∈ Programs ∈ Python 3.1 ∈ IDLE (Python GUI).
 • Š, ^ • f • " ' • < • print (' € • , f „ , ... † † ^ „ ! ') " ^ f ž f • < • < ™ ž ž ¨ " < , ™ Enter. ¶ ^ ž , ž • f † ^ • • • < • < f ž † • f Hello World > ^ ž ™ < ž • • † ^ .

```
Python 3.0.1+ (r301:69556, Apr 15 2009, 15:59:22)
[GCC 4.3.3] on linux2
Type "help", "copyright", "credits" or "license" for more
information.
>>> print(' € • , f „ , ... † † ^ „ ! ' )
€ • , f „ , ... † † ^ „ !
>>>
```

€ ^ , ^ < Ě , ¨ • < • ... < f Ě Python • ^ ~ • • † • f < Ě † † ™ • ™ (output) < Ě ' , ^ † † ¨ " † • • ^ ! ' Ě < ... ž ™ Ě † ... ž f ~ ' , " ž ^ < • • † • f † • ^ • † < ™ ž ¨ (statement) • • Python. ~ , Ě • f † ™ ž ™ f ™ « † • < Ě † print (< « ž > • •) ' f ^ † ^ < Ě ž Š • ™ Ě † • ™ ž ™ f ^ • ¨ ž ™ < • < f † ¨ < Ě ~ ž ^ , „ ™ Ě † • . Š • Š , < Ě ~ • • † ™ Ě † • < ™ " • • † • † ™ € • , f „ , ... † † ^ „ ! " ^ f ^ Ě < ... < Ě ž Š † • < ^ f • < Ě † ™ ¨ ... † Ě .

™ ... • f † • Š ~ ž † • † • ... – ^ ž Š ¨ ¨ f • , † ~ † • " Š

• f ^ † ^ " ž • • • • • < Ě † " ™ † • ... ž ^ , ž f • < • ctrl -d (• « † Ÿ ™ ž ™ EOF - End Of File) ^ † „, Ě • f † ™ ž ™ f • • • < ™ IDLE ¨ " " ž ™ f " ž Ě – ™ Linux/BSD. ' † „, Ě • f † ™ ž ™ f • • • < Ě ' , ^ † † ¨ • † < ™ ž Š † < > † Windows, ž f • < • ctrl -z " ^ f † • < " ž f • < • Enter.

Š' f-•ž •‡...ž •' •«•, ž^•š i | œfi ^ (Editor)

[illegible]

—•• ^ ž... <f~ ž™ž« Ÿ••f• ~ ^ž<fœ••f~ ••†~f Ć „, >†<f~œ ••f• †~†•~ ••†ž~«~ž ...ž™Ė ...ž~<^ •f~™, <f~“
<†œ†^<^<™Ė Python ž,™', „†††<œ~ „, >†<~™†<f “<“žžĖž~ <•f Š•<• †~†ž™, ••<• †~•••<• <™ ž, ...', ^††^
“f†^ „•<•†•^f~...†^<Ė~“< ž•œ~<™Ė. Šž•Ė~Ė, Ė•žf•œ††•Ė†~Ÿ™Ė«” †~†•†ž™ž~™Ė†•<Ė„...†•Ė†<“<f~“
ž”œĖž™Ė „™Ė†•“”†•f•<™† “Š•f~^~ž•f•œ••†œ^ „, >†<~•<^f•>•<“...ž~~œ^††††•†...<††f^ ž |Ėœ†f^
•†<™žœ.

Š"† „, €•f†™ž™f••• Windows, <...< ž,™<•†> †^ „, €•f†™ž™fœ••• <™ IDLE. •™ IDLE " "†•f •f†<^" <f"œ •žf•œ†††•€ <™€ "Š•f" ^ " ^f ž™žž" ž•, f••...<•, ^ ...ž> ~ <™ ...<f • ^~ •žf<, ž•f† ^ <, „•<• < ž,™', "††<^" • ^~ † • ^~ž... <™ IDLE ^††••• "žž~ž, ' '†<^<. €€††††f"œ •€†•> •€: %~ „, ~•f†•' •f ••Š• Š• Notepad -•††f †• ^ " ^"œ •žžž™'œ •ž•f•œ •† " "†•f •f†<^" <f"œ •žf•œ†††•€ " ^f •ž•€™ ••† fžž™<€<, -•f <€ •<™„f•€ <™€ "•f† †™€<, ž™€ ••†f † ^ž™ž«•€†††<f" ... „ ^, ^ ^<€, f•<f" ... <€†žž•, žž• •œ† ^~ ...ž> ~ †^ •™«†• ^, ' ...<•, ^, Š~ž™. •ž•†•, ' ^<• ^ ...ž> ~ <™ IDLE (" ^f™ VIM •ž•€™) †^ • ^~ Ý™€†œ•™€†††f<^<•• ^f<...

[illegible]

^ <...™, •" ‡ ¢ Ž•<•, †Ž™, ••< †^ ^, "••<••< •<™£~ •Ž•|•, ' ^•< ~ "•ft ‡™£ Gedit ~f Kate,™f™Ž™™f£Ž", „™£†
 •' ^•<••<£† ‡™f ^Ž... Ž,™•ŽŽ™™•œ •<f~ Ž•, f••...<•, ~ •f^†™~ Linux Ž™£ „,£•ft™Ž™f™«† <™ GNOME œ <™ KDE,
 ^†<••<™f„™. ¢£†•fŠ•<• ...<f™f •Ž•|•, ' ^•< ~ ^£™• „„,† ^•<~™£† <™† „Š•f~ ^f^ †^ <™† „™†™£† Žf™
 •£^†™'†> <™, ^ŽŽ™ •†Ž~, „™£† •, ' ^Ž••<•< Ž••œ~ <™£. ¶^Ž, Ž•f†^ •<Ž••< ^Ž,™', „††^<• •^~ |>
 ^Ž... <™†•Ž•|•, ' ^•<œ "•ft ‡™£.

Š"† ...< †žf,™ ž,™', ^††^<f<œ™, <...< œ•£ ¢ ^™, £•††ž™f•< <™ Vi m œ <™† Emacs. ¥• „, •f" -<^f †^ ž™††• ...<f ž, ..." •f<^f 'f^ •«™ ^ž... <™£~ ž™f f•£,™«~ ž•|•, '•^< ~ "Š•f" ^ " ^f ¢ ^™—•ž£œ...< ^ž... <£ „, œ•£ <™£~ 'f^ <£ •£', ^—œ < > † Python ž,™', ^††" < > †•^~. €„™> žf"™ „, £•††ž™fŠ <™ Vi m 'f^ <^ ž•, f•<...<, ^ ž,™', "††<"†™£. ¢•ž•, ž<•£ ž™£ ...< •f<<•††††™f †^~f, Š••< „, ...†™ Š•< †^†" ¢<•< <™ Vim œ <™† Emacs, <...< •£††<Š ††žf—ž™" ^†††" ¢<•< †^ „, £•††ž™f•<•™ž™f™†œž™< ^ž... <™£~ •«™ " ^¤Š~ ¢^• ^~ —†™†ž™ž« „, œ•†††f•<£†ž™, ..^.

$\Phi \cdot \sim \in \dots <^{\text{TM}} \ddot{Y}\dot{f}\ddot{Y} \cdot^{\text{TM}}, \varpi^{\wedge}_{\text{,,}} (\mathbb{E} \cdot f \dagger^{\text{TM}} \tilde{Z}^{\text{TM}} f_{\oplus} \cdot^{\text{TM}} \mathbb{E} \dagger \cdot <^{\text{TM}} \textbf{IDLE}, <^{\text{TM}} \textbf{IDE}$ (Integrated Development Environment - $\pm \tilde{Z}^{\text{TM}} \cdot \tilde{\mathbb{Z}} \mathbb{E}, > \dagger \dagger^{\text{TM}} \in \cdot, \ddot{Y}'' \tilde{\mathbb{Z}} \tilde{\text{TM}} \dagger' \dagger^{\text{TM}} \tilde{Z} \in | \mathbb{E}^-) \text{ " } \sim f \cdot \tilde{Z} \cdot | \cdot, ' \wedge \cdot \llcorner \text{" } \tilde{S} \cdot f'' \wedge \tilde{Z}^{\text{TM}} \mathbb{E} \cdot \tilde{z} \tilde{J} \quad | \wedge \dagger \cdot .$ $\cdot^{\text{TM}} \textbf{IDLE} \cdot ' \text{" } \wedge \varpi \cdot \cdot \wedge \cdot \wedge f \cdot |$
 $^{\text{TM}}, f \cdot \dagger^{\text{TM}} \llcorner \wedge \tilde{Z} \dots <^{\text{TM}} \tilde{Z}, \dots ', \wedge \dagger \dagger \cdot \cdot ' \text{" } \wedge \cdot \cdot \wedge \cdot \mathbb{E}^- \llcorner \mathbb{E}^- \text{Python} \cdot \cdot \text{Windows} \text{" } \sim f \text{ OS X}. \tilde{S} \cdot \dagger \sim f \cdot \tilde{Z} \cdot \mathbb{E}^- \cdot f \wedge \varpi \cdot f \dagger^{\text{TM}} ' f$
 $\cdot ' \text{" } \wedge \cdot \wedge \cdot \cdot \wedge \cdot \mathbb{E} \cdot \cdot \text{Linux}^{[2]} \text{" } \sim f \text{BSD} \cdot \wedge \cdot \wedge \cdot \dagger \cdot \cdot \wedge \cdot^{\text{TM}} f_{\text{,,}} \wedge \cdot \tilde{Z}^{\text{TM}} \varpi \cdot \llcorner \mathbb{E}, f \wedge (\text{repositories}).$

$$\begin{aligned} & \mathbb{P}^{\sim} \cdot \mathbb{M} \ll \mathbb{P} \cdot \mathbb{Z} \tilde{\mathbb{S}} \sim \dots, \mathbb{E} \cdot \mathbb{P}^{\mathbb{M}} \mathbb{Z}^{\mathbb{M}} \mathbb{P}^{\mathbb{M}} \ll \mathbb{P} \cdot \mathbb{Z}^{\mathbb{M}} \text{ IDLE} \cdot \mathbb{Z}^{\mathbb{M}} \cdot \mathbb{Z} \dots \mathbb{P} \cdot \mathbb{P}^{\mathbb{M}} \ll \mathbb{P} \oplus \mathbb{P}^{\sim}. \quad \mathbb{P}^{\sim} \mathbb{Z} \cdot, \mathbb{P} \cdot \dots \ll \cdot, \cdot \sim \mathbb{Z} \mathbb{Z} \mathbb{E}, \mathbb{M} - \mathbb{M}, \cdot \cdot \sim, \mathbb{Z}^{\sim}, \mathbb{P}^{\sim} \mathbb{Z} \mathbb{S} \\ & \mathbb{P}^{\sim} \mathbb{P}^{\sim} \ll, \quad \mathbb{P} \cdot \ll \mathbb{E} \mathbb{P} \ll \mathbb{P}^{\sim} \mathbb{P}^{\sim}, \cdot \cdot \cdot \mathbb{E} \ll \mathbb{M} \mathbb{E} \text{ IDLE}^{[3]}. \end{aligned}$$
[illegible]

šž^†^ž^†Ÿ"†> "žžŒ †^ —™, ", ž^, ^" ^žŠ •žfž |<• †† " ^<" žžŒž™ •ž•|•, ' ^•œ 'f^ Python - †ž™, •• †^ " "†f <Œ •Œ' ', ^œž,™', ^††" <> †•• Python žf™ •f^•"•••<f"œ " ^f•«"™žŒ.

Sf^ Š•"ž „, •Š•ž Š•" Vim

• ž", „•f †^• ^žœ •f•^'> 'œ •<™ žš~ †^ †•<^<, ³•<• <™ Vim •• †^ f•„Œ, ... Python IDE ^ž... <™† John M. Anderson ^[6].

Sf^ Š•"ž „, •Š•ž Š•" Emacs

• ž", „•f †^• ^žœ •f•^'> 'œ •<™ žš~ †^ †•<^<, ³•<• <™† Emacs •• †^ f•„Œ, ... Python IDE ^ž... <™† Ryan McGuire ^[7].

¥, ~•f†•'•f|†š^ž††^ ^, „•••'~ž^••" i |œfi ^

' ~ •žf•<, ³™Œ†• •<™† ž,™', ^††^<f•†... š•†f ž^, "•™•Œ ...ž™<• †^œ^†™Œ†• †^ " ^†™«„ 'f^ 'žš••^ ž,™', ^††^<f•†™«„ <™ ž, Š<™ ž, ...', ^††^ž™Œ', " —™Œ†• " ^f <, „™Œ†• †^ •†^f <™ ž, ...', ^††^ »Hello, World!¼ («^•, •, š...†•!¼) -<™ †...†™ ž™Œ " "†f •†f †^ ž •f »^•, •, š...†•!¼ ...<† <™ <, |™Œ†•. ½ž~ „f ž•f " ^f™ Simon Cozens ^[8], •†^f »<™ ž^, ^•™•f^" ... |..., "f ž,™~ <™Œ~ œ•™«~ <™Œ ž,™', ^††^<f•†™«„ 'f^ †^ †^~ Ÿ™Œœœ•™Œ†††††™Œ†• <Œ 'žš••^ " ^ž«<•, ^¼:).

š" "f†œ•<• <™† •ž•|•, ' ^•œ "š•f" ^ž™Œ •žfž |^<•, •f•" '•<• <™ ž, ...', ^††^ž™Œ ^™ž™Œœœ• " ^f ^ž™œœ••«•<• <™ > ~ hel loworl d. py

' † „,Œ•f†™ž™f••<• <™ IDLE, •žfž |<• Fi l e ∈ New Wi ndow " ^f •f•" '•<• <™ ^" ...ž™Œœœ ž, ...', ^††^ . j ž•f<^ •žfž |<• Fi l e ∈ Save.

```
#!/usr/bin/python3
#Filename: helloworld.py
```

```
print('€•, f„, ...††^„!')
```

•, |<• ^Œ... <™ ž, ...', ^††^ ^†™•™†<~ †^ " žŒ—™~ (<•, †^<f" ... •<™ Linux œ', ^††œ •†<™žš† •<™ DOS) " ^f •f•"™†<~ <Œ† •†<™žœ python3 hel loworl d. py. ŒŒ†•fš•<• ...<f ž,† •š••<• <Œ† •†<™žœ 'f^ <Œ† •" < ž••Œ <™Œ ž,™', "††^<™~ helloworld.py œ^ ž, ž•f †^ „•<• †•<^Ÿ•• •<™ —" "•ž™ ...ž™Œ •†^f ^ž™œœ••Œ††™ ^, „•™ helloworld.py.

' † „,Œ•f†™ž™f••<^f <™ IDLE, •žfž |<• ^ž... <™ ††™« Run ∈ Run Modul e œ „,Œ•f†™ž™fœ•<• <Œ •Œ†<...†•ŒŒ žžŒœ" <,™ž™•™Œ F5.

•™ ^ž™< ž••†^ •†^f ^Œ<...:

```
$ python3 helloworld.py
€•, f„, ...††^„!
```

' †žœ, ^<• <Œ† |™•™ ž™Œ —^•†<^f žf™ ž"†>, •Œ' „^, Œœœ, f^! •, |^<• •žf<Œ„š~ <™ ž, š<™ •^~ ž, ...', ^††^ •• Python.

Œ•ž•, •ž<• •Œž™Œ žœ, ^<• " "ž™f™†œ†Œ†^ž"œ™Œ~, ž^, ^" ^žš |^†^', " ³•<• <™ ž^, ^ž"†> ž, ...', ^††^ %œ...†š™„ ...ž~ ~ <™ žž ž<• žf™ ž"†> " ^f <, |<• <™ |^†". ŒŒ†•fš•<•™ <f Œ Python " "†f •f" ", f•Œž•-š†-•—ž^> †ž„. <™ print ••† •†^f <™ •f™ †• <™ Print -ž^, ^Œœ•<• <™ ž•-... p •<™ ž, š<™ " ^f <™ " —ž^™ P •<™ <ž•Œ<^™. šž••Œ~, Ÿ•Ÿ^f> œœœ•™ <f •† Œž", „™Œ† "•†" œ •œž™œ <~ (tabs) ž,† <™† ž, š<™ „^, ^"œœ, ^ (' ,††^) ••" "œ•', ^††œ -œ^•™«†•'f^<• ^Œ<... •†^f •Œ†^†<f" ... ^, ' ...<•, ^.

— „f <Š, ^, tž™,™«•^†• †^ <, |™£†• <™ ž, ...', ^††" †^~ •—' ...™† '†>, •-^†• ^", fYŠ~ <£ •f^•,™†œ ž,™~ ^£<... '† ...†>~ † ž^†• †^ †ž™,™«†• †^ <™ <, |™£†• ^ž...™ž™£•œž™<•; '£<... †ž™,™«†• †^ <™ •žf<„™£†• ^ž™«£„•«™†<^~ <™ ž, ...', ^††• •†• ^ž... <f~ •f^•,™†~ ž™£ ž•, f „™†<f •<£ †•<^Yžœœ ž•, fY"žž™†<™~ PATH. Š" †• —™, " ž™£ <, „<•™ž™f™œž™< ž, ...', ^††<, <™ •«<£†^ <™ ^†-£<" •• " †• ^ž... <£~ •f^•,™†~ ž™£ ž•, f „™†<f •<£ †•<^Yžœœ ž•, fY"žž™†<™~ PATH "f, ^† Y, •«•, <™ ž, ...', ^††• •<ž•<f. —ž™,™«†• †^ "™£†• <™ ž, ...', ^††" †^~ •f^• •f†™ ^ž...ž^†<™«^žž" ^†<f, "™†<^~ <™ ^, „™ ž£'•™£ "Š•f"• •†• ^ž... <f~ •f^•,™†~ ž™£ ž•, f „™†<f •<£† PATH.

```
$ echo $PATH
```

```
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games
```

```
$ cp helloworld.py /usr/local/bin/helloworld
```

```
$ hello
```

```
€•, f„, ...††^„!
```

££†•fŠ•<• ...<f™f —"•ž™f ž™£ ž•, f „™†<f •<£† PATH •†f •£†œ«>~ —"•ž™f <™£ •£•œ†^<™~. 'f' ^£<... „, f„ —•<• •f^fŠ†^<^ £ž•, „œ•<£ 'f' †^ †<f, "ž•<• •' ^£<™«~ †^ ^, „™, ž„. Y"™†<^~ †ž,™«<" •<£† •†<™žœ •^~ <™ sudo, •£ž^œ: sudo cp helloworld.py /usr/local/bin/helloworld œ "žžœ •†<™žœ ž™£ •^~ •†f •f^fŠ†^<^ £ž•, „œ•<£ (•£†Y™£ž•£<•<• <£† <•"†£, > •£ <™£ •£•œ†^<™~ •^~ 'f' ^£<... <™ †^).

—ž™,™«†• †^ •™«†• <^ ž•, f„™†•†^ <£~ PATH „£•f†™ž™fŠ†<^~ <£† •†<™žœ echo (•• <•, †^<f"...) "f ž,™«<™†<^~ ž,† <™ ...†™†^ <£~ †•<^Yžœœ~ <™ •«†Y™ž™ \$ 'f' †^ ••|™£†• •<™ " ž£—™~ ...<f ž™£†• <£† <f†œ <£~ •£'•", f† †£~ †•<^Yžœœ~. —ž™, •<• †^ ž,™«<• •<• †^ •f^•,™†œ •<£ †•<^Yžœœ PATH •†™†<^~ •• <•, †^<f"... <£† •†<™žœ PATH=\$PATH: /home/swaroop/mydir ...ž™£ ' /home/swaroop/mydir' •†^f£ •f^•,™†œ ž™£ † ž•<• †^ ž,™«<• •<•.

```
'~†••«~
```

ž ž,™«œ£££†^~ •f^•,™†œ~ •<£† \$PATH †• <£† •†<™žœ PATH=\$PATH: /home/swaroop/mydir ž•f<™£, '• ž,™«>, f†", "f <™ ^ž™< ž•†" <£~ „†<f †•<" ^ž... •ž^†•"•†£££ <™£ •£•œ†^<™~. ££†Y™£ž•£<•<• <£† <•"†£, > •£ <™£ •£•œ†^<™~ •^~ 'f' †...††££ ž,™«œ£££ •f^•,™†œ~ •<£† \$PATH.

'£œ£££†™™~ •†f ž™ž« „œ•f†£ ^† † ž•<• †^ ', "ž•<• „œ•f^ scripts ž™£ † ž•<• †^ †ž™, •<• †^ <^ <, „<• ^ž...™ž™£œž™<•,™ž™<•œž™<•. Š†f •†^ •£†f™£, '•<• <f~ •f" ~ •^~ •†<™ž ~ ...ž~ ž„. £•†<™žœ cd œž™f^œž™<• "žžœ •†<™žœ „£•f†™ž™f•<• •• †^ <•, †^<f"... <™ Linux œ•<£', ^††œ •†<™žž† <™£ DOS.

```
€•, ••„
```

„™ ^—™, " <£† Python †^ ž, ...', ^††^, †^ script œž™'f•†f"...ž^ „™£† <£† •f^ •£†^••.

•†^a~Š!†š^ž—• •f^

'† „, f„ —•<• ', œ'™, ^žžœ,™—™, •~ •„<f" †• †^ •£†", <£•£œ •†<™žœ •<£† Python, <...< †ž™, •<• †^ „£•f†™ž™fœ•<• <£† •†>†^<††£££, <£•£ hel p. Š†f f•f^<•, ^„œ•f†£ •f•f" ...<† „£•f†™ž™f•<• <£† "™†•...ž^ <™£ •f, †£†•£œ. 'f^ž^, "•f†^, •Š•< hel p(print) -œ^†-^†••f <£† <•"†£, > •£ 'f^ <£ •£†", <£•£ print ž™£ „£•f†™ž™f•<•f^f^ <£† •«žž" •£ •<£†™«...†£.

```
'~†••«~
```

£f •<• <™ q 'f' †^ "ž•••<• <£ Y™œ«f^.

—• <™† ••f™ <, ...ž™, †ž™, •<• †^ Y, •<• žžœ,™—™, •~ •„<f" †• •„•...†™<fœž™<• •<£† Python. ¬, £•f†™ž™fœ•<• <£ hel p() 'f' †^†" †•<• ž•, f••...<•, ^'f^ <£ „œ•£ <£~ •f^~ <£~ hel p!

£•ž•,ž•>•£ ž™£ „, f„ —•<• Y™œ«f^ •„<f" †• <ž•<~ (operators) ...ž~ <™ return, <...< ž, ž•f†^ <™£ <™ž™«<œ•<• ^†††••• ^žž" •f•^' > 'f" ž„. hel p('return') <f Š•< †^†£†ž•, •£<•£ Python

•„•<f“” †• <™ <f ž,™•ž^œ••<• †^ “” †•<•.

‘ “†•£~

¶^ ž, ž•f <Š, ^ †^ †ž™, ••<• †^ ‘, “—•<•, †^ ^ž™œ“•«•<• “^f †^ •“<•ž••<• ž,™’, “††<^ Python †• •£“™ž•^.
•Š, ^ ž™£ •••<• †^~ „, œ•<£~ <£~ Python, ^~ †“ œ™£†• ž•, f••...<•, ^ •„•<f“” †• <£† Python.

€^, ^ž™†ž ~:

- [1] <http://www.geany.org/>
- [2] <http://love-python.blogspot.com/2008/03/install-idle-in-linux.html>
- [3] <http://www.python.org/idle/doc/idlemain.html>
- [4] <http://www.python.org/cgi-bin/moinmoin/PythonEditors>
- [5] <http://www.python.org/cgi-bin/moinmoin/IntegratedDevelopmentEnvironments>
- [6] <http://blog.sontek.net/2008/05/11/python-with-a-modular-ide-vim/>
- [7] <http://www.enigmacurry.com/2008/05/09/emacs-as-a-powerful-python-ide/>
- [8] ± •£‘’, ^— ^~ <™£ “^<žž£“ <f“™« ŸfŸž•™£ “Beginning Perl”

- €,™£’™«†•†™ • Šž...†•†™
- €••> •<^ ž•, f•...†•†^

Python el:Ÿ^ —^ •f; £

•™ †^ <£žš••<• ^žž“ »~^•, •, Š...†•!¼ ••†•†^f^, “•<...•, •†^f; ¶ ž•<• †^ •£†f™£, ‘œ••<• ž•, f••...<•, ^ -œ ž•<•
†^ “, ^<œ••<• “”ž™f^ ••™† †^ •f•...™£, †^ <^ „•f, f•<••<• “^f †^ •|“’•<• “” <f ^ž... ^£<“. —ž™,™«†• †^ <™
•žf<«™£†• ^£<... •<£† Python †• •<^œ•, ~ “^f †•<^Ÿž£<~.

™“, f•—; Šf; £ž •š^••, £ž (Literal Constants)

† †^ ž^, “••f’†^ “£, f™ž•“<f“œ~ •<^œ•, “~ •†^f †^~ ^, f††...~ ...ž~ 5, 1. 23, 9. 25e-3 œ †f^ •£†Ÿ™ž™••f, “
...ž~ ~‘ %š<£ „, ••ž ^ž• †š^••’ •†„žf’ ‘ œ “”ž• †š^••’ •†„žf’ !”. ‘ ž™“^ž•<^f “£, f™ž•“<f“œ •f...<f
^>...†•, †^ž†~£ <f†œ <£~™, ••<^f “£, f™ž•“<f“œ. ± ^, f††...~ 2 ††žž^, f•<“ <™† •^£<... <™£ “^f <•ž™<^ “žž™ - ••†^f
‘ž%Ÿ†...œ •f...<f£ <f†œ <£~ ••†ž™, ••†^ ^žž“ |•f. ½, ^, ...ž^ ^£<“ ^†^—,™†<^f>~ “£, f™ž•“<f“ ~ •<^œ•, ~.

•, f•†••

±f^, f††™• •<£† Python •†^f <, fš† <<ž> †:™f ^“ , ^f™f (Integers),™f ^, f††™• “††£œ~ £ž™•f^•<™žœ~ (floating point) “^f™f †f’ ^•f“™• ^, f††™• (complex numbers).

%_ † †^ ž^, “••f’†^ ^“ , ^f™£ •†^f <™ 2 “^f •†^f ^žž“ †^~ ^“ , ^f™~ ^, f††...~.

%_ €^, ^••’†^<^ ^, f††š† “††£œ~ £ž™•f^•<™žœ~ (œ floats’f^ •£†<™†•) •†^f™f 3. 23 “^f 52. 3E-4. •™
•«†Ÿ™ž™£ •£žš†•f •«††£ <™£ 10. •^£œœ <£†ž•, •ž<• •£, <™ 52. 3E-4 •£†^†•f 52. 3 * 10⁻⁴.

%_ €^, ^••’†^<^ †f’ ^•f“š† ^, f††š† •†^f™f (-5+4j) “^f (2. 3 - 4. 6j)

‘~†••œ~žf^£†’•f, •“ž’, •ž, ^††^šf•š£ž

¥•†£ž“, „•f |•„>, f•<...~ ‘long int’ <<ž™~. ± ^“ , ^f™~†ž™, ••†^ „•f “”œ• <f†œ.


```
#!/usr/bin/python3
# Filename: str_format.py

age = 25
name = '%0f•†' Š••'

print('£ {0} „, ••Ž {1} „<-•.' .format(name, age))
print('„ -Ž•<, ™•, † „Ž • {0} ^ „ <•• ™Ÿ¤> ••;' .format(name))

j | ™•™~:
```

```
$ python str_format.py
£ %0f•†' Š•• „, ••Ž 25 „<-•.
„ -Ž•<, ™•, † „Ž • %0f•†' Š•• ^ „ <•• ™Ÿ¤> ••;
```

€Š~ Ž•f<™£, '••:

—f^ •£†Ÿ™Ž™••f, " †Ž™, ••† „, £•f†™Ž™f••™, f•† †~Ž, ™•f^', ^—~ (specifications) " ^f " ^<" •£† Ž•f^, †Ž™, ••† „ Ž£¤•• £ † ™•™~ format 'f^ †^ <f^ ^†f" ^<^•<œ••f †• ^†<••™f„ ^™, ••†^<^ (arguments) <£~ †•¤...™££ format.

€^, ^<£, œ•<• <£† Ž, Š<£ •œŽ> •£ {0} Ž™£ ^†<f•<™f„ •• <£ †•<^ŸŽ£œ name £ ™Ž™• ^ •†^f <™ Ž, Š<™ ..., f•† ^ <£ † ™•™ ™™, —™Ž™•£•£~. €^, ™†™•~ ^, £ ••<<•, £ •œŽ> •£ {1} ^†<f•<™f„ •• <£ †•<^ŸŽ£œ age >~ <™ ••<<•, ™ ..., f•† ^ <£ † ™•™ ™™, —™Ž™•£•£~.

¶^ ••^†• <™ ••f™ ^Ž™< Ž••† ^ ^f †• ^ŽŽ£Ž™£„ ^ •£†Ÿ™Ž™••f, Š†: '£ ' + name + ' „, ••Ž ' + str(age) + ' „<-•.', Ž^, ^<£, œ•<• ...†> ~ <£† ^„œ†f^ " ^f <£† •žf,, ž•f^ •• •—"Ž†^<^. ¥•<<•, ™†, £ †•<^<, ™žœ •£†Ÿ™Ž™••f, " ~¤^ ••„ •žf<£„¤•• ^£...†^<^ <£ † ™•™™ format ^†<• 'f^ <£, £œ †•<^<, ™žœ ••Š. •, <™†, †• <£ „, œ•£ <£~ †•¤...™££ format, †Ž™, ™«†• †^ ^ŽŽ" |™£†• <™ †œ†£†^, „>, ~ †^ „, •f" -<^f †^ ^„™Ž£¤™«†• †• <f~ †•<^ŸŽ£œ ~ Ž™£ „, £•f†™Ž™fœ¤£" ^†, " ^f <™ ^†<••<, ™—™.

H Python †• <£ † ™•™™ format ^†<f" ^¤f•<" " "¤• <f†œ ™, ••†^<™~ •<£ ¤•£ <£~ Ž, ™•f^', ^—œ~. —Ž™, ™«† †^ •£Ž> ™«† Ž•ž™†•, •<•, •~ Ž, ™•f^', ^—~ ...Ž> ~:

```
>>> '{0:.3}'.format(1/3) # €•, f£„, ...† (.) f, †^%•„f Š†„<£ •Ž•^•£
'0.333'
>>> '{0:_^11}'.format('hello') # ' ' „ " "f " • , •Š• -f~•† ( _ ) " • Š™ , •^" •£™
~„•<f•fŽ†^" •• (^) †„ ™™' ' <•• 11
'__hello__'
>>> '£ {name} "-f•¥„ <• {book}'.format(name='Swaroop', book='A Byte of
Python') # •' †„Ž ' ' | „> •-~' „ŽšŽ-•
'£ Swaroop "-f•¥„ <• A Byte of Python'
```

±f Ž•ž<™†, •f• ^£œ~ <£~ Ž, ™•f^', ^—œ~ †™, —™Ž™•£•£~ ^†^Ž™†<f•<™ "•†•†™ Python Enhancement Proposal No. 3101 [3].

%•Š^—~Š£Ž (Variables)

≥ „, œ•£ †...†™ "£, f™Ž•" <f" Š† •<^¤•, Š† " ^<^†<" •«†<™† ^Ÿ^, •œ- „, •f^—...†•<• " "Ž™f™ <, ...Ž™ ^Ž™¤œ" •£•£~ " ^f •ž•|•, ' ^••^~ " "¤• žŽ£, ™—™, ^~. Š•Š •†^f ž™£ •—, †...™†<f ™f •†Ž%š, •žf„ ±f †•<^ŸŽ£œ ~ •†^f ^", fŸŠ~ ...<f <™ ...†™†^ •£†•ž" '•<^f-™f <f† ~ <™£~ ž™f"•žž™£†, £Ž^œ †ž™, ••<• †^ ^Ž™¤£"•«••<• ™f•œž™<• †• <£ „, œ•£ < > ††•<^ŸŽ£œŠ†. ±f †•<^ŸŽ£œ ~ •†^f ^žž" <†œ†^<^ <£~ ††œ†£~ <™£ ≥/. •~ ...ž™£ †ž™, ••<• †^ ^ž™¤£"•«••<• žŽ£, ™—™, ^•. ' †<•¤•<^ †• <f~ "£, f™Ž•" <f" ~ •<^¤•, ~, „, •f" -••<• " "Ž™f^ † ™•™™ (method) 'f^

†^ " ^Ž ••<• ^E< ~ <f~ †<^ŸŽE< ~, ^ŽŽ" " ^f †<™E~ •Š••<•™†...†<^.

¬†•†^Š•œ•••^ ^†^Ž†¤, f•Šfj •"

±f †<^ŸŽE< ~ •†^f Ž^, ^•••†^<^ ^†^††, f•<f"Š†. % %-%"-j ...†'Ž†œ •†^f •™¤ †<™†...†<^ 'f^ †^ ^†^††, •™E† ^œŽ†. •Ž", „™E†™, f•†††f " ^†...†• Ž™E Ž, Ž•f †^ ^"™Ž™E¤œ••<• 'f^ <E†™††^<™•™•^ ^†^††, f•<f"Š†:

% ± Ž, Š<™~ „^, ^"œ, ^~<™E ^†^††, f•<f"™« Ž, Ž•f †^ •†^f †^', "††^<E~ ^Ž-^Ÿœ<™E ("•-^Ž^•™ ASCII œ Ž•-... ASCII œ „^, ^"œ, ^~ Unicode) œ†f^ " " <> Ž^œŽ~ ('_).

% •™ EŽ...Ž™fŽ™ <™E™†...†<™E ^†^††, f•<f"™«†Ž™, •†^ ^Ž™<•Ž•<^f ^Ž...', "††^<^ ("•-^Ž^•™ ASCII œ Ž•-... ASCII œ Unicode „^, ^"œ, ^~), " " <> Ž^œŽ~ ('_) œ ^, f¤†™«~ (0-9).

% Φ<™ ...†™†^ •†... ^†^††, f•<f"™«•f^", •†™†<^f <^ Ž•-" ^Ž...<^ "•-^Ž^•™ (case-sensitive). 'f^ Ž^, "••f'†^, <™ myname " ^f<™ myName œ††•†^f<™•f™. €^, ^<E, œ•<•<™ Ž•-... n •<™ Ž, Š<™ Ž^, "••f'†^ " ^f<™ "•-^Ž^•™ N •<™ ••œ<•,™.

% €^, ^•••†^<^ •...Ÿ"„™†™†<™•™•••^ ^†^††, f•<f"™«: i, __my_name, name_23, a1b2_c3 " ^f random_utf8_characters_, f€€•, , •, „...\$•„j €€††^%€•, .

% €^, ^•••†^<^†' %„•f-„™†™†<™•™•••^ ^†^††, f•<f"™«: 2things, this is spaced out, my-name, " ^f "this is i s_i n_quotes".

% -Ž™, ••<•†^ „, E•f†™Ž™f••<••ŽŽE†f" ~ Ž |f~>™†...†<^ ^†^††, f•<f"Š†, Ž„•, <•_†••^ ^•Š.

Ÿ"•fœœ•††††

±f †<^ŸŽE< ~ †Ž™,™«††^ •f^<E,™«†††~ •f^-™,•<f"Š†<œŽ>†Ž™E™†™†"-™†<^f Š"•fœœ•††††. ±f Ÿ^•f"™•<œŽ™f••†^f^, f¤†™• " ^f•E†Ÿ™Ž™••f, ~, ...Ž>~œE^†^-, ^†•. Φ<^•Ž...††^ "•-^Ž^f^, ¤^•™«†•ŽŠ~†Ž™,™«†•†^•E†f™E, 'œ•™E†•f•™«~†~<œŽ™E~„, E•f†™Ž™fŠ†<^• ŠŽ"•f~.

•†Šfj•†•†^

@^¤E†"•<•, E Python ^†<Ž^†Ÿ"†•<^f o<fœŽ™<•„, E•f†™Ž™f••<^f•• †^ Ž, ...', ^††^>~ †^ %œŽ†^†•†-•, ††f^'•†f"œ ††™f^<E~ Ž |E~.'†<•†^Ž™«†•'<™ ^œŽ†, Ž†•'<™ %œŽ†^†•†-•'.

'~†••¤~žf^„, •Š•Ž•†Šfj•f†•†•Š, <•"Ž', •Ž, ^††^Šf•†•"

² Python •†^f †<™†^ ^†<f"•f†•†™<•,•œ~†•<E†††™f^...<f™<fœŽ™<••†^f†^ ^†<f"•†•†™•E†Ž•, fŽ^†Ÿ"†™†<^, f¤†™~, •E†Ÿ™Ž™••f, ~ " ^f•E†^, <œ•f~.

•Š, ^¤^•™«†•<E„, œ•E†<^ŸŽE<Š††^~•† "E, f™Ž•" <f"~•<^¤•, ~. 'Ž™¤E"•œ•<•<™ Ž^, ^" " <> Ž^, "••f'†^ " ^f"•<Ž•<•<™ Ž, ...', ^††^.

€|Ž†^Ž, E<•Š•', •Ž, E††^Š~ Python

² <Ežf"œ•f^•f"••••œ~'f^<E†^Ž™¤œ"•E•E " ^f"•<Ž•œ•†...Ž,™', "††^<™ Python •†^f E ^"•Ž™E¤E:

1. '†™•|<•<™†^'^<E††™••~•Ž•|•, '^•œ"Š•f"•.
2. '"„<™†"Š•f"•<™EŽ,™', "††^<™~Ž™E•†<^f•<™Ž^, "••f'†^.
3. 'Ž™¤E"•œ•<•<™>~^„•™†•<™...™†^Ž™E^†^-, •<^f•<™•„Ž™'. '™Ž™E¤Š<E•«†Ÿ^•E^Ž™¤œ"•E•E~...Ž>†<†Ž,™', ^††^<>† Python†•<E†"•<"ŽE|E.py.
4. Š"•Ž•<•<™•f•,†E†•Eœ†•<E†•†<™Žœpython var.py œ„, E•f†™Ž™fœ•<•<™ IDLE 'f^<E†"•<Ž•œ<>†Ž,™', ^††^<>†.-Ž™, ••<•†^" "†<•Ž•œ~<^„„••"•<Ž•f†^...Ž>~|E'œ¤E"•Ž,™E'™E††>~.

€^,Œ•fž†^:¥, •~†•Š^--~Š|‡i^fi",f•-•iŠfi|‡•Š^••,|‡

Filename : var.py

i = 5

print(i)

i = i + 1

print(i)

s = '''This is a multi-line string.

This is the second line.'''

print(s)

i |™•™~:

\$ python var.py

5

6

This is a multi-line string.

This is the second line.

€Š~Ž•f<™E, '••:

®^žŠ~Ž•f<™E, '••<™ž, ...', ^††^ €. Š<^, "„>, ™«†• <E† <ftœ <E~ "E, f™Ž•" <f"œ~ •<^••, " ~ 5 •<E† •<^ŸŽE<œ i† •<E „, œ•E <™E <•Ž•<œ •"„Š, Œ•E~ (=). ' E<œE ', ^††œ ™†™†" -•<^f •†<™Žœ (statement) •f...<f •ŒŽŠ†•f ...<f " " <f ž, ž•f† ^†•†f " ^f •<E† ž•, •ž<• œ† ^~, •E†• ™E†• <™ ...†™† ^<E~†•<^ŸŽE<œ~ i† •<E† <ftœ 5. <œE •E† „•f^, •" <ŒŽŠ†™E†• <E† <ftœ <E~†•<^ŸŽE<œ~ i† •<E „, œ•E <E~†•<™Žœ~ print Œ™ž™^, -E•f" ", ^žž" •" <ŒŽŠ†•f <E† <ftœ <E~†•<^ŸŽE<œ~ •<E† ™œ...†E.

-•<" ž, ™•œ <™E†• 1 •<E† ^ž™œE"•E† †E <ftœ <™E i " ^f ^ž™œE"•«<^f •†E†•, >††E •" †™E. Š^<...ž† <E† •" <ŒŽŠ†™E†• " ^f ...ž> ~ ž•, ft†™E†•, †^~•žf•<, -f <E† <ftœ 6.

€^, ™†™> ~, "„>, ™«†• <E† "E, f™Ž•" <f"œ •<^••, " •<E† •<^ŸŽE<œ s " ^f•" <ŒŽŠ†™E†• •<E† ™œ...†E.

' ~†••œ~ žf^ ', •ž, ^††^Šf•Šœž •Š^Šfi|‡ž-œ••, |‡

±f†•<^ŸŽE<~ „, Œ•f†™ž™f™«†<^f†...†™†• <E† •"„Š, Œ•E •• ^E<~†f^~ <ftœ~. ¥•† ^ž~f<••<f/„, Œ•f†™ž™f••<^f " "ž™f^ •œž>•E (declaration) œ™™, f•†...~ <<ž™E •••™††>† (data type definition).

®•žfiœž i^f<"•fiœžž, ^††œž'~ž^••" i|œfi^

-f^ -E•f"œ', ^††œ •†f^E<...ž™E •••~ Š, f€†ž†...<^†', " -•<•<™ž, ...', ^††^ -f^ž™'f"œ', ^††œ •†f^E<...ž™E Š, f€††• Python> ~†f^•†f^••†<™žœ. 2 Python Ež™œ <f•f>žE, " ...<f " "œ•' >'†^ " "...%•••" ^†f•<™f„•••†f^, •"†^ " "...%•••".

i†ž^, "••f'†^ž™'f"œ~', ^††œ~ •†f†f^•†<™žœ...ž>~ print('Hello World') -†^E<œœ<^†••†f^', ^††œ ^ž...†...†E<E~ (~ž>~ <EŸžž•••<™†•ž•|•, ' ^<œ "Š•f" ^), <...< ^E<œ ^†f•<™f„••ž•œ~ ••†f^ -E•f"œ', ^††œ.

i††••^, Œ Python •†œ^, „«†f <E „, œ•E†f~ " ^f†...†™†•†<™žœ~ ^†' ', ^††œ Š•<™ "Š•f"^^†^••†f^•E^†'†>•<™~.

Š™†ž•ž•<† " ^œ™, •••<ž•, f••...<•, •~^ž...†•^ž™'f"~', ^††~ ••†f^†...†™-E•f"œ', ^††œ, <...<ž, ž•f†^<™™, •••<•, Œ<"†• <E „, œ•E <™E •, ><E†^<f"™« (semicolon) (;) " ^f •••†f <™ <ž™~†f~ž™'f"œ~', ^††œ~/•†<™žœ~. 'f^ž^, "••f'†^, <™

```
i = 5
print(i)
```

```
••†^™£•f^•<f" " ••f™ †•<™
```

```
i = 5;
print(i);
```

```
"^f<™••f™ †ž™, ••†^', ^-<••> ~
```

```
i = 5; print(i);
```

```
œ ^" ...†£ " ^f
```

```
i = 5; print(i)
```

˘•<...™, •"•Š †¤ †^ •£†£¤•••<• †^ ž,™', ^††^<•••<• ž,£<•†š^ž †•^ i ^f †...†• -•žfi ž, ^†† •• †f^
•†f^•^ <"•fi ž, ^†† †...†•. ¬, £•f†™ž™fœ•<• ž•, f••...<•, •~ -£•f" ~', ^†† ~'f^†•^†...†™ ž™'f"œ', ^††œ, ^†
^£œœ ••†f ...†<> ~†•' "ž£. ≥ f• ^ ••†f †^ ^ž™-•£„¤•• <™ •, > <£†^<f" ..., ...™ <™ •£†^<...† ž•, f••...<•,™, Š•<•™
"Š•f"^^ †^ ••†f •£^†"†† •<™~. ¢<£† ž, ^'†^<f" ...<£<^, •†- „> „, £•f†™ž™fœ•f ž™<,™«<• „> •f
•, > <£†^<f" ... •• †^ ž, ..., ^††^ Python.
' "™ž™£¤•• †^ ž^, "••f'†^ •«†<^†£~ †f^~ ž™'f"œ'~, ^††œ~ ž™£ •" <••†•<^f •• ž™žž ~ -£•f" ~', ^†† ~. ' £<...
^†^- , •<^f> ~ **explicit line joining.**

```
s = 'This is a string. \
This continues the string.'
print(s)
```

```
≥ |™•™~ <™£ žž^, ^žž†> "Š•f"^^:
```

```
This is a string. This continues the string.
```

```
€^,™†™> ~,
```

```
print\
(i)
```

```
••†^f<™••f™ †•
```

```
print(i)
```

-•, f" ~ -™, ~, £ž", „•f †f^ •f> ž£, œ žž^, ^•™„œ ...ž™£ •• „, •f" -•<^f †^ „, £•f†™ž™fœ••<• †f^ ^, f•<•, œ žž" 'f^
" "¤•<™. ' £<œ ••†f £ ž•, •ž<> •£ ...ž™£ £ ž™'f"œ', ^††œ „, £•f†™ž™f•• žž^, •†¤ ••f~ (), ^' "«ž•~ [] œ "' "f•<, ^ {}.
' £<... ^†^-, •<^f> ~ **implicit line joining.** ¶|^ <™ •••<• •<£† žž, " |£ ...<^†¤ ^', "ž™£†•žž,™', "††^<^†•ž••<~
•<^ •ž...††^ "•- "žž^f^.

Š•„ i !œfi ^ (Indentation)

± "•†...„Š,™~ •†^f•Œ†^†f"..."•Œ† Python. €, "'†^†f,¬ i•†...Ž„^,^i\$, ^Ž•Š~†^,„ Š~ŽŽ,^†† Ž•†^f •~†^†Šfi...Ž. 'Œ<... ^Ž™~^Ž•<^f••„ i !œfi ^. ±f^,„f™• „•†™• „^„<œ,•~ ("•†" " ^f•ŒŽ™œ <•~) •Œ†^,„œ <Œ~ Ž™'f"œ~ ', ^††œ~ " ^™,•™Œ† <™ •Ž•Ž•™ ••™„œ~ <Œ~ Ž™'f"œ~ ', ^††œ~, " ^f ^Œ<... †• <Œ ••f, " <™Œ Ž,™••f™,•~f <Œ†™†^•™Ž™•Œ•Œ <†•†<™ŽŠ†.

'Œ<...•Œ†^†f...†f™f•†<™Ž~Ž™ŒŽ"†•†^~',¢'•f " ^f™~••Ž™Œ††^ „™Œ† <™ ••f™ •Ž•Ž•™ ••™„œ~. Š"œ• <™f^™†"•^ •†<™ŽŠ†, " ^Ž•<^f'~•jŒœ^ (block). ¶|^•™œ†• Ž^,^••'†^<^ 'f^ <Œ•Œ†^••^ <† ŽŽ™""•>†•<^ •Ž...††^ "•~"Ž^f^.

®^œŒ†"•<•Ž"†<^...†f™fŽ"œ™~••™„~†Ž™,••†<Ž,™" ^Ž •™Œ†•~"Ž†<^. 'f^Ž^, "••f†^:

```
i = 5
```

```
print(' ' <Ž^Œ „,••Ž ', i) # Š•~"f! >†™""œŠ• 'Œf €, "ŠŽ"f "ŠŽŒ f†•Ž
<Ž• -f•^^Œ•
print(' ©™•••'•^•'•>, Ž <Ž^Œ „,••Ž ', i)
```

'†•<Ž•••<™†Ž^,^Ž"†> "Š•f^,œ^Ž,™"«³f<™Ž^,^""<†•~"Ž†^:

```
File "whitespace.py", line 4
    print(' ' <Ž^Œ „,••Ž ', i) # «' ' ^•! œf•†" |<„ "•• ŠŽ'†<Ž^•†<Ž•
•f~Œ <Ž• -f•^^Œ•
    ^
```

IndentationError: unexpected indent

€,™• |<• <™† "•†...„^,^"œ,^•<Œ†^,„œ <Œ~••«<•,Œ~',^††œ~. •™•~"Ž†^Ž™ŒŒŽ™••f"†«•fŒ Python†^~ Ž•f...fŒ•<†<^Œ <™ŒŽ,™', "††^<™~•††f"™Œ,Œ,•ŒŽ^•œ,™ "Š•f"~^<™ŒŽ,™', "††^<™~••', "~<Œ"•>•<". €™Œ•Œ†^†f'f^•~...†f•†•€...†Ž†%Ÿ%~...†Ž%~% Ž†~†œŽ†~f†,€,•œœ•†,†~Ž,™~ ("•<... ^Ž... <Œ† Ž,™•ŽfŽ'††Œ "«,f^ŽŽ™""•^Ž™Œ„,Œ•††™Ž™f™«<••Œ†„f^,~Œ•f""). ±fŽ•,fŽ<Š••f Ž™Œ†Ž™,••<†^~^,†...•<†•~ŽŽ™""••~œ^†^Ž<Œ„œ™œ†•<^•Ž...††^"•~"Ž^f^,...Ž>~<™• "•~"Ž^f™'f^<™†Ž•'™,™œ~.

¥, •~Š~Ž••„ Ž

®^†~†^†^†††††«<••<ŒŽ™œ<•~ " ^f "•†" •<f~••™„~•f...†fœ^Ž,™"ŽŒœ••^Œ†Ÿ^<Œ<^†•<^|«•f^~™,•<f"Š†Ž•f<™Œ, 'f"Š†. ¢~'>~†Ž™ <Œ„œ•Œ••<•†...••~•¢'Ž•,•ŸfŽ• (1 tab) œŽ†'œ...j~^†~™~ (4 spaces) 'f^""œ••Ž•Ž•™••™„œ~.

ŠŽfŽ |<•†^~Ž...<^•«™•<ŒŽ••™„Š†. Š^f•Œ†^†f"™œ,™••†^f†^•ŽfŽ |<•†^ " ^f†^<™„Œ•f†™Ž™f••<•Š~••,Œ,•ŒŽ^•œ•Œ†Œœ••<^Œ<...<™•<ŒŽ•~•.

'~†••œ~Žf^',•Ž,^††^Šf•ŠœŽ•Š~Šfi |†Ž~œ••|†

² Pythonœ„•fŽ"†<^••™„œ'f^ŽŽ™""••~" ^fŽ™<^'«Ž~ (braces). Š"•Ž•<•from __future__ import braces 'f^Ž•,f•...<•,~ŽŽŒ,™~™,•~.

‘ “†•£~

•Š, ^ ^-™« •f£Ž••^†• <f~ Ž•Ž<™† , •f•~, †Ž™, ™«†• †^ Ž, ™„> , œ•™£†• •• Žf™ •†•f^- , ™†<^ †^<^ ...Ž> ~ <f~ •†<™Ž ~ •Ž ' „™£ , ™œ~. ° •Ÿ^f> †••<• ...<f •••<• " †•<™f †• ...• ^ •f^Ÿ" •^<• •• ^£<... <™ " •- " Ž^f™.

- € , ™£' ™«†•†™ • ŠŽ...†•†™
- €••> •<^ Ž•, f• „...†•†~

References

- [1] http://www.unicode.org/faq/basic_q.html#16
- [2] <http://stackoverflow.com/questions/175240/how-do-i-convert-a-files-format-from-unicode-to-ascii-using-python#175270>
- [3] <http://www.python.org/dev/peps/pep-3101/>

Python el:Ÿ•-••Š¢Ž i ^f •i < , £••fŽ

Šf•^ž¤ž

±f Ž•, f••...<•, •~ •†<™Ž ~ Ž™£ ' , " -•<• †^ Ž•, f „™£† •"- , " ••f~ (expressions). i †^ ^ŽŽ... Ž^ , " ••f'†^ †•^~ " - , ^•£~ •†^f 2 + 3. -•^ " - , ^•£†Ž™ , ••†^ •f^„> , f•<•• •• <Ž••<~ (operators) " ^f <•Ž••<™£~ (operands).
±f Ž†, †' Žf„ ••†^f Ž•f<™£ , ' ••~ Ž™£ " " †™£† " " <f " ^f †Ž™ , ™«††^†^Ž^ , ^•<^¤™«††• •«†Ÿ™Ž^...Ž> ~ <™ + œ†• •f•f" ~ Ž |•f^- " Ž•f•f" . ±f <•Ž••<~ ^Ž^f<™«† " " Ž™f^ •••™†††^ Ž" †> •<^ ™Ž™• †^ Ž•f<™£ , ' œ•™£† " ^f ^£<" <^ •••™†††^ ™†™†" -™†<^f Ž†, †' Žf•. ¢<£ •£' " •" , f† †£ Ž• , •Ž<> •£ , ™f <•Ž••<™f ••†^f <™ 2 " ^f <™ 3.

Ÿ•-••Š¢Ž

¶^ , •†™£††•†•^ , œ'™ , £†^<f" •<™£~ <•Ž••<~ " ^f <£ „ , œ•£ <™£~:

¢£†•fŠ•<• ...<f †Ž™ , ••<• †^ Ÿ , ••<• <£† <†œ <> †•"- , " ••> †Ž™ ••†™†<^f •<^ Ž^ , ^•••'†^<^ „ , £•f†™Ž™fŠ†<^~ <™ •f• , †£†•£œœ •f^• , ^•<f" " . 'f^ Ž^ , " ••f'†^ , 'f^ <™† Ž' „™ <£~ " - , ^•£~ 2 + 3 , „ , £•f†™Ž™fœ•<• <£† "™†•...Ž^ <™£ •f^• , ^•<f"™« •f• , †£†•£œœ <£~ Python:

```
>>> 2 + 3
5
>>> 3 * 5
15
>>>
```

Ÿ•-••Š Ž	~ †•†^	Š« Ž~•~	€^ , ^œ••Ž†^Š^
+	¢£†	€, ™•¤ <f •«™ ^†<f" ••†•†^.	•™ 3 + 5 •†•f 8. •™ ' a' + ' b' ••†•f ' ab' .
-	-••™†	Š•<• ••†•f †^†^ , †£<f" ... ^ , f¤†... , œ ^-^f , •• †^†^ , f¤†... ^Ž... †^† " ŽŽ™.	•™ -5. 2 ••†•f †^†^ , †£<f" ... ^ , f¤†... •™ 50 - 24 ••†•f 26.
*	ŠŽ•	¥•†•f <™ ' f†...†•†™ •«™ ^ , f¤†Š†œ†f" •£†Ÿ™Ž™••f , " (string) •Ž^†^Ž^†Ÿ^†...†•†£ <...••~ -™ , ~.	•™ 2 * 3 ••†•f 6. •™ ' l a' * 3 ••†•f ' l a l a l a' .
**	¥«†^†£	ŠŽf< , -•f <™ x £³> ††™ •<£ •«†^†£ y.	•™ 3 ** 4 ••†•f 81 (•£Ž^•œ 3 * 3 * 3 * 3).
/	¥f"	¥f^f , •• <™ x †• <™ y.	•™ 4 / 3 ••†•f 1. 3333333333333333.

[illegible]

+X, -X	¶•<f" ..., ' , ‡€<f" ...
~X	¥£ ^•f" ... ±¬ ^a
**	Ä³> •£•••«†^†£
x.attribute	' ‡^—™, " •• „ ^, ^" <£, f•<f" ...
x[index]	Subscription
x[index1:index2]	§™††" <f^•†^ (Slicing)
f(arguments ...)	§Žœ•£•£†", <£•£~
(expressions, ...)	££† ‡> •£œ •†—" ‡f•£ ŽŽ•f" • ^~
[expressions, ...]	€, ™Ÿ™Žœ Ž••<^~
{key:datum, ...}	€, ™Ÿ™Žœ Ž•!f"™«

±f <•Ž••< ~ <™£™ ™Ž™•™£™ ••† „™£†• ^" ...†£ •£†^†<œ••f «^•!£'£«™«† •••Ž...††^ "•—"Ž^f^.

••Ž••< ~ †• <£† ~f%œ...•Žf...%†-Ž•Ž%Ÿ, ••"™†<^f •<£†••f^', ^††œ •<™† Ž^, ^Ž"†> Ž•†^" ^. ``f^ Ž^, "••f'†^, <™
+ " ^f <™ - „™£† <£†••f^ Ž, ™<•, ^f...<£<^.

• — ^Ž Š~Ž ••f, £Ž "' •—•Žf•†•"

``f^ ‡^ " "†™£†• <f~ •—" , "••f~ Žf™ •£^†" '†> •<~, ‡Ž™, ™«†• ‡^„, £•f†™Ž™fœ•™£†• Ž^, •†« ••f~. ``f^
Ž^, "••f'†^, <™ 2 + (3 * 4) •†^f••™£, ^ Žf™ •«"™Ž™ ‡^ <™ " ^<Ž"Ÿ™£†• ^Ž... <™ 2 + 3 * 4 <™ ™Ž™
^Ž^f<•• <£ '†Š•£ <> ‡ Ž, ™<•, ^f™<œ> ‡ <> ‡ <•Ž••<Š†. „ Ž> ~ " ^f ...Ž^ <^ "ŽŽ^, ™f Ž^, •†« ••f~ «^ Ž, Ž•f†
„, £•f†™Ž™f™«†<^f†••«†••£ (†£† <™ Ž^, ^" "†<•) " ^f†††£†•†^f" „, £•<~ (...Ž> ~ Ž„. •<™ 2 + (3 + 4)).
• Ž^, „f ‡^ •ŽfŽŽ ™† ŽŽ•™† " <£†^ •<£ „, œ•£ Ž^, •†« ••> ‡ -†^~ Ÿ™£«" ‡^ ^ŽŽ"†™£†• <£ ••f, " £Ž™Ž™'f•†™«.
``f^ Ž^, "••f'†^, ^† « Ž•<† '•†f£ Ž, ...•«••£ Ž, f† <™† Ž™ŽŽ^ŽŽ^•f^†... ••†•^ "—, ^•£, <...<†Ž™, ••<†
' , "³•<• " " <f ...Ž> ~ (2 + 3) * 4.

' "•„čŠf•~ (Associativity)

±f <•Ž••< ~ •£†œ«> ~ •£•„•<—™†<^f ^Ž... <^ ^, f•<•, " Ž, ™~ <^ ••!f" •£Ž^•œ ™f <•Ž••< ~ †• <£† ••f^
Ž, ™<•, ^f...<£<^ £Ž™Ž™'•—™†<^f ^Ž... <^ ^, f•<•, " Ž, ™~ <^ ••!f". ``f^ Ž^, "••f'†^, <™ 2 + 3 + 4 £Ž™Ž™'•—•<^f
> ~ (2 + 3) + 4. —•, f"™• <•Ž••< ~ ...Ž> ~ ™f <•Ž••< ~ ^†"«••£~ „™£† •£•„ <f•£ ^Ž... <^ ••!f" Ž, ™~ <^
^, f•<•, " •£Ž. <™ a = b = c ^†<f†<> Ž•—•<^f> ~ a = (b = c).

Šj <, £••fŽ (Expressions)

€^, "••f'†^:

```
#!/usr/bin/python
```

```
# Filename: expression.py
```

```
length = 5
```

```
breadth = 2
```

```
area = length * breadth
```

```
print('Area is', area)
```

```
print('Perimeter is', 2 * (length + breadth))
```

```
| ™•™~:
```

```
$ python expression.py
Area is 10
Perimeter is 14
```

€Š~ •™£Ž•«•f:

•™ †œ"™~ (length) " ^f <™ ŽŽ" <™~ (breadth) <™£™, «™' > †•™£ ^Ž™«£"•«™†<^f •• †•<^ŸŽ£< ~ †• <™ ••f™ ...†™†^.
 ¬, £•f†™Ž™f™«†• ^£< ~ <f~ †•<^ŸŽ£< ~ 'f^ †^ £Ž™Ž™'•™£†• <™ •†Ÿ^•...† " ^f <£† Ž•, •†•<,™ <™£™, «™' > †•™£†•
 <£ Ÿ™«£•f^ •"—, "••> †. ' Ž™«£"•«™£†• <™ ^Ž™< Ž••†^ <£~ "—, ^•£~ length * breadth •<£†•<^ŸŽ£<œ
 (variable) area " ^f Ž•f<^ <™ <£ŽŠ†™£†• „, £•f†™Ž™fŠ†<^~ <£ •£†", <£•£ print. €<£ ••«<, £ Ž•, •Ž<> •£,
 „, £•f†™Ž™f™«†• ^Ž••£œ•^~ <£† <f†œ <£~ "—, ^•£~ 2 * (length + breadth) •<£•£†", <£•£ print.

ŠŽ••£~ , Ž^, ^<£, œ•<• <™† <, ...Ž™ †• <™†™Ž™•™ £ Python "<£ŽŠ†•f ...†™, —" <^ ^Ž™<•Ž •†^<^. €^, '...Ž™ Ž™£ ••†
 „™£†• " ^«™, ••f †^ "•†... ^†"†••^ •<™ 'Area is' " ^f •<£†•<^ŸŽ£<œ area, £ Python <™ <™Ž™«•<• 'f^
 •†"~ <f Š•<•† Ž",™£†•†•^ Žf™ " ^«^, œ ...†™, —£ |™•™ " ^f <™ Ž, ...', ^††^ ••†f Ž™Ž« Žf™ •£^†"†•† >•<™†•
 ^£<... <™† <, ...Ž™ (^—™« •• „, •f" —<^f†^ ^†£•£„™«†• 'f^ <^ "•†" •<f~ •£†Ÿ™Ž™••f, ~ Ž™£ „, £•f†™Ž™f™«†• 'f^
 |™•™). ' £<... •†^f †^ Ž^, "••f†^ <™£ ŽŠ~ £ Python ""†f <£ -> œ <™£ Ž,™', ^††^ <f•œ«"™Ž£.

' "†•£~

Š••^†• Ž> ~ „, £•f†™Ž™f™«†• <™£~ <•Ž••< ~, <™£~ <•Ž••<™£~ " ^f <f~ •"—, "••f~ ^£<" ^Ž™<Ž™«† <^ Ÿ^•f" "
 •™†f"" •<™f„••^ ""« Ž,™', "††^<™~. €<£ •£† „f^, «^ •™«†• ŽŠ~ <^ „, £•f†™Ž™f™«†• •<^ Ž,™', "††^<"†~
 „, £•f†™Ž™fŠ†<^~ •†<™Ž~.

- €„™£'™«†•†•†™ • ŠŽ...†•†™
- €••> •<^ Ž•, f•„...†•†^

References

- [1] <http://docs.python.org/3.0/reference/expressions.html#evaluation-order>

Python el:° –•ž„•ž , • ž

šf•^ž¤ž

Œ< ž,™', "††^< ž™Œ ••^†•† „,f <š, ^, Œžœ, |•ž"†<†f^••f, "•†<™žš†, <f~™ž™••~•" <ž™«••žf•<" Œ Python†•<Œ†••f^••f, ". '†¤ž™Œ†•...†>~†^žž" |™Œ†•<Œ†,™œ•" <ž•œ~; '†, 'f^ž^, "••f'†^,¤ž™Œ†•<™ž, ...', ^††^†^ž",•f†•,f"~^ž™—"••f~"~f†"™†•f•f^–™,•<f"™ž, "'†^< Œž...•f^–™,•<f"~ž,™Áž™¤••f~, ...ž>~ž...†^•" <Œžš••fš"~žŒ†, ^<œš"~žŒ•ž, ^<, ^†ž™'^†•<Œ†š, ^;

„ž>~••>~††††< 3^<•, ^Œ<...žf<Œ'„†<^f„,Œ•f†™ž™fš†<^~•†<™ž~•ž'„™Œ,™œ~. •ž",„™Œ†<,•f~†<™ž~•ž'„™Œ,™œ~•<Œ† Python - i f, for "~fwhi l e.

–•žš•– if

²•†<™žœ i f „,Œ•f†™ž™f••<^f'f^†^•ž'„¤•†f^•Œ†¤œ"Œ"~f tœ– (iŒ) Œ•Œ†¤œ"Œ^Œœ•†^f^žŒœœ~, <...<••" <ž••<^f†^•«†™ž™œžž™"••^•†<™žš† (žž™™††"–<^f if-block),•f^–™,•<f"™ (else) '•†<^f•ž•|•, '^••^•†...™ž™Œ•Œ†...ž™Œ•†<™žš† (žž™™†††"–<^f else-block). ²„,œ•œ<™Œ...™Œ else•†^fž,™^f,•<f"œ.

€^, "••f'†^:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: i f. py

number = 23
guess = int(input('©ž†'–„<„ "••• •~"f•ž• •fž¤†: '))

if guess == number:
    print('ªš–→•fž<Œfžš, <•• ^••<"¥•<„.') # Ÿ'f –™, •œf (block)
|„~ž•'„ž„š–
    print('(‰' ' ' š„• ~„fš, |„<„ ~ž ~•••• •f••„, •! )') # Ÿ'f –™, •œf
<„'„ž–•„ž„š–
elif guess < number:
    print('–žž, „„•ž', –• ^„–•'Ÿ<„f••.') # ~ž „f –™, •œf
    # j–™†•~š• Œf, •œ•š• ...š„ Œ'~š• •œš...† „f† –™, •œf† ...
else:
    print('–žž, „„•ž', –• ^ž~f†<„f••.')
    # –†'–„ Œf „"•–„ guess > number „f Œf •Œ••š• •œ<

print(' " '••')
# Œ š•~•šf^f f¤šž •œš™~ž •, š•~•^šf„ –•œšf "•š• šžŒ •, š'~•"ž šž†
„•<•'Œ• if
```

i |™•™~:

```
$ python i f. py
©ž†'–„<„ "••• •~"f•ž• •fž¤†: 50
–žž, „„•ž', –• ^ž~f†<„f••.
" '••
```

```
$ python i f. py
©Ž†' –„<„ „ ••• •~" f•Ž• •fŽ¤†: 22
–¬Ž, „, ••Ž ' , –• ^„–•' Ÿ<„f••.
" ' ••

$ python i f. py
©Ž†' –„<„ „ ••• •~" f•Ž• •fŽ¤†: 23
ªŠ–¬•fŽ<ŒfŽ•, <•• ^••<"¥•<„.
(%' ' ' Š„ • ~„fŠ, i „<„ ~•Ž ~••" •• •f••„, •! )
" ' ••
```

€Š~ Ž•f<™Œ, ' ••:

Φ<™ Ž, ...', ^††^ ^Œ<... †^†<•«•f™ „, œ•<Œ~ ^, f¤†™«~ " ^f •Ž ' „™Œ†• ^† ^†<f•<™f„™«† •<™† ^, f¤†... Ž™Œ „™Œ†•™, ••f. ±, •™Œ†• <Œ† †<^ŸŽŒœ number > ~™Ž™f™†•œŽ™<• ^" , ^f™ ^, f¤†... •Žf¤†™«†•, ž„. 23. Å•<•, ^Ž•, †™Œ†• <Œ† Ž, ...† •Œ <™Œ „, œ•<Œ „, Œ•†™Ž™fŠ†<^ <Œ† •Œ†", <Œ•Œ input(). ±f•Œ†^, <œ•f~ •†^f ^ŽŽ" •Ž^†^„, Œ•†™Ž™fœ•†^ "™††" <f Ž,™', ^††< > †. ¶^†™Œ††• Ž•, f••...<•, ^'f ^Œ< ~•<™ •Ž...†•†™ "–" Ž^f™.

€^, „™Œ†• †f^ •Œ†Ÿ™Ž™••f, " (string) •<Œ† •†> †^<† ††Œ •Œ†", <Œ•Œ input, Œ™Ž™•^ •" <ŒŽŠ†•f •<Œ†™œ...†Œ ^Œœ <Œ† •Œ†Ÿ™Ž™••f, " " ^f ^††††f <Œ† •f•^'> 'œ ••™††††† ^Ž... <™† „, œ•<Œ. –...Žf~ •f•"™Œ†• " " <f " ^f Ž^œ•™Œ†• <™ ŽŽœ" <,™ enter, Œ•Œ†", <Œ•Œ input() •Žf•<, –f ^Œ<... Ž™Œ •f•"™Œ†• ^†> ~•Œ†Ÿ™Ž™••f, ". Φ<Œ† •Œ† •f^, ^Œœ Œ•Œ†Ÿ™Ž™••f, " †<^<, Ž•<^f ••^" , ^f™ ^, f¤†... †• <Œ† „, œ•Œ <Œ~ int "f ^Ž™ŒŒ"•«<^f •<Œ††<^ŸŽŒœ guess. Φ<Œ† Ž, ^††<f" ...<Œ^, Œ int •†^f †f^ "Ž"•Œ, "ŽŽ^ <™†™Ž™Œ „, •f"–<^f †^ | , <•Ž,™~ <™ Ž^, ...† •†^f ...<f †Ž™, ••<†^ <Œ† „, Œ•†™Ž™fœ••<• 'f^†^†<^<, Ž•<†f^ •Œ†Ÿ™Ž™••f, " •'††^" , ^f™ ^, f¤†... (ŒŽ... <Œ† Ž,™ÅŽ...œ•Œ...<f Œ•Œ†Ÿ™Ž™••f, " Ž•, f„•f††' "Œ,™" , ^f™ ^, f¤†... <™ "•†•†™).

Φ<™ •Ž...†•†™ Ÿœ†^ •Œ" , •†™Œ†• <™ Ž,™'† •<f" ... <™Œ „, œ•<Œ† •<™† ^, f¤†... Ž™Œ •ŽfŽ | ^†. Š† •†^f ••f™f, •" <ŒŽŠ†•<^f††œ†Œ^ •Žfœ„•~. ΦŒ††Š•<...<f „, Œ•†™Ž™f™«†• •Ž•Ž••^ ••™„Š†'f^†^•ŒŽŠ™Œ†• •<Œ† Python Ž™f•~†<™Ž™Œ†• •Ž™f^ŽŽ™"••^.'f^Œ<... <™ Ž„'™,™f••™„~•†^f Ž™Žœ•Œ†^†<f" ~•<Œ† Python. ŠŽŽ•>†^~"™Ž™Œœ••<• Ž†<^<™† "††...††Š•Œ†•Žœ~„, œ•Œ~ ••™„Š†<.™†^~"™Ž™Œœ••<•;

€^, ^<Œ, œ•<•...<f Œ•Œ†<™Žœ i f Ž•, fŽ^†Ÿ††f"†f"† " ^f " " <•Ž••^<™ <Ž™~Œ <•f•ŒŽŠ†™Œ†• •<Œ† Python ...<f ^"™Ž™Œœ...†f^ ŽŽ™"•"••^†<™ŽŠ†.

Φ<Œ†•Œ† „•f^•Ž' „™Œ†• ^†<™ Ž,™'† •<f" ... •†^f†f", ...<•,™ ^Ž... <™†^, f¤†...†^~,"f^†††f, ŽŽŒ,™–™,™«†• <™†„, œ•<Œ...<f ŒŽ, ...† •œ <™Œ Ž, Ž•†^•†^f Ž'™†• ^Žœ<•, Œ^Ž' ^Œœ†. 'Œ<... Ž™Œ „, Œ•†™Ž™fœ•^†•••Š••†^f™...™~ el i f™™Ž™™~•<Œ† Ž, ^††<f" ...<Œ^ •Œ†Œ"–f•«™•Œ„•<f–...†•~•†<™Ž™~ i f el se–i f el se ••†^•†<™Žœ i f–el i f–el se. 'Œ<... "†f<™ Ž,™', ^††^•Œ™Ž™...™ ^f††fŠ†f <™†^, f¤†...<† ••™„Š† Ž™Œ ^Ž^f<™«†<f.

±f•†<™Ž™~ el i f " ^f el se Ž, Ž•f•Ž•Œ~†^ „™Œ†"† " ^f " " <•Ž••^<™ <Ž™~Œ <Œ~Ž™'fœ~', ^††œ~, ^"™Ž™Œœ«†•†~^Ž...<f^†<••<™f„~ŽŽ™"••~•†<™ŽŠ†(†•^<"ŽŽŒŽ•••™„~Ÿ•Ÿ^>~).

–Ž™, ••<†^ „•<•ŽŽŒ†•^•†<™Žœ i f •†<... <Œ~ŽŽ™"••^~ if (if-block) †f~•†<™Žœ i f "™". 'Œ<... ^Ž™~^Ž••<f•†→ŽŒ††Œ•†<™Žœ i f.

¶Œ†Œœ••<...<†œ†^< el i f " ^f el se •†^f Ž,™'f, •<f"–. –f^•Ž"„f•<Œ' "Œ, Œ•†<™Žœ i f •†^f:

if True:

```
print('••Ž, „, ••Ž •'Ž¤'•')
```

'–™« Œ Python <•ŽfŠ•f <Œ† •" <Ž•Œ™Ž™"ŽŒ, Œ~Œ~•†<™Žœ i f •Œ†Ž•, fŽ^†Ÿ††††††† " ^f <†•Œ„•<f–...††††™, >† el i f " ^f el se, ž,™„>, "f•<Œ†•Ž...††Œ•†<™Žœ •<Œ† ŽŽ™"••^Ž™Œ Ž•, f„•<Œ†•†<™Žœ i f. Φ<Œ† Ž•, •Ž<•œ†^~ Ž,™"•f<^f'f^ <Œ† "«, f^ŽŽ™"••^†• <Œ†™Ž™•^ | •f†"•fŒ•" <Ž•Œ <™Œ Ž,™', "††^<™~" ^f Œ•Ž...††Œ•†<™Žœ •†^f print(' " '••'). –<" ^Ž' ^Œ<... Œ Python ŸŽ Ž•f <™ <Ž™~ <™Œ

Ž,™', "††^<™~ " ^f ^žŽ" <Ž•fŠ†•f••..

' † "f ^£<... •†^f † ^ ž™ž« ^žŽ... ž, ...', ^††^, „> •žf•£†"†•f ž™žŽ" ž, "'†^< ž™£ ž, ž•f † ^ ž"Ÿ•<• £ž...³£
^" ...† ^ " ^f•' † ^<...™ ^žŽ... ž, ...', ^††^... ž ^£<" •†^f ^, "•<" •<, > <" ("f•"žž£" <f" ^žŽ" 'f ^...™£~™£†
ž,™Œ•<™,f" ... •• C/C++) " ^f ^ž^f<™«† † ^< •£†•f•£<™ž™fœ••<•, ^žŽ" †•<" ^ž' ^£<... œ ^ž™" <œ••<• •£„, •f ^
•<£†„,œ•£ <™£~ " ^f œ ^• ^~ ^†™«† Š-£•f" ^<.

' ~†••œ~ žf ^', •ž, ^††^Šf•Š£ž C/C++

¥•† £ž",„f •†<™žœ switch •<£† Python. —ž™,••< † ^ „,£•f†™ž™fœ••< †f ^ •†<™žœ
i f. . e l i f. . e l s e 'f ^ † ^ " " †•<• <™ ••f™ ž, "'† ^ (" ^f •• †•,f" ~ ž•,fž<Š••f ^ † ^ „,£•f†™ž™fœ••< † ^
ž•|f" ... 'f ^ † ^ <™ " " †•<•',œ'™, ^).

- •†Š•- while

² •†<™žœ w h i l e •~ •žf<, ž•f † ^ •" <•ž••• •ž^†•fž£†† † ^ †f ^ žž™" ^• ^ •†<™žŠ†, ...™ †f ^ ž,™Œž...œ••£
ž ^, ^† †•f ^ž£œ ~. ² •†<™žœ w h i l e •†^f † ^ ž ^, " ••f'† ^ ^£<™« ž™£ ^ž™" ^ž••<^f •†<™žœ Š...-••> (*looping*
statement). —f ^•†<™žœ w h i l e †ž™,••† ^ „•f † ^ ž ž,™^f, •<f" ... „,™ e l s e.

€ ^, " ••f'† ^:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: while.py
```

```
number = 23
running = True
```

while running:

```
    guess = int(input('©ž†'—_<„ "••• •~"f•ž• •fžœ^† : '))
```

```
    if guess == number:
```

```
        print('ªŠ—•fž<£fž•, <•• ^••<"¥•<„.')
        running = False # fœŠ... ,•£•„ Š™£ %œ†...™ w h i l e £f "Šf"fžž"•„ •£<
```

```
    elif guess < number:
```

```
        print('¬ž, „, ••ž ', —• ^„—•'Ÿ<„f••.')
    else:
```

```
        print('¬ž, „, ••ž ', —• ^ž~f†<„f••.')
else:
```

```
    print('£ •f†¬•• w h i l e <„f ^•<, †<ž™..')
```

```
    # i —™†•^Š• £f —†™"£' "•Š• ...Š„ •~™ £' ~Š• •£<
```

```
print(' "'••')
```

ĵ |™•™~:

```
$ python while.py
```

```
©ž†'—_<„ "••• •~"f•ž• •fžœ^† : 50
```

```
¬ž, „, ••ž ', —• ^„—•'Ÿ<„f••.
```

```
©ž†'—_<„ "••• •~"f•ž• •fžœ^† : 22
```

```
¬ž, „, ••ž ', —• ^„—•'Ÿ<„f••.
```

```
©ž†'—_<„ "••• •~"f•ž• •fžœ^† : 23
```

```
ªŠ—•fž<£fž•, <•• ^••<"¥•<„.
```

```
£ •f†¬•• while <„f^<, ‡<ž™„
„'••
```

€Š™ ž•f<™£, '••:

Φ^£<...<™ ž, ...', ^††^ ž^•-™£†• ^™...†^<™ ž„f„†•f ž, ...' ‡• •£™, ^žž™<™ žž•™† „<£†^•†^f...<f•žf<, ž•f•<™† „,œ•<£ ‡^•£†„••f ‡^††<«f†„,f ‡^Ÿ, f<™† •>•<...^,f†...-•†„,f"-•<f•£ž. ‡^•„<ž•••ž†•ž£†† ‡^<™ ž, ...', ^††^'f^„„••ž, ...' ‡• •£, ...ž>~'f†...<†•<™ ž,™£'™«†•†™ ž^,„••f'†^.'£<...•†^f ‡^ž™ž«„^ž...ž^,„••f'†^<£™„œ•£™<£™•†<™žœ while.

—•<„f†™«†•<f™•†<™ž™input „fif •†<™£ ž, ...™£ while „f™,•-™£†•<£††•<Ÿž£œrunni ng •• True ž,f†<™† ž, ...™ while. €„Š<^•ž'„™£†•^†£†•<Ÿž£œrunni ng „f<£†<†œ True „f•<£†•£†„f^ž,™„>„†••<£†•„<ž••£<£™†••<™f„£™€„•^œ%„ while (while-block). '—™«„<•ž••<••^£œ£žž™„„^,£ž,™Áž...••£•ž'„•<f„fž„žf,£ž. •<£†ž•,ž<>œ†^£†•<Ÿž£œrunni ng. Š†££†œ<£™•£†„•-•f†^•†^f true (^ž£™),„<ž••<f„fž„žf™ž...„ž£,££žž™„„^ while (while-block), •f^—™,•<f„ž,™„>„†••<£†•„<ž••£<£™ ž,™^f,•<f„œ™žž™„„•^~ else (else-block) „f†•<„ž,™„>„†••<£†•ž...†££•†<™žœ.

≥ žž™„„•^ else „<ž••<f...<†£ž,™Áž...••£<™£ ž, ...™£ while ^ž™„<„<£†<†œ False (ž•£•~)^£<...†ž™,••†^•£†ž••^™...†^„f„^<„<£†ž,Š<£—™,„ž™£•ž'„•<f£ž,™Áž...••£. Š†££ž„„f†^~„™ else 'f^†^ž, ...™ while,„<ž••<fž™†<™•,„<™„f†^f^„™ž••<™† ž, ...™†•<£†•†<™žœ break.

±f<†~ True (^ž£™)„f False (ž•£•~)™†™†™-™†<f—ž™«ž•f™f<«ž™f (Boolean types) „f†ž™,••<†^••>,œ••<„f^†<™f„™«†•<f<†~1„f0^†<™f„^.

'~†••„~žf^',•ž,^††^šf•šžC/C++

¶£†£••<„f†ž™,••<†^„•<††™„ else 'f^<™† ž, ...™ while.

¬ —, ...„ž for

≥ •†<™žœ for...in •†^f„žž£†•^•†<™žœ ž, ...™£,£™ž™•^†£%-%„%„šœ-†ž%„•†f^„™ž™£••^†<f„f††,£ž. „<ž••<f••„„•^†<f„•†•†™•†f^„™ž™£••^¶^™«†•ž„f••<•,~ž•ž<™†,•f~„•<f„†•<f^„™ž™£•••<^ž...††^„—„ž^f.'£<...ž™£ž,ž•f†^'†,~•<ž,™™<™ž^„†•†^f...<f†f^„™ž™£••^•†^~žž™†f^<^†††£††£££žž™'œ^†<f„f††.

€^,„••f'†^:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: for.py
```

```
for i in range(1, 5):
    print(i)
else:
    print('£ •f†¬•• loop <„f^<, ‡<ž™„')
```

ĭ ĭ™•™™:

```
$ python for.py
1
2
3
4
£ •f†¬•• loop <„f^<, ‡<ž™„
```


‘ ž™< Ž••†^:

```
$ python break.py
Enter something : Programming is fun
Length of the string is 18
Enter something : When the work is done
Length of the string is 21
Enter something : if you wanna make your work also fun:
Length of the string is 37
Enter something :         use Python!
Length of the string is 12
Enter something : quit
Done
```

€Š~ Ž•f<™E, '••:

Φ' ^E<... <™ Ž, ...', ^††^ Ž^•, †™E†• •Ž^†•fŽ(E†† †^ <^ •f•^„ †<^ ••™† †^ <™E „, œ•<E „^f •“<EŽŠ†™E†• <™ tœ“™~ “” †• •f•^' > 'œ~ (•EŽ. <™ •«†™Ž™ „ ^, ^“<œ, > †). ĳ „™E†•™, ••f †^† •f•f“... „,™ 'f^ <E† •f^“™Žœ <™E Ž,™', „††^<™~, •Ž ' „™†<^~ ^† <^ •f•^„ †<^ ••™† †^ <™E „, œ•<E •†^f 'quit'. Φ<^†^<“†• <™ Ž, ...', ^††^ •†%~–EŽ•–Ž%„ <™† Ÿ, ...™ “^f–†™†™E†• •<™ < Ž™~ <™E Ž,™', „††^<™~.

•™ †œ“™~ <E~ •f•^„ †•••^~ •E†Ÿ™Ž™••f, “~ †Ž™, ••†^ Ÿ, •†•„, E•f†™Ž™fŠ†<^~ <E† •†•> †^<> † †E •E†“, <E•E len .

¶E†E†••<• ...<f E •†<™Žœ break †Ž™, ••†^ „, E•f†™Ž™fE†•••Ž••E~ “^f†• <™ Ÿ, ...™ for.

Swaroop's Poetic Python

•^ •f•^„ †<^ ••™† †^ ž™E „, E•f†™Ž™•E•••Š •†^f †^ †f“, ... Ž™fœ†^ ž™E ' , ^3^ †• <•<Ž™ Swaroop's Poetic Python:

```
Programming is fun
When the work is done
if you wanna make your work also fun:
    use Python!
```

– •†Š•– continue

² •†<™Žœ continue „, E•f†™Ž™f••<^f 'f^ †^ EŽ™•••†™E†• •<E† Python †^ Ž^, ^Ž••³•f <f~ EŽ...Ž™fž•~ •†<™Ž~ •<E† <, „™E•^ žŽ™“” •^ Ÿ, ...™E “^f†^ ' > –†•~ ††• <E† •Ž...†•†E •Ž^†“ ŽE³E <™E Ÿ, ...™E.

€^, “••f'†^:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: continue.py

while True:
    s = input('©Ž†' –„<„ ~' <Ž : ')
    if s == 'quit':
        break
    if len(s) < 3:
        print('œ•' Ÿ ^Ž~f†')
        continue
```

```
print(' • ^E~•• <> • „Ž†•¬¤" •<> • „, ••Ž „™•f~" •' )
# > ‡™" ¢' "Š• ™Š„€Ž-™Š• •~™ •€<
```

```
j | ™•™~:
```

```
$ python test.py
©Ž†' -„<„ ~' <Ž : a
œ•' Ÿ ^Ž~f†
©Ž†' -„<„ ~' <Ž : 12
œ•' Ÿ ^Ž~f†
©Ž†' -„<„ ~' <Ž : abc
• ^E~•• <> • „Ž†•¬¤" •<> • „, ••Ž „™•f~" •
©Ž†' -„<„ ~' <Ž : qui t
```

€Š~ Ž•f<™E, '••:

¢' ^E<... <™ Ž, ...', ^††^, ^Ž™••„...†^•<• ••™† ‡^ •f•^> 'œ~ ^Ž... <™† „, œ•<E, ^ŽŽ" <^ •Ž•|•, ' ^-...†^•<• †...†™
•" ‡ „™E† <™EŽ" „f•<™† †œ"™~ 3 „^, ^" <œ, > ‡. j <f, „, E•f†™Ž™f™«†• <E† •†•> †^<> † ‡E •E†", <E•E | en 'f^
†^ Ÿ, ™«†• <™† †œ"™~ "f ^† ^E<... •†^f †f", ...<•, ™ ^Ž... 3, <...<• Ž^, ^Ž•Ž™E†• <f~ EŽ...Ž™fŽ~ •†<™Ž ~ •<E† ŽŽ™" " •^
„, E•f†™Ž™fŠ†<^~ <E† •†<™Žœ conti nue. ¥f^—™, •<f" ", ™f EŽ...Ž™fŽ~ •†<™Ž ~ •<E† ŽŽ™" " •^ •" <Ž™«†<^f " ^f
†Ž™, ™«†• ‡^ " " ‡™E†• ™Ž™f™•œŽ™<• ••™~ •Ž•|•, ' ^••^~ ¤ Ž™E†• •' ^E<... <™ •E†•™.

¢E†•fŠ•<• ...<f E •†<™Žœ conti nue •™EŽ•«•f•Ž••E~ " ^f †• <™ Ÿ, ...™ for.

' "†•E~

Š••^†• ŽŠ~ „, E•f†™Ž™f™«†• <f~ <, •f~ •†<™Ž ~ •Ž ' „™E ,™œ~ -<E† i f, <E† while " ^f <E† for †^-•†• <f~
•E„•<f-...†•†•~ •†<™Ž ~ break " ^f conti nue. ' E< ~ ^†œ"™E† •<^ Žf™ •E„†" „, E•f†™Ž™fE† ‡^ †, E <E~
Python " ^f'f' ^E<... •†^f™E•fŠ••†^ •|™f"•f> ¤•• " ^†••~ †' ^E<~.

¢<^ •Ž...†•†^ ¤^ •™«†• Ž> ~ ‡^ •E†f™E, 'œ•™E†• " ^f ‡^ „, E•f†™Ž™fœ•™E†• •E†^, <œ••f~.

-
- Ž, ™E' ™«†•†™ • •Ž...†•†™
 - €••> •<^ Ž•, f•„...†•†^
-

Python el: ' " † ^, Š ••fž

Šf•^žžž

±f•f†^, <œ••f~ •†^f•ž^†^„, (E•ft™ž™fœ•ft^†, (Ež,™', ^††" <> †. (E~•žf<, ž™f††^ •†•<• †^...†™†^ •• †^ •«†™ž™ •†<™žš† " ^f †^ <, „•<• •“•†™ <™ •«†™ž™ •†<™žš† „, (E•ft™fš†<^~ <™ ...†™†" <™f~,™ž™f•œž™<• •<™ ž,™', ^††" •~ " ^f ...•~ —™, ~ ž•<•, ' f<... •†^f'†> •<... •^† ^, "'• (calling) <E~ •f†", <E•E~. j „™f†•œ•E „, (E•ft™ž™fœ•fž™žž ~ •†>†^<>††••f†^, <œ••f~...ž>~ <E l en " ^f <E range.

² †™f^ <> † •f†^, <œ••> † •†^f žf^†...† Š• 'f• •'•"œ^•• •™†f" ... •<™f„•™™ž™f™f•œž™<•†E •<™f„•fš•™f~ ž,™', "††^<™~ (••...ž•~ <f~ 'žš•••~ ž,™', ^††^<f•†™«), 'f' ^f<... ž••f•, •f†œ•™f†• •f" —™, •~ ž<E„ ~ <>† •f†^, <œ••> † •• ^f<... <™ "•—"ž^™.

±f•f†^, <œ••f~™, •-™†<^f„, (E•ft™ž™fš†<^~ <Ež |E "ž•• def,†<" <E†™ž™•^ ^™ž™fœ•• †^...†™†^ž™f Š~"Š•'•f•• <E† "•"•<™<• •f†", <E•E " ^f " ^<...žf† ^™ž™fœ•• †^ -•f' ", fž^, •†ž••>†ž™f†ž™,™†††^ ž•, f"ž•™f††•, f"™†...†^<†<^žžE<š†, " ^fE', ^††œ <ž•fš†f†• •fžžœ <ž••^ (:). E^, ^" " <> ^™ž™fœ•• †^žž...ž~, "••f'†^†• †^ •«†™ž™ •†<™žš†ž™f ^ž™<ž™«††,™~ ^f<œ~ <E~ •f†", <E•E~. —• ^f<... <™ž^, "••f'†^ ž••<•...<f•<E†ž, ^††^<f" ...<E<^ •†^fž™ž« ^žž...:

E^, "••f'†^:

```
#!/usr/bin/python
```

```
# Filename: function1.py
```

```
def sayHello():
```

```
    print('Hello World!') # "—E™~™ •Eš™~<E —™ž fEž,™žE "šž "œE•†šž"ž
```

```
# ¥' ~™† šž† "œE•†šž"ž†
```

```
sayHello() # ,~ž"ž šž† "œE•†šž"ž†
```

```
sayHello() # ,~ž"ž šž† "œE•†šž"ž† œfE•
```

```
j |™•™~:
```

```
$ python function1.py
```

```
Hello World!
```

```
Hello World!
```

Eš~•™fž•«f:

O,•-™f†•†f^•f†", <E•E†•<™...†™†^ sayHello ^™ž™fœš†<^~ <E •«†^†E...ž>~•|E'œ•^†•ž^, ^ž"†>. ' f<œE •f†", <E•E •†„fž^, ^†<,™f~'f' ^f<... •• •Ežš††<^f " ^œ...ž™f†<^žžE<~ ^†"†•• •<f~ž^, •†ž••f~. ±fž^, "†<,™f •<f~ •f†^, <œ••f~ •†^f ^žž" E...™•™~ •<E •f†", <E•E Š•<•†^ž•,†††• •f^—™, •<f" ~ <f† ~ •<E •f†", <E•E " ^f†ž^, †™f†• ^†<•<™f„ ^ž™<ž•†^<^.

(E†•fš•<•...<f†ž™,™«†††^ ^ž™«†• <E†••f^ •f†", <E•E •«™ —™, ~, •Ež^œœ•„, •f" -<^f†^', " —™f†•<™†••f™ "Š•f" ^•«™ —™, ~.

$$\in^{\wedge}, \bullet \bullet f' \dagger^{\wedge}:$$
[illegible]

Ÿ•' f_i ¢Ž †•Šˆ—~Š¢Ž (Local variables)

[illegible]
$$\in \hat{\epsilon}, \bullet \bullet f' \dagger \hat{\epsilon}:$$

```
#!/usr/bin/python
```

```
# Filename: func_local.py
```

x = 50

```
def func(x):
```

```
print(' • x _ , • • Ž' , x)
```

$$x = 2$$

```
print(' - ' + ' • | • < • < • ™ Ž ~ † x ‡ _ ' , x)
```

func(x)

```
print(' • x „ , • • Ž • ~ † ^ • ' , x)
```

$$i \quad | \quad TM \bullet TM \sim :$$

```
$ python func_local.py
```

• x „ „ • • Ž 50

$$- \frac{1}{2} \left(\frac{\partial}{\partial t} + \frac{\partial}{\partial x} \right) \cdot \left(\frac{\partial}{\partial t} - \frac{\partial}{\partial x} \right) \cdot \text{TM} \tilde{Z}^+ \times \tilde{t}_n = 2$$

• x „ „ • • Ž • ~ † ^ • 50

$$\in \check{S} \sim \bullet^{\text{TM}} \pounds \check{Z} \bullet \ll \bullet f:$$

$\mathbb{C} \subset \mathbb{E} \cdot \mathbb{E} \dagger "$, $\langle \mathbb{E} \cdot \mathbb{E}, \langle \mathbb{E} \dagger \ddot{Z}, \check{S} \langle \mathbb{E} -^{\mathbb{M}}, " \ddot{Z}^{\mathbb{M}} \mathbb{E} "$, $\mathbb{E} \cdot f \dagger^{\mathbb{M}} \ddot{Z}^{\mathbb{M}} f^{\mathbb{M}} \ll \dagger \cdot \langle \mathbb{E} \dagger \check{Z} \dagger \cdot "$ $\dagger \cdot \langle^{\mathbb{M}} \dots \dagger^{\mathbb{M}} \dagger^{\wedge} x$, \mathbb{E} Python $"$, $\mathbb{E} \cdot f \dagger^{\mathbb{M}} \ddot{Z}^{\mathbb{M}} f \cdot \cdot \langle \mathbb{E} \dagger \langle f \dagger \mathbb{E}$
 $\langle \mathbb{E} \sim \check{Z}^{\wedge}, \wedge \dagger \langle, {}^{\mathbb{M}} \mathbb{E} \ddot{Z}^{\mathbb{M}} \mathbb{E} "$, $f \cdot \mathbb{E} \check{Z} \rangle \boxtimes \cdot \cdot \cdot \langle \mathbb{E} \cdot \mathbb{E} \dagger "$, $\langle \mathbb{E} \cdot \mathbb{E}$.

$$\begin{aligned} S^{\wedge} \dots \check{Z} f^{\dagger} \bullet \dots \rangle, {}^{\text{TM}} \ll \dagger \bullet \langle \mathbb{E} \ddagger \langle f t \mathfrak{e} \ 2 \bullet \check{\zeta}^{\text{TM}} \text{X} \cdot {}^2 \text{TM} \ddagger \text{TM} \dagger \wedge \bullet \bullet \wedge \text{X} \bullet \bullet \ddagger \wedge f \langle \text{TM} \check{Z} f'' \mathfrak{e} \bullet \langle \mathbb{E} \bullet \mathbb{E} \ddagger \rangle, \langle \mathbb{E} \bullet \mathfrak{e} \dagger \wedge \sim. \downarrow \langle \bullet f \dots \langle \wedge \ddagger \wedge \check{Z} \ddot{Z}'' - {}^{\text{TM}} \mathbb{E} \dagger \bullet \\ \langle \mathbb{E} \ddagger \langle f t \mathfrak{e} \langle \text{TM} \mathbb{E} \text{X} \bullet \langle \mathbb{E} \bullet \mathbb{E} \ddagger \rangle, \langle \mathbb{E} \bullet \mathbb{E}, \check{\zeta}^{\text{TM}} \text{X} \check{Z}^{\text{TM}} \mathbb{E}^{\text{TM}}, \bullet \bullet \langle \mathbb{E}'' \bullet \bullet \check{\zeta}^{\text{TM}} \rangle \ll, f^{\text{TM}} \langle \dagger \mathfrak{e} \dagger \wedge \bullet \bullet \ddagger \bullet \check{Z} \mathbb{E}, \bullet \bullet - \bullet \check{f}. \end{aligned}$$
[illegible]

¥, •~ Š~Ž •‡Š•– Ž global

[illegible]
$$\in \hat{\mathcal{C}}, \dots f' \vdash \hat{\mathcal{C}};$$


```
#!/usr/bin/python
# Filename: func_global.py

x = 50

def func():
    global x

    print(' • x „, ••Ž', x)
    x = 2
    print(' ~' • | • < • ~••• Ž~† x ‡„', x)

func()
print(' ~ <Ž^£ <•Š x „, ••Ž', x)

; |™•™~:
```

```
$ python func_global.py
• x „, ••Ž 50
~' • | • < • ~••• Ž~† x ‡„ 2
~ <Ž^£ <•Š x „, ••Ž 2
```

€Š~ •™£Ž••f:

² •†<™Žœ gl obal „, £•f†™Ž™f••<^f'f^†^ •£ŽŠ••f ...<f <™ x ••†^f†f^ „^•™Žf“œ†•<^ŸŽ£<œ, 'f'^£<... <™ Ž...™ ...<^†•“„>,™«†•†f^<†œ'f^<™ x†•^•<£•£†“, <£•£, ^£<œ£ ^ŽŽ^'œ ^Ž•f“™†•-•<^f...<^†„, £•f†™Ž™f™«†• <£†<†œ<™£x<™“£, >~<†œ†^.

–Ž™, ••<†^“^•™, •••<Ž•, f••...<•, ~^Ž...†•^“^•™Žf“~†•<^ŸŽ£<~„, £•f†™Ž™fŠ†<^~<£†••f^•†<™Žœ gl obal .“f^Ž^, “•f'†^ gl obal x, y, z.

¥, •~Š~Ž•†Š•– Ž nonlocal

;™£†••f†„, f<Š, ^ŽŠ~†^™£†•Ž, ...Ÿ^•£••†•<^ŸŽ£<~••<™Žf“œ“^f“^•™Žf“œ•†ŸŽ•f^.'ŽŽ"£Ž“, „•f“^f†“ŽŽ™...™~•†ŸŽ•f^~Ž™£™†™†“-•<^f†£<™Žf“œ•†ŸŽ•f^ (nonlocal scope) “^f••†^f†•<^|«<>†•£™^†><, >†<«Ž>†. ‡f†•<^ŸŽ£<~†£<™Žf“œ~•†ŸŽ•f^~Ž^, ^<£,™«†<^f...<^†™, •-•<••£†^, <œ••f~†•^•<f~•£†^, <œ••f~.

'–™«...Ž^•<£ Python ••†^f“•<•Ž•f†™~“Š•f“^~, ‡Ž™, ••<†^™, •••<•£†^, <œ••f~™Ž™£•œŽ™<•.

'~•™«†•†^Ž^, “•f'†^:

```
#!/usr/bin/python
# Filename: func_nonlocal.py

def func_outer():
    x = 2
    print(' • x „, ••Ž', x)

    def func_inner():
        nonlocal x
        x = 5
```

```
func_inner()
print(' • <™Ž~† x ' ' ' • | „ ‡ „ ' , x)
```

```
func_outer()
```

```
j |™•™~:
```

```
$ python func_nonlocal.py
• x „ , ••Ž 2
• <™Ž~† x ' ' ' • | „ ‡ „ 5
```

€Š~ •™£Ž•«f:

„ <^† •†^•<† •^ •<£† func_inner, <™'x' Ž™£™, •-<^f •<£† Ž, Š<£ ' , ^††œ <™£ func_outer, •„•<f™™ •† •†^f™«<• •• <™Žf™œ™«<• •• „^™Žf™œ•†Ÿ Ž•f^ . ¥£ŽŠ†™£†• ...<f „ , £•f†™Ž™f™«†• ^£<... <™ x †• <™ nonlocal x „^f <f ^Ž™™ <™«†• Ž, ...•Ÿ^£ •• ^£<œ <£†•<^ŸŽ£œ.

€,™•Ž^œœ•<• †^ ^ŽŽ™-™†<^~ <™ nonlocal x •• global x, „^f •Ž•£~ †^ †•<^f†Š†<^~ <£† ••f^ <£† †<™Žœ, †^ Ž^, ^<£, œ••<• <£ •f^—™, „ •<£† •£†Ž•, f—™, „ •• ^£<~ <f~ •«™ Ž•, fŽ<Š••f~.

€, ••' f-•Ž†£†•Ž Š†£Ž •, ••†^Š•Ž

£• „™Ž™f~•£†^, <œ••f~ ••>~ †^ ¢ Ž™£†• †^ „™†™£†• †•, f™~ Ž^, ^† <,™£~ <™£~ €...•%ŧ...†Ž†^f„ „^f †^ „, £•f†™Ž™fœ•™£†• Ž,™•ŽfŽ•'††• <††~ •™†™ „, œ•<£~ •• ¢ Žf†^ •Š••f <††~ •• <™f~ Ž^, ^† <,™£~. '£<...†Ž™, •• †^ •žf<£„œ•• †• <£ Ÿ™œœ•f^ <† Ž,™•ŽfŽ•'††• <†Š†™, ••†^<™~. —Ž™, ••<• †^ „^™, •••<• Ž,™•ŽfŽ•'††• <††~™, f•†™ <†'f^ Ž^, ^† <,™£~, <™Ž™œ•<Š†<^~†•<™™™†™^<£~ Ž^, ^† <,™£•<™†™, f•†™ <£~•£†™, <£•£~ <™† <•Ž••œœ•„Š, £•£~ (=) †^ ^™Ž™£œ••<^f ^Ž™ <£† Ž,™•ŽfŽ•'††• <†œ.

££†•fŠ•• <™f £ Ž,™•ŽfŽ•'††• †£ <†œ™, ••†^<™~ Ž, Ž•f †^ •†^f†f^ •<^œ•, „. „^f^ <£† ^„, •Ÿ•f^ £ Ž,™•ŽfŽ•'††• †£ <†œ™, ••†^<™~ Ž, Ž•f †^ •†^f^††•<™ŸŽ£œ -^£<... •|£'••<^f†• Ž•Ž<™†, •f~ •<^ •Ž...††^ „•—Ž^f^ . €,™~ <™ Ž^, ...†, •†^f^, „•<... †^ <™ œ£†™ •<•.

€^, „••f^†^:

```
#!/usr/bin/python
# Filename: func_default.py
```

```
def say(message, times = 1):
    print(message * times)
```

```
say('Hello')
say('World', 5)
```

```
j |™•™~:
```

```
$ python func_default.py
Hello
WorldWorldWorldWorldWorld
```

€Š~ •™£Ž•«f:

² •£†™, <£•£†• <™™™†^ say „, £•f†™Ž™f••<^f'f^†^ <£ŽŠ••f†f^ •£†Ÿ™Ž™••f„, <...••~ —™, ~...••~ „f „^™, f•<... Š††•†™f •™œœ <†œ, <...<• ^Ž... Ž,™•ŽfŽ™œ£££†Ÿ™Ž™••f„ <£ŽŠ†•<^f†f^—™, „. '£<... <™ Ž•<£„^†™£†• „^™, •-™†<^~†f^ Ž,™•ŽfŽ•'††• <†œ••£†•1 'f^ <£Ž^, „†•<,™ times.

[illegible] $\sim \hat{t} \pm \check{S}f_i \dots$ [illegible]
$$\begin{aligned} & \cdot \mathbb{E} \ll \dots \cdot \mathbb{E} \uparrow \tilde{Y}^{\wedge} \cdot \ddagger \cdot f \cdot f_{\dots} \langle f \uparrow \mathbb{M} f \langle f \uparrow \sim \cdot \mathbb{M} \gg, \mathbb{M} \ll \ddagger \cdot \langle f \cdot \langle f \sim \tilde{Z}^{\wedge}, \hat{\wedge} \uparrow \langle, \mathbb{M} \mathbb{E}^{-} \uparrow \cdot \langle \mathbb{E} \boxtimes \cdot \mathbb{E} \langle \mathbb{M} \mathbb{E}^{-}. \cdot \cdot f^{\wedge} \tilde{Z}^{\wedge}, \mathbb{M} \cdot \cdot f \uparrow \hat{\wedge} \mathbb{E} \text{ def} \\ & \text{func(a, b=5)} f \cdot_{\mathbb{M}} \ll \cdot f \sim \tilde{Z} \tilde{Z} \mathbb{M} \mathbb{E} \text{ def func(a=5, b)} \cdot \cdot \ddagger f \cdot_{\mathbb{M}} \ll \cdot f. \end{aligned}$$

¬, •, †, ^, \$, ^, †, •, -¢, «, •, f, Z, -j, -•, fœf, £ (Keyword Arguments)

[illegible][illegible]
$$\in \hat{\cdot}, \cdot \cdot f' \dagger \hat{\cdot}:$$

```
#!/usr/bin/python
# Filename: func_key.py
```

```
def func(a, b=5, c=10):  
    print('a is', a, 'and b is', b, 'and c is', c)
```

```
func(3, 7)
func(25, c=24)
func(c=50, a=100)
```

$$i \quad | \quad \text{TM} \bullet \text{TM}^{\sim} :$$

```
$ python func_key.py
a is 3 and b is 7 and c is 10
a is 25 and b is 5 and c is 24
a is 100 and b is 5 and c is 50
```

$$\in \check{S} \sim \bullet^{\text{TM}} \pounds \check{Z} \bullet \ll \bullet f:$$
$$\begin{aligned} & \text{func } f: \mathbb{Z} \rightarrow \mathbb{Z}, f(x) = 3x + 7 \\ & \text{func } g: \mathbb{Z} \rightarrow \mathbb{Z}, g(x) = x^2 + 1 \\ & \text{func } h: \mathbb{Z} \rightarrow \mathbb{Z}, h(x) = x^2 - 1 \end{aligned}$$
[illegible]

$$\begin{aligned} & \mathbb{C} \langle \mathbb{E} \dagger \langle, \cdot, \cdot \mathbb{E} _, \mathbb{E} \cdot \mathbb{E} \text{ func}(c=50, \ a=100) _, _, \mathbb{E} \cdot f \dagger \mathbb{M} \tilde{\mathbb{Z}} \mathbb{M} f \mathbb{M} \mathbb{E} \dagger \cdot \dagger \dots \dagger \mathbb{M} \mathbb{M}, \cdot \dagger \wedge \langle \wedge \dagger \cdot \tilde{\mathbb{Z}} \mid \cdot f \sim \tilde{\mathbb{Z}} \cdot f \cdot f \rangle ' f \wedge \dagger \wedge \\ & \text{"} \wedge \mathbb{M} \mathbb{M}, \cdot \mathbb{M} \mathbb{E} \dagger \cdot \langle f \dagger \sim \langle f \dagger \sim. \mathbb{C} \langle \mathbb{E} \dagger \cdot f \tilde{\mathbb{S}} \cdot \langle \cdot \dots \langle f \text{"} \wedge \mathbb{M} \mathbb{M}, \cdot \mathbb{M} \mathbb{E} \dagger \cdot \langle f \dagger \mathbb{E} ' f \wedge \langle \mathbb{E} \dagger \tilde{\mathbb{Z}} \wedge, \text{"} \dagger \cdot \langle, \mathbb{M} \mathbb{C} \tilde{\mathbb{Z}}, f \dagger \text{"} \wedge \mathbb{M} \mathbb{M}, \cdot \mathbb{M} \mathbb{E} \dagger \cdot ' f \wedge \langle \mathbb{E} \dagger a \\ & \wedge \text{"} \dots \dagger \wedge \text{"} f \wedge \dagger \mathbb{E} a \cdot \dagger \dagger f \mathbb{M}, f \dagger \dagger \dagger \mathbb{E} \tilde{\mathbb{Z}}, f \dagger \wedge \tilde{\mathbb{Z}} \dots \langle \mathbb{E} \mathbb{C} \cdot \langle \mathbb{M} \dagger \mathbb{M}, f \dagger \dots \langle \mathbb{E} \sim \cdot \mathbb{E} \dagger \dagger, \langle \mathbb{E} \cdot \mathbb{E} \sim. \end{aligned}$$

€^, £†•Š, •f VarArgs

$$^{\sim} \dagger \bullet \bullet \ddot{x} \bullet ^{\sim}$$
$$1 \cdot > \sim \alpha^{\wedge} \check{Z}, \bullet \check{Z} \cdot \dagger^{\wedge} ', " {}^3 \text{ME} \dagger \cdot ' f^{\wedge} \wedge E_{\dots} \bullet \bullet \cdot \check{Z}_{\dots} \dagger \cdot \dagger^{\wedge} " - \check{Z}^{\wedge} f^{\wedge} \cdot \check{Z} \cdot f \cdot \alpha e \bullet \bullet \dagger , {}^m \text{E} \dagger \cdot \dagger f \check{Z} \alpha e \bullet \bullet f^{\wedge} \dots \dagger^{\wedge} ' f^{\wedge} \langle f^{\wedge}$$
$$- \bullet, f'' \sim -^{\text{TM}}, \sim \bullet \bullet \sim \bowtie \check{Z}^{\text{TM}} \dot{\mathbb{E}} \dot{\mathbb{f}} \bullet \dot{\mathbb{f}}^{\wedge \text{TM}}, \bullet \bullet \text{TM} \dot{\mathbb{E}} \dot{\mathbb{f}} \bullet \dot{\mathbb{f}}^{\wedge} \bullet \mathbb{E} \dot{\mathbb{f}}'', \langle \mathbb{E} \bullet \mathbb{E} \mathbb{E}^{\text{TM}} \check{Z}^{\text{TM}}, \dot{\mathbb{f}} \dot{\mathbb{f}}^{\wedge} \check{Z}^{\text{TM}}, \bullet \bullet \dot{\mathbb{f}}^{\wedge} \check{Z}^{\text{TM}} \dot{\mathbb{Y}} \bullet \text{TM} \text{TM} \dot{\mathbb{f}}^{\text{TM}} \bullet \mathbb{O} \mathbb{E} \check{Z}^{\text{TM}} \langle \bullet^{\wedge}, \mathbb{f} \bowtie \dot{\mathbb{f}} \dots$$
$$\in^{\wedge}, \bullet \bullet f' \dagger^{\wedge}:$$

```
#!/usr/bin/python
```

```
# Filename: total.py
```

```
def total (i n i t i a l =5, *numbers, **keywords):
```

```
count = initial
```

```
for number in numbers:
```

```
count += number
```

```
for key in keywords:
```

```
count += keywords[key]
```

```
return count
```

```
print(total(10, 1, 2, 3, vegetables=50, fruits=100))
```

$$i \quad | \quad TM \bullet TM^{\sim} :$$

```
$ python total.py
```

166

$$\in \check{S} \sim \bullet^{\text{TM}} \check{Z} \bullet \ll \bullet f:$$
[illegible]
$$\hat{\eta} \cdot | \cdot , \cdot \rangle_{\text{Fock}}^{\text{TM}} \in \mathcal{T} \langle f \tilde{Z} \cdot \cdot \cdot \sim " \wedge f \langle \tilde{Z} \cdot | f " \cdot \cdot \quad \hat{\eta} \cdot \cdot \check{Z}_{\dots} \cdot \cdot \dagger^{\text{TM}} " \cdot - " \tilde{Z}^{\text{TM}}.$$

€^, £†•š, •f †...‡• †• -¢«•fž-; -•fæf£

[illegible]
$$\in \hat{\mathcal{C}}, \dots f' \vdash \hat{\mathcal{C}}:$$

```
#!/usr/bin/python
```

```
# Filename: keyword_only.py
```

```
def total (i n i t i a l =5, *n u m b e r s, v e g e t a b l e s):
```

```
count = initial
```

```

for number in numbers:
    count += number
count += vegetables
return count

print(total(10, 1, 2, 3, vegetables=50))
print(total(10, 1, 2, 3))
# Raises error because we have not supplied a default argument value
for 'vegetables'

```

```
i |™•™~:
```

```

$ python keyword_only.py
66
Traceback (most recent call last):
  File "keyword_only.py", line 12, in <module>
    total(10, 1, 2, 3)
TypeError: total() needs keyword-only argument vegetables

```

€Š~ •™ŁŽ•«•f:

² •œŽ> •ŁŽˆ, ˆ† <, > ††•<" ˆŽ... †fˆ Žˆ, "†•<,™†• ˆ•<•,••"™, „•f> ~ ˆŽ™< Ž•†ˆ™,••†ˆˆ†• Ž |•f~ "Ž•f•f" †...†™. Š"† •• ˆŁ<" <ˆ™,••†ˆˆˆ •••†•<ˆ†fˆ Ž,™•ŽfŽ•'† †Ł <†œ, <...<•™f "Žœ••f~ <Ł•Ł†", <Ł•Ł ˆˆ •Š•™Ł† •—"Ž†ˆ •"† <™ ...,f•†ˆ†• Ž |Ł-"Ž•f•f ••† ••†•<†f, ...Ž> ~ ˆˆ•†•<†f "ˆ†f Žˆ, ˆŽ"†> .

Š"† ˆ Ž•<•†ˆ „•<•™,••†ˆˆ†• Ž |•f~-"Ž•f•f" †...†™† ˆŽŽ" ••† „,•f"-••<•†fˆ Žˆ, "†•<,™†• ˆ•<•,••"™, <...<• „,Ł•†™Ž™f••<•†...†™ <™Ł ˆˆ•<•,••"™ „>,f~ "ˆ†•ˆ™††ˆˆ•, ...Ž> ~ <™ def total(initial=5, *, vegetables).

- •†Š•- return

² •†ŽŽœ return „,Ł•†™Ž™f••<ˆ†'fˆ†ˆ „™Ł†•†ŁŽ...•' " ˆŽ... †fˆ •Ł†", <Ł•Ł, •ŁŽˆ•œ†ˆ Ÿ'™«†• ˆŽ... <Ł•Ł†", <Ł•Ł-Ž™,™«†••Ž••Ł~ ,Ž,™ˆf,•<f"" ,††ŁŁŽ...fŁ•>•†•†%Ž†•" ˆŽ... <Ł†•Ł†", <Ł•Ł.

€ˆ, "••f'†ˆ:

```

#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: func_return.py

```

```

def maximum(x, y):
    if x > y:
        return x
    elif x == y:
        return 'ŁŽ •fŽˆˆ•, „,••Ž ,†•Ž'
    else:
        return y

print(maximum(2, 3))

```

```
i |™•™~:
```


' "†•£~

Python.

- $\in, {}^{\text{TM}}\mathbb{E}'{}^{\text{TM}} \ll \dagger \cdot \ddagger^{\text{TM}}$ • ŠŽ... $\dagger \cdot \ddagger^{\text{TM}}$
- $\in \bullet \bullet \rangle$ • $\langle ^{\wedge} \check{z} \bullet$, $f_{\bullet, \dots} \dagger \cdot \ddagger^{\wedge}$

References

[1] <http://www.python.org/dev/peps/pep-3107/>

Python el: • , • , | † ^ Š ^

Šf• ^ žǻž

i „•• •f žš~ †ž™,••† •ž†^„,€•ft™ž™fœ••• „Š•f“^ •™ ž,...!,^††” •~™,•-™†<~†f^ -™,”
•£†^,<œ••f~ •f “”†<• ...†> ~†ž •ž<•†^ •ž†^„,€•ft™ž™fœ••• ††† ,f††...•£†^,<œ••† •• „žž~
ž,™’, ”†††<^ž™£’ ,”—<•ž> ž>••>~ „••†††<³•f£^ž”†<£•£•††f<^„,¤,š††<^.

[illegible]

i ‡~ "Žž™~ <, ...ž™~ •‡f ‡^ ', "—•< ^ ^, α, Š†^<^ •<£† ^, „f“œ ' ŽŠ••^ •<£† ™ž™~^ ', "—<£" • o
•f•, †£†•£œ~ <£ Python. „f^ ž^ ", "•f†† ‡ž™, ••< ‡^ ', "³•< ^, α, Š†^<^ •<£ ' ŽŠ••^ ž, ™', ^††^f•†™« C
[1] „f ‡...žf~ ‡•<^'ž> <f•<™«£†, ‡^ „, (£f†™ž™f(£™«£† ^ž... <™† „ Ššf•^ ž™£ ', "—•< •• Python ...<†
„, (£f†™ž™f••< <™† ž, ...£ž™ •f•, †£†•£œ <£ Python.

[illegible]
$$j \cdot \langle f \mid \dagger \tilde{Z}^M, \dots \langle \cdot \mid \dagger \hat{\cdot} \rangle_{\mu}, \langle f \mid \dagger \tilde{Z}^M f \rangle_{\mu} \dots \langle \cdot \mid \cdot \rangle \cdot \tilde{Z} \cdot \langle \cdot \mid \cdot \rangle \langle \dagger \tilde{Z}, \dots \langle \dagger \tilde{Z} \langle \dagger \tilde{Y} \tilde{Z} f^M \rangle_{\mu} \rangle \langle \cdot \mid \cdot \rangle \text{Python. } A, \mu f^M \rangle \cdot \langle \cdot \mid \cdot \rangle \cdot \tilde{Z} \cdot \langle \cdot \mid \cdot \rangle \langle \cdot \mid \cdot \rangle \langle f \mid \dagger \tilde{Z}^M f \rangle_{\mu} \dots \langle \cdot \mid \cdot \rangle \langle \cdot \mid \cdot \rangle \langle \cdot \mid \cdot \rangle \langle \dagger \tilde{Z}, \dots \langle \dagger \tilde{Z} \langle \dagger \tilde{Y} \tilde{Z} f^M \rangle_{\mu} \rangle \langle \cdot \mid \cdot \rangle.$$
$$\in \hat{\mathcal{C}}, \bullet \bullet f' \dagger \hat{\mathcal{C}}:$$

```
#!/usr/bin/python
# Filename: using_sys.py

import sys

print('The command line arguments are:')
for i in sys.argv:
    print(i)

print('\n\nThe PYTHONPATH is', sys.path, '\n')
```

$$i \quad | \quad \text{TM} \bullet \text{TM}^{\sim} :$$

```
$ python using_sys.py we are arguments
The command line arguments are:
using_sys.py
we
```


are
arguments

The PYTHONPATH is [' ', 'C:\\Windows\\system32\\python30.zi p',
'C:\\Python30\\DLLs', 'C:\\Python30\\lib',
'C:\\Python30\\lib\\plat-win', 'C:\\Python30',
'C:\\Python30\\lib\\site-packages']

€Š~Ž•f<™E, '••:

A, „f““ f#’æ”fŽt <™ “, , , > t^ sys „, E•ft™Ž™fŠt<^~ <E† •t<™Žæ import. Š^<“ “«„f™ Ž...’™ ^E<... ’f^ <E†
Python •E†^•t•f ...<f „ Ž™E†• t^ „, E•ft™Ž™fœ•™E†• ^E<... <™ “, , , > t^ . •™ “, , , > t^ sys Ž•, f „f
Ž•f<™E, ’f“...<E<^ Ž™E „f•• •E†• <™†•f•, tE†•E<œ <E~ Python “f <™ Ž•, fŸ“ŽŽ™† <™E •EŽ. <™ system.

„<^†E Python •“<Ž• <E† •t<™Žæ import sys, ³„†•f’f^ <™ “, , , > t^ sys. €• ^E<œ <E† Ž•, •Ž<• •E, •†^f
†^Ž...<^ •t•> t^<• t†^ , , , Št^<^, “f’f^E<... E Python | , •f Ž™E „^ <™ Ÿ, •f.

Š”† •†æ<† t^ •t•> t^<• t†^ “, , , > t^ •EŽ. t^ “, , , > t^ , ^†††™ •• Python, <...<™ •f•, tE†•E<œ~ <E~
Python „^ <™ ³„†• •<™E~ “^<^Ž...’™E~ Ž™E Ÿ, ••™†<f •<E†•<^ŽŽE<œ sys. path. Š”† <™ “, , , > t^ Ÿ, •••
<...<™f •t<™Ž~ •<™ “E, >~ <†æ†^ <™E ^, , , Št^<™~ <„™E† “f <...<™ “, , , > t^ •~’•t<^f •f%Ÿf’†••’f^ t^
<™ „, E•ft™Ž™fœ•••. €E†•fŠ•<• ...<f E^, „f™Ž™•E•E’•t<^f†...†™ <E† €...™Ž•—™, “ Ž™E •f••’™E†• t^ “, , , > t^.
² t<^ŽŽE<œ argv •<™ “, , , > t^ sys •f••’•<f „, E•ft™Ž™fŠt<^~ •E†Ÿ™Žf•t... t• <Ž•••• •EŽ. sys. argv.
'E<... •••†•f | •“”„^, ^...<f ^E<œ E™†™†^••^ •†^† ,™~ <™E ^, , , Št^<™~ sys. | t^ ^ “...†^ ŽŽ•™† “<E†^E<œ~
<E~ Ž,™• ’f•E~ •†^f ...<f ^E<œ E™†™†^••^ •† •E’ “,™«<f t• “^††^ “ŽŽE†•<^ŽŽE<œ argv Ž™E
„, E•ft™Ž™fœ••<f •<™ Ž, ...’ , ^††” •^~.

“^<••’ Ž<E sys. argv „, ••Ž ^Ž• ~^”Šf †Š^••’ •t„Žf—• (•Ž ‘, †<„•
„|Ž—Ÿ•<Ž †„™†^„•• ~„«’ •Ž•. EŽŠŽ~’ Ž sys. argv™„fŽ”¬„Ž <•• ~<’ •—•
<•>™†„””•Š•E ŠŽt’†f””Žt •EŠ™~<E (command line arguments) ŠŽ’. <•
•f, †<•<™•Š “¬Š•™„f’†„Ž †<•™f†—f•^~’†••¬fŽŽŽ^•™•Ž—<••<Ž•—f•^~E
„•<•’—•.

Š”† „, E•ft™Ž™fœ••• “Ž™™ IDE (Integrated Development Enviroment •EŽ.™Ž™”ŽE, >††™ Ž•, fŸ“ŽŽ™†
††”Ž<E|E~) ’f^ t^ ‘, “³•• “f t^ <, |•• ^E<^ <^ Ž,™, “††^<^, ³|• •<^††™ “f^ t†^ <, ...Ž™ t^
“^™, •••<™, •†^<^ , ^††æ~ •t<™ŽŠ† •<™ Ž, ...’ , ^††^.

Š•Š ...<† •“<Ž™«† python using_sys.py we are arguments, <„™E†• <™ “, , , > t^
using_sys.py t• <E† •t<™Žæ python “f <^ “ŽŽ• •<™f„•• Ž™E ^“™Ž™E„™«† •†^f™, •†^<^ Ž™E Ž•, †™«†
•<™ Ž, ...’ , ^††^ . ² Python ^Ž™™E“•«f <^™, •†^<^ <E~’ , ^††æ~ •t<™ŽŠ† •<E†•<^ŽŽE<œ sys. argv ’f^ t^ <^
„, E•ft™Ž™fœ•••.

¶E†E„••• ...<f E™†™†^••^ <™E ••†^,™E •t<™ŽŠ† Ž™E <„f •†^f Ž”†<^ <™ Ž, Š<™ ...,f•†^ •<E Ž••<^
sys. argv. | <f •• ^E<œ <E† Ž•, •Ž<• •E „™E†• <™ 'using_sys.py' •^† sys. argv[0], <™ 'we'
•^† sys. argv[1], <™ 'are' •^† sys. argv[2] “f <™ 'arguments' •^† sys. argv[3]. €E†•fŠ•<•
...<f E Python ^, „••f††•<, “f^Ž... <™ 0 “f...f^Ž... <™ 1.

•™ sys. path Ž•, f „f <E Ž••<^ t• <^™†.†^<^ “^<^Ž...’† ^Ž...™™E •f••’™†<f <^ , , , Št^<^.
€^, ^<E, œ•••...<f E Ž, Š<E •E†Ÿ™Ž™•f, “•<™ sys. path •†^f “•f^ . ’E<œ E “•f^ •E†Ÿ™Ž™•f, “••„†f...<f
™ <„>† “^<^Ž™™~ •†^f •Ž•E~† ,™~ <™E sys. path, o™Ž™™~ •†^f <™ •f™†• <E†•<^ŽŽE<œ Ž•, fŸ“ŽŽ™†<™~
PYTHONPATH. ’E<... •E†•†f...<f†Ž™, ••••Ž•E„••^†^ •f••’•<^ , , , Št^<^ Ž™E Ÿ, ••™†<f •<™† <„™†<^
“^<^Ž™™. ¥f^—™, <f“” Ž, Ž•f†^ <™Ž™œ•œ••• <™ “, , , > t^ •^••††^Ž... <™E~ “^<^Ž...™™E~ Ž™E
Ÿ, ••™†<f •<™ sys. path.

```

os; print(os.getcwd()) 'f^†^Ÿ, ••• <™† <, „™†<^ „^<„Ž™'™ <™f Ž,™', „††^<™~ •^~.

```

%•Š^Ž–•ŠŠf•††^ ±yte ^, „••^ †••' †i Š^•~ .pyc

² •f•^'>'œ •†~^ , , Št^<™~ •†^f †f^ fŽ...••f Ž™f „™•<••f, <•f f Python „™†f †•, f„ „ ...ŽŽ^ 'f^ †^ <™
 „™†•<•', f™, ...<•, ^, †~^ <, ...Ž™~ •†^f f^ •f™f, '•^ •fŽ%„, j ŽŽ†' •f–j – byte %••†j – (byte-compiled files) †•
 <f† •Ž „<^f . pyc f™Ž™•^ •†^f †f^ •†f™†•f†™, –œ •<f†™Ž™•^ f Python †•<^<, Ž•f <™ Ž, ...', ^††^
 (†f†f™••• <™ • •f•^'>'f„ ... <††^ <™f ŸfŸŽ™f 'f^ <™ ŽŠ~ Ž•f™f, '•• f Python). ' f<... <™ ^, „••™ †• •Ž „<^f
 .pyc •†^f „, œ•f†™ <f† •Ž...†f†™ –™, „ Ž™f †• •f„'•< <™ „, >†^ ^Ž... †^ •f–™, <f„ ... Ž, ...', ^††^. ' f<... †^
 •†^f Ž™Ž <^ „«<„™ 'f^< †^ <††^ <f™ •f, '••^~ 'f^ <f† •f•^'>'œ •†~^ , , Št^<™~ „fœ•f •†f. ŠŽ•f^
 <^ byte-compiled ^, „••^ •†^f ^†•!„, <f<^ ŽŽ<–..., †~^ (platform-independent).

'~†••••~

•^ ^, „••^ . pyc •f†œ>~ •f™f, '™«†<f <™† •f™ „^<„Ž™'™ †• <^ ^†•<™f„^ ^, „••^ . py. Š™† f
 Python •† „f „•f^ 'f^ †^ ', „³f •• ^, „••^ •• f<...† <™† „^<„Ž™'™, <...< <^ ^, „••^ . pyc •• †
 •f™f, 'f™«†.

– •†Š•– from ... import ...

E™† † Ž•< †^ •f„'•< ^Ž•f™~^ <f†•<ŸŽfœ argv †•^ •<™ Ž, ...', ^††^ •~^ ('f^ †^ ^Ž™–«'•< <f†
 ŽŽf„<,™Ž™'fœ•f™f sys. „™• –™, „), <...† Ž™, ••< †^ „, f•f™Ž™fœ••< <f† •†™Žœ from sys import
 argv. Š™† † Ž•< †^ •f„'•< ...Ž•~ <f™†™†^••~ Ž™f „, f•f™Ž™fœ«†<f <™ „, >†^ sys, <...† Ž™, ••< †^
 „, f•f™Ž™fœ••< <f† •†™Žœ from sys import *. ' f<... Ž•f™f, '•• „™• „, >†^ .

„•†f„ Ž, Ž•f †^ %œ'††Ž††^ „, f•f™Ž™fœ••^ fœ <f† •†™Žœ „^f^†^ fœ~†^ „, f•f™Ž™fœ••< <f† •†™Žœ
 import •Ž•fœ <f <™ Ž, ...', ^††^ •~^ †^ ^Ž™–«'•f <f† •«'„™fœ <††™†^•fŠ† „^f †•^ •†f Ž™
 •f^†™† >•<™.

–††^••^ ^, •, †^Š•Ž (module's__name__)

Š™• „, >†^ „f †f™†™†^••^ „f™f •†™Ž™~ •• †^ „, >†^ †Ž™,™«††^†^ ^Ž«Ž™f† <™ ...†™†^ <™f
 ^, >Št^<™~ <™f. ' f<... •†^f •«„ fœ•<™ •<f† •f•f„œ „^<„•<^f <™f fŽ™Ž™'f•†™«'f^ <™ •† <™ „, >†^ <, „f
 †...†™ <™f œ •f„'•<f. Ž~^†^–, †f™• Ž,™f™f††^, ...<††^ „, >†^ •f„'•<f 'f^ Ž, Šf™ –™, „™
 „Š•f„^••^ f<... <™ „, >†^ „<Ž•<f. –Ž™,™«††^ „, f•f™Ž™fœ•™f†^ fœ <f† ††™f^ 'f^ †^ ^ŽŽ™†™f†
 <f•f†Ž•, f–™, „ <™f ^, >Št^<™~ „† <™ Ž, ...', ^††^ „, f•f™Ž™fœ•<f^ Ž...†™ <™f „^f ...f„^<† •f„'•<f^ Ž...
 †^ „ŽŽ™ „, >†^. ' f<... †Ž™, •• †^ •Žfœ„•• „, f•f™Ž™fŠ†<~ <™ f•f™„^, ^„ <f, f•<f„... __name__ <™f
 ^, >Št^<™~.

œ^, „••f†^:

```

#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: using_name.py
if __name__ == '__main__':
    print('AŠ†† <•™f†–f•^^• <f™–„Ž •™† ^†•• <•Š')
else:
    print('°→ „Ž†–†„, •™† „••'••'•'fœf>^•')

i™•™~:

```

```
$ python using_name.py
%Š<† <• ™f†-f•^^• <f"¬„Ž •™† ^†•• <•Š
```

```
$ python
>>> import using_name
°¬> „Ž†•¬„„ , •™† "•• ' ' ' • ' f‡f> ^•
>>>
```

€Š~ Ž•f<™£, '••:

⊕• " " „ , , > †^ •<£† Python „•f™, f•„•• £™†™†^••^ <™£ __name__, " ^f•" † ^£<••†^f' __mai n__' , <...<•
•£†•Ž" ' •<^f...<f<, „•f†...†™ <™£ ^Ž... <™ „, ••<£ " ^f†Ž™, ™«†• †^ " " †™£†• " ^†™†f" ~ •† , ' •f•~.

Šf^ †^ <Šf£„†•Š• Š^ œfj £ •^Ž ^, •, | †^Š^

² •£†™£, '•• <† •f" Š† •^^ ^, „ , > †" <† ••†^f•«"™Ž£, <™ „•<• " " †•fœ•£, "f ^£<... •f...<f " " „• Ž, ...' , ^††^ •<£
Python •†^f•Ž••£~ "f †^ " , „ , > †^ . 'f^ <™ †...†™ Ž™£ Ž, Ž•f †^ •••<• •'™£, ™f •†^f†^ „•f†f^ •Ž " <^•£ . py.
•™ ^" ...Ž™£™ Ž^, " ••f'†^ „^ <™ " " †•f Žf™ | •" " „^ , ™.

€^, " ••f'†^:

```
#!/usr/bin/python
# Filename: mymodule.py
```

```
def sayhi():
    print('Hi, this is mymodule speaking.')
```

```
__version__ = '0.1'
```

```
# End of mymodule.py
```

•™ ^†> < , > •†^f †^ ••'†^ %„...Ÿ...™•%Ž•„. „ Ž> ~ †Ž™, ••<• †^ •••<• ••† £Ž", „•f " ^††•^ f•f^f<•, ...<£<^
•£' " , f†...†•†™ †• †^ •£†£œf•††™ Ž, ...' , ^††^ •• Python. K^<...žf† „^ •™«†• ŽŠ~ †^ „, £•f†™Ž™f™«†• ^£<... <™
" , „ , > †^ •<^ •f" " †^^ Ž, ™' , "††^<^ •• Python.

¶£†£œ„••• ...<f <™ " , „ , > †^ Ž, Ž•f †^ <™Ž™„•••<^f •<™† ••f™ " ^<" Ž™'™ †• <™ Ž, ...' , ^††^ Ž™£ <™ •f•" '™£†•, œ <™
" , „ , > †^ Ž, Ž•f †^ Ÿ, ••" <^f •• †^† ^Ž... <™£~ " ^<^Ž...™£~ Ž™£ ••†^f •<£ Ž•<^ <™£ sys. path.

€^, " ••f'†^:

```
#!/usr/bin/python
# Filename: mymodule_demo.py
```

```
import mymodule
```

```
mymodule.sayhi()
print('Version', mymodule.__version__)
```

j | ™•™~:

```
$ python mymodule_demo.py
Hi, this is mymodule speaking.
Version 0.1
```

€^, ^<€ , œ•<• ...<f „, €•f†™ž™f™«†• <™† ••f™ •€†Ÿ™žf•†... †• <•ž...~ 'f^ †^ •f•"™€†• † ž€ •<™ " , , , > †^ . 2
 Python " " †•f •> •<œ •ž^†^„, €•f†™ž™•€•€ <™€ ••f™€ •€†Ÿ™žf•†™« 'f^ †^ <™€ •š••f <€† „^, ^" <€ , f•<f"œ
 Pyth...†f^ ^••œ€•€, <f š•<• †^ †€† „, •f" -•<^f†† †^œ^†•<• " ^f†™« , 'f™€~ < , ...ž™€~ 'f^ †^ " " †•<• ž , " " †^<^ .
 ®^ †f^ •"•™,œ ...ž™€ '•†•<^f „, œ•€ <€~ •«†<^†€~ from. . import:

```
#!/usr/bin/python
# Filename: mymodule_demo2.py
```

```
from mymodule import sayhi , __version__
```

```
sayhi ()
print('Version' , __version__)
```

™™ ^ž™< ž••†^ <™€ mymodul e_demo2. py •†^f <™••f™†• <™™ ^ž™< ž••†^ <™€ mymodul e_demo. py.

€^, ^<€ , œ•<• ...<f „, •† œ^†† œ•€ •€ž> ††™™ ...†™†^ <€~ "•™•€~ __version__ •<™ " , , , > †^ <™™ž™™
 •f•"™•f <™™ mymodule, œ^ 'f†...<^† •«' " ,™€•€. ' €<... •†^f •ž••€~ žfœ^†...† •f...<f •†^f "™†œ ž , ^" <f"œ 'f^ " " œ
 " , , , > †^ †^ •€žš†•f <™™†™«†• ,™™ "•™•œ~ <™€ „, €•f†™ž™fš†<^~ ^€<... <™™ ...†™†^ . 'f^ ^€<... <™™ ž...™™ •€†f•<^ <^f†
 ž ,™™<f†" <• <€†††™žœ import ^" ...†^ "f^† <•f'†•<^f <™™ ž , ... , ^††" •~†•' ^ž«< ,™™ .

šž••€~ œ^ †ž™ ,™«œ^<• †^ „, €•f†™ž™fœ••<•:

```
from mymodule import *
```

' €<... œ^ •f•œ' ^'• ...ž^ <^ •€†...f^™†...†^<^ ...ž> ~ <™™ sayhi ^žž" •• œ^ •f•œ' ^'• •<™™ __version__ •ž•f•œ
 ^ , „••f†• •fžž ~ " " <> ž^«ž•.

Ÿ• Zen š~ž Python

-f^ ^ž... <f~ ^ , „ ~ " ^™™œ' €•€~ <€~ Python •†^f ...<f š ±f , €< ~ •†<™ž ~ •†^f " ^ž«<• , •~ ^ž... ^€< ~ ž™€
 •†€ž^"™™†<^f< (Explicit is better than Implicit). • , †<• import this 'f^ †^ †"œ•<• ž , f••...<• , ^" ^f
 •••<• ^€<œ <€ •€-œ<€•€ [2] ž™€ ž , ^œ <f ž , ^••' †^<^ 'f^ " " œ• †f^ ^ž... <f~ ^ , „ ~ <€~ Python.

- •"†€, š~•~ dir

-ž™™ ,œ•<• †^ „, €•f†™ž™fœ••<• <€† •†>†^<^††€ •€†" , <€•€ dir 'f^ †^ •••<• †f^ ž••<^†• <^
 ^†^†† , f•<f"™™ ž™€™™ ,••f †^ ^†<f"•††™™ . 'f^ ž , "••f†^ , •• †^ " , , , > †^ , <^ ^†^†† , f•<f"™™
 ž , fž^†Ÿ™†™€† <f~ •€†^ , <œ••f~ , <f~ "ž"••f~ " ^f <f~†•<^žž€~ ~ ž™€™™ , •-™†<^f•• ^€<... <™™ " , , , > †^ .

„ <^† •†•<• <™™ ...†™†^ •†...^ , , , Š†^<™™ •<€ •€†" , <€•€ dir , ^€œ •žf•< , -•f <€ ž••<^ <^†™††" <^†ž™€
 ™™ , •-™†<^f•• ^€<... <™™ " , , , > †^ . „ <^† •†ž , „•<^f " ^††^ „ , f•†^ , <...<• •žf•< , -•f <€ ž••<^ <^†™††" <^†ž™€
 ž™€™™ , •-™†<^f•<™™ < , „™†" , , , > †^ .

€^ , "••f†^†:

```
$ python
```

```
>>> import sys # -f^†€•„ ~"Šf š•€ „ €„™™•f†f, šž†„š„, <€, "• fœšž šž€  

™™f,™™>†ž , -ž• <• 'fœf>^• sys
```

```
>>> dir(sys)
['__displayhook__', '__doc__', '__excepthook__', '__name__',  

'__package__', '__s  

tderr__', '__stdin__', '__stdout__', '__clear_type_cache',  

'__compact_freelists',
```

```
'_current_frames', '_getframe', 'api_version', 'argv',
'builtin_module_names',
'byteorder', 'call_tracing', 'callstats', 'copyright', 'dispiayhook',
'dllhandle',
, 'dont_write_bytecode', 'exc_info', 'excepthook', 'exec_prefix',
'executable',
'exit', 'flags', 'float_info', 'getcheckinterval',
'getdefaultencoding', 'getfile',
'esystemencoding', 'getprofile', 'getrecursionlimit', 'getrefcount',
'getsizeof',
'gettrace', 'getwindowsversion', 'hexversion', 'intern', 'maxsize',
'maxunicode',
, 'meta_path', 'modules', 'path', 'path_hooks', 'path_importer_cache',
'platform',
'm', 'prefix', 'ps1', 'ps2', 'setcheckinterval', 'setprofile',
'setrecursionlimit',
, 'settrace', 'stderr', 'stdin', 'stdout', 'subversion', 'version',
'version_info',
'warnoptions', 'wiover']
```

```
>>> dir() # €^€•„ ~^"Šf „€„™•f‡f, ŠŽ‡„Š„, <€ '„f Š™ Š‡' •™€ •‡€‡•"f
['__builtin__', '__doc__', '__name__', '__package__', 'sys']
```

```
>>> a = 5 # €Ž„™‡‡' •^ „f €'f „•Šf%~ŽŠŽ 'a'
```

```
>>> dir()
['__builtin__', '__doc__', '__name__', '__package__', 'a', 'sys']
```

```
>>> del a # €„f' ‡••„ Ž f•f„‡•^ '€f ...€™"f
```

```
>>> dir()
['__builtin__', '__doc__', '__name__', '__package__', 'sys']
```

```
>>>
```

€Š~ Ž•f<™€', '•:

' „f" " ŸŽ Ž™€†• <€ „,œ•€ <€~ •€†", <€•€~ dir •<™ •f•^„‡ ‡ „, >†^ dir. MŽ™,™«†• ‡^ •™«†• <€† <„ „•<f^ Ž••<^ <† ‡f•f™„^, ^" <€, f•<f" Š‡ Ž™€ Ž•, f „f.

Š^<...Žf‡ „, €•f†™Ž™f™«†• <€† •€†", <€•€ dir „, ~ ‡^ <€~ Ž•, „™€€†• Ž^, ^† <,™€~. ' Ž... Ž,™•ŽfŽ™'œ, •Žf•<, -f <€ Ž••<^ <™€ <, „™‡‡<™~ ^, „, Št^<™~. €^, ^<€„œ•<...<f € Ž••<^ <† ‡f•^„‡ ‡† ‡^, „, >†" <† ••†^f •Ž••€~†,™~ ^€<œ~ <€~ Ž••<^~.

„f^ ‡^ •••<• •• „, •€ <€ dir,™, •-™€†• ‡f^ „^f‡™«, 'f^ ‡•<^ŸŽ€<œ a „^f •„>,™«†• •^ ^€œ ‡f^ <f†œ, ‡•<^ <••„„™€†• <€ dir „^f Ž^, ^<€,™«†• ...<f €Ž", „f ‡f^ •ŽfŽ, ...••<€ <f†œ •<€ Ž••<^ <™€ ••f™€™‡...†^<™~. ' -^f,™«†• <€ ‡•<^ŸŽ€<œ/f•f™„^, ^" <€, f•<f" ... <™€ <, „™‡‡<™~ ^, „, Št^<™~ „, €•f†™Ž™f™«†•<^~ <€† •‡<™Žœ del „^f € ^ŽŽ~'œ ^†<^†•Ž" <f ŽŽŽf•<™^ŽŽ< Ž••†^<€~ •€†", <€•€~ dir.

j ‡^ •„...Žf™ •<€† del: ^€œ € •‡<™Žœ „, €•f†™Ž™f••<f 'f^ ‡^ •f^', „ž•f ‡f^ ‡•<^ŸŽ€<œ/...†™†^ „^f ^-™« € •‡<™Žœ „f <, ‡f, •• ^€œ <€† Ž•, •Ž<• •€ del a, •• ‡Ž™, ••< Žf^ ‡^ •f•" '•< <€ ‡•<^ŸŽ€<œ a €••†^f •^† ‡^

†Œ† ŒŽœ, | • Ž, †† " ^ȳ...Ž™Œ.

ŒŒ†•fŠ•<• •Ž•Œ™ ...<f Œ •Œ†", <Œ•Œ di r() Ž•f<™Œ, '•••• •Œ•f••"Œ•Ž† ^††f"•†•†™. '†^ Ž^, "••f†^, <, |<• di r(print) '†^ †^†"ȳ•<• •„•<f"† •<^ f•f™„^, ^" <Œ, f•<f"™ <Œ™ •Œ†", <Œ•Œ™ print, œ di r(str) '†^ <^ f•f™„^, ^" <Œ, f•<f"™ <Œ™ "Ž"•Œ™ str.

€^; ŒŠ^ (Packages)

M „, f <Š, ^, Ž, Ž•f †^ „•< ^, „••f †^ Ž^, ^<Œ, ••< <Œ† f•, ^, „•^ †• <Œ†™Ž™•^™, '††Š†††<^f <^ Ž,™', "††^<" •^~. †f †•<^ŸŽŒ<™ •Œ†œœ>™ ŽŒ'•†™Œ†††•^ •<f™ •Œ†^, <œ••f™. †f •Œ†^, <œ••f™ "†f™f "†™Žf"™ †•<^ŸŽŒ<™ •Œ†œœ>™ ŽŒ'•†™Œ†††•^ •<^ ^, ȳ, Š†^<^. •f ȳ^ '††...<†™†>™ ^† ȳ Ž^<• †^™, '††Š••<^<^, ȳ, Š†^<^; '†^†Œ... „™†<^f•Š•<™ Ž,™•"œ†f™ <^ Ž^" <^.

•^ Ž^" <^ •††f^ŽŽŠ™—"••Ž™f^, ȳ, >†" <>††• †^•f•f"™ ^, „•™ __i ni t__. py Ž™Œ ••„†f•<Œ† Python ...<†Œ<™™—"••Ž™™•††f•f•f"™™ •f...<f Ž•, f „f^, ȳ, Š†^<^ Python.

'~ Ž™«†•...<f ȳ Ž•<• †^•Œ†f™Œ, 'œ••<• †^ Ž^" <™ Ž™Œ™†™†"-•<^f 'world'†•ŒŽ™Ž^" <^ Ž™Œ™†™†"-™†<^f 'asia', 'africa', ".<Ž. "†f^†Œ<^ <^ŒŽ™Ž^" <^†•<Œ•f, " <™Œ™ Ž•, f „™Œ†^, ȳ, Š†^<^...Ž>™ 'india', 'madagascar', ".<Ž.

††Ž^, "••f†^††^†™ ŽŠ™ȳ^•™†™«•^<•<™Œ™—"• Ž™Œ™:

```
- <some folder present in the sys.path>/
- world/
  - __i ni t__. py
  - asia/
    - __i ni t__. py
    - india/
      - __i ni t__. py
      - foo. py
  - africa/
    - __i ni t__. py
    - madagascar/
      - __i ni t__. py
      - bar. py
```

†^ Ž^" <^ •††f††^•Œ™Ž•^•<Œ† f•, ^, „f™œ™, '™†>Œ <>†^, ȳ, >†" <>†. ¶|^••<• Ž™ŽŽ" <^™f^ Ž^, ^••'†^<^•<Œ†• Ž, ...<ŒŽŒŸŸŽf™ȳœ"Œ.

' "†•Œ™

„Ž>™^", fŸŠ™"†f™f•Œ†^, <œ••f™•††f•Ž^†^„, Œ•f†™Ž™f™«†•†^†, ŒŽ,™', ^††" <>†, <^ ^, ȳ, Š†^<^•††f•Ž^†^„, Œ•f†™Ž™f™«†•†^ Ž,™', "††^<^••^ Ž^" <^ •††f††^"ŽŽŒf•, ^, „•^†††™, '††Š†•<^, ȳ, Š†^<^. Ž, ...<ŒŽŒŸŸŽf™ȳœ"ŒŽ™Œ•Œ†™••<f <Œ† Python•††f†^ Ž^, "••f†^<^™f>†Ž^" <>†"†f^, ȳ, >†" <>†.

†„™Œ†••f ŽŠ™†^„, Œ•f†™Ž™f™«†•^†Œ<^ <^ ^, ȳ, Š†^<^"†f ŽŠ™†^•Œ†f™Œ, '™«†•f"™†^, ȳ, Š†^<^.

Š^<...Ž†ȳ^†™Œ†•†, f"™•†f^™™Œ••™††f•™Ž™Œ™†™†"-™†<^f•™†™••™†††.

- € , ™E' ™«†•†™ • Šž...†•†™
- €••> •<^ ž•, f• „...†•†^

References

- [1] <http://docs.python.org/extending/>
 [2] <http://stackoverflow.com/questions/228181/zen-of-python>

Python el: © • †¢Ž æ•æ•†¢†Ɂ†

Šf•^žɁž

±f•™† ~ •••™† †> † •†^f ^E<... ž™E Ž •f <™ ...†™†" <™E~, •EŽ^•æ •†^f ••f„ ž™E †ž™, ™«† †^ „, ^<æ•™E† †^--
 †•, f' " •f•••f-% — • " ŽŽ^ Ž... 'f „, E•f†™ž™f™«†<f 'f^ †^ ^ž™æE" •™E† •••™† †^ ž™E „™E† • „ •E †•<†|«
 <™E~.

• ž™, „™E† < •••, f~ •™† ~ •••™† †> † •†> †^<> † †•~ •<E Python, ™f Ž•<•~, ™f žž•f" ••~, <^ ž•|f" " ^f <^
 •«†ž™. ¶|^ •™«†• žš~ †^ <^ „, E•f†™ž™f™«†• " ^f žš~ †^~ " " †™E† <E -> æ •E "™ž™...<, E.

®••Š^

—f^ ' , †<• •†^f †f^ •™†æ •••™† †> † ž™E •E' „, ^<•• †f^ •f^<•<^† †E •Ežž™' æ •<™f„•> †, •EŽ^•æ †ž™, ••<•
 †^ ^ž™æE" •«•<• †f^ %•, > Ÿ% (sequence) ^†<f" •† †> † •<E Ž•<^ . ' E<... •†^f •«"™ž™ †^ <™ —†<^•<•<• ^†
 •"—•<•<• †f^ Ž•<^ 'f^ ^'™, ~, ...ž™E „•<• †f^ Ž•<^ †• ^†<f" •†•†^ ž™E ž, ž•f †^ ^'™, " ••<•, " ^f •" <...
 ^E<™« žfæ†™† „•<• " "æ •<™f„•™ •• •f^—™, <f"æ ' , ^††æ •<E Ž•<^ ^'™, Š† •^~ , †Š •<E† Python
 <™ž™æ•<•<• " ...††^<^ ^†† •••<• <™f„••.

≥ Ž•<^ <> † •<™f„•> † ž, ž•f †^ "Ž•†<f •• ^' "«Ž~ (•EŽ^•æ [" ^f]) <f Š•<• †^ " ^<^ž™Ÿ•†•f E Python
 ...f " ^™, ••<• †f^ Ž•<^ . ' —™« „•<• •E†™E, 'æ•f †f^ Ž•<^ †f^ —™, " †ž™, ••<• †^ ž, ™•æ ••<• †^
 †•<^†fæ••<• æ †^ 3" |•<• 'f^ •<™f„•• ^• ^E<æ <E Ž•<^ . ' ž... <E •<f†æ ž™E †ž™, ™«†• †^ ž, ™•æ •™E†• " ^f †^
 †•<^†fæ•™E†• •<™f„••, Ž †• ...<f E Ž•<^ •†^f †^~ •†ž%š, žž~ «ž™~ •••™† †> † (mutable data type), •EŽ^•æ
 ^E<...™ <«ž™~ †ž™, •• †^ ^žž~ „æ••.

Š, ž•, ~ •f•^žɁž •Š^ ^†šfi •†•†^ (objects) ; ^f šfž i —E••fž (classes)

' † " ^f „™E†• ^†^Ÿ" žf † „, f <š, ^ <E •E-æ<E•E 'f^ <^ ^†<f" •†•†^ " ^f <f " ž™•f~, †f^ †f", æ •ž•|æ' E•E
 ^ž^f<•<^f ^, fŸš~ <š, ^ 'f^ †^ " ^<ž™Ÿ•<• " ^ž«<, ^ <f~ ž•<•. ¶|^ •|•, •E†æ•™E†• ^E<... <™ æ †^ ^, '...<•, ^
 ••• •f" ... <™E " —" ž^f™.

≥ Ž•<^ •†^f †^ ž~, " ••f' †^ „, æ•E~ ^†<f" •† †> † " ^f " ž™•> †. „ <† „, E•f†™ž™f™«†• <E †•<^žžE<æ i " ^f
 •" „> , ™«†• •' ^E<æ† †f^ <†æ, ^~ ž™«†• <™† ^ " , ^f™ ^, fæ†... 5, ^E<... †ž™, ™«†• †^ <™ •"—<™«†• •† <E
 •E†™E, '•^ •†... ^†šfi •†¢†" (•EŽ. Ež...<^•E~ (instance)) i <E~ i —E•~ž (•EŽ. <«ž™E (type)) i nt. ¢<E†
 ž, ^††<f" ...<E<^†ž™, ••<• †^ •f^Ÿ" ••<• <E Ÿ™æ•f^ •<™ hel p(i nt) 'f^ †^ <™ " ^<ž™Ÿ•<• " ^ž«<, ^.

Mf^ " ž™•E †ž™, ••ž•E~ †^ „•f †••...æ•"ž (methods), •EŽ^•æ •E†^, <æ•f~ ž™E ™, ••<E~ ^† 'f^ „, æ•Ež™E „•f
 •„ •E†...†™ †• ^E<æ <E† " ž™•E. —ž™, ••<• †^ „, E•f†™ž™f™æ••<• ^E<" <^ † , E ž•f<™E, 'f" ...<E<^~ †...†™ ...<^† „•<•
 †^ ^†<f" •†•†™ •• ^E<æ <E† " ž™•E. 'f^ ž~, " ••f' †^ E Python ž~, „•f †f^ † ™•™ append 'f^ <E† " ž™•E
 list, ž™E •^~ •žf<, ž•f †^ ž, ™•æ ••<• †^ ^†<f" •†•†™ •<™ < ž™~ <E~ Ž•<^~. 'f^ ž~, " ••f' †^, <™
 mylist.append('an item') æ ž, ™•æ ••f ^E<æ <E •E†Ÿ™ž™•f, " •<™ < ž™~ <™E mylist. ¢E†•fš•< <E
 „, æ•E <™E •E†Ÿ™žf•†™«†• <ž•••~ 'f^ †^ •f•^ „æ™«†™f† †™•™f <> † ^†<f" •† †> †.

—f^ "Ž" •E ‡ž™, •• •ž••E~ ‡^ „f' •œ•^ (fields), ž™E ••‡ ••‡^f <ž™<^ "žž™ ž^, " ‡•<^ŸžE< ~ ž™E™, ••<E" ^‡
'f^ „,œ•E ž™E „f •„ •E ‡™ ‡• ^Eœ <E‡ "ž" •E. —ž™, ••< ‡^ „,E•f†ž™fœ••<• ^E< ~ <f~
‡•<^ŸžE< ~/™†™†•••~ ‡™ ‡™ ...<^‡ „•< ‡^ ^‡f"••‡•†™ ^Eœ~ <E~ "ž" •E~. •^ ž••• •ž••E~ •f•"™†<^f ‡•
•E†Ÿ™žf•†™ ‡• <ž•••~, 'f^ ž^, "••f'†^, mylist. field.

€^, "••f'†^:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: using_list.py

# |¤Šž •^Ef„ ž ~^"Šf f'™†<E "™¤
shoplist = ['^E' •', ' ^' •~•', ' ~•f†<•', ' ^™••' ••']

print('œf"™„ž •\ ' •~•f' ‡', len(shoplist), '™f' ^•<•.')

print(' •™f' ^•<• •Š<' „,•ž: ', end=' ')
for item in shoplist:
    print(item, end=' ')

print('\nœf"™„ž „™, ‡ž• •\ ' •~•f' ‡> fŸi ž.')
shoplist.append(' fŸi ž')
print(' ' , ‡<• •~•f~ ^•Š <~f• „,•ž: ', shoplist)

print(' ±• <•|ž••^E‡> <ž ', ‡<• ^•Š <~f•')
shoplist.sort()
print(' ' <•|ž••ž^"ž ', ‡<• ^•Š „,•ž', shoplist)

print(' •™f~<•™f' ^••™Š ¤\ ' •~•f' ‡> „,•ž', shoplist[0])
olditem = shoplist[0]
del shoplist[0]
print('%0-†f•‡• <•', olditem)
print(' ' , ‡<• •~•f~ ^•Š <~f• „,•ž', shoplist)
```

j |™•™~:

```
$ python using_list.py
œf"™„ž •' •~•f' ‡> 4™f' ^•<•.
 •™f' ^•<• •Š<' „,•ž: ^E' • ^' •~• ~•f†<• ^™••' ••
œf"™„ž „™, ‡ž• •' •~•f' ‡> fŸi ž.
 ' , ‡<• •~•f~ ^•Š <~f• „,•ž: ['^E' •', ' ^' •~•', ' ~•f†<•',
'^™••' ••', ' fŸi ž']
 ±• <•|ž••^E‡> <ž ', ‡<• ^•Š <~f•
 ' <•|ž••ž^"ž ', ‡<• ^•Š „,•ž ['~•f†<•', ' ^' •~•', '^E' •',
'^™••' ••', ' fŸi ž']
 •™f~<•™f' ^••™Š ¤\ ' •~•f' ‡> „,•ž ~•f†<•
%0-†f•‡• <• ~•f†<•
 ' , ‡<• •~•f~ ^•Š <~f• „,•ž [' ^' •~•', '^E' •', '^™••' ••', ' fŸi ž']
```

€Š~•™Ež•«f:

H t<^ŶZŒœ shopl i s t •†f t f ^ Ž•<^ ^'™, Š† ' f ^ " " Ž™f™† Ž™Œ ŽŒ' ^†•f •œ† ^'™, ". œœ shopl i s t
^Ž™œŒ" •œ™Œ†• •Œ†Ŷ™Ž™•f, ~ < †™†™†" < † < † ††f" •†† † † Ž™Œ œ ^ ^'™, " •™Œ†•, ^ŽŽ" †Ž™, •<• † ^
Ž,™.œ •<• •œ•†••"œ•Ž††••„ ‰-Ž†††•f-> •œ Ž•<^ •Œ†Ž•, fŽ^†Ŷ^†™† † † ^, fœ†Š† œ ^...† ^ ^ f " ŽŽ•
Ž•<•.

$\check{S}\check{Z}\bullet\bullet\mathbb{E}^{\sim}\dots^{\mathbb{M}}\mathbb{E}\dagger\bullet\dots,\mathbb{E}\bullet f\dagger^{\mathbb{M}}\check{Z}^{\mathbb{M}}f\mathbb{E}\bullet f\prec^{\mathbb{M}}\check{Y},\dots^{\mathbb{M}}$ for...in ' $f\wedge\dagger\bullet\check{Z}\wedge\dagger\check{Z}\wedge\dagger\mathbb{M}\mathbb{E}\dagger\bullet\prec\wedge\wedge\dagger f^{\sim}\bullet\dagger\wedge\wedge\mathbb{E}^{\sim}\check{Z}\bullet\prec\sim\dots\dots\dots f$
 $\prec\check{S},\wedge,\check{Z},\check{Z}\bullet f\dagger\bullet\dots\prec\wedge\check{Z}^{\sim}\check{Y}\bullet f\dots f\mathbb{E}\check{Z}\bullet\prec\wedge\bullet\dagger f\bullet\check{Z}\bullet\mathbb{E}^{\sim}\dagger f\wedge\wedge^{\sim}\mathbb{M}\check{Z}^{\mathbb{M}}\mathbb{E}\mathfrak{A}\wedge\wedge\geq f\bullet f\prec f\prec,\dots\mathbb{E}\prec\wedge\wedge\wedge\dagger\wedge^{\sim}\mathbb{M}\check{Z}^{\mathbb{M}}\mathbb{E}\mathfrak{A}f\check{S}\dagger\mathfrak{A}\wedge$
 $\bullet\mathbb{E}\prec\mathbb{E}\mathfrak{A}\bullet\bullet\bullet\check{Z}\dots\dagger\wedge\mathbb{E}\bullet\dagger\wedge\prec\mathbb{E}\wedge\wedge$.

$\in \hat{\sim}, \hat{\sim} \langle \mathbb{E}, \mathbb{E} \cdot \langle \cdot \rangle \cdot \hat{\sim} \rangle \sim \dots, \langle \mathbb{E} \cdot f \cdot \dagger^{\mathbb{M}} \hat{\sim}^{\mathbb{M}} f^{\mathbb{M}} \rangle \langle \dagger \cdot \langle \mathbb{E} \hat{\sim} \mid \mathbb{E} \cdot \hat{\sim} \cdot f \cdot \dots, f \cdot \dagger \hat{\sim} \text{ end } \cdot \langle \mathbb{E} \cdot \mathbb{E} \dagger \rangle, \langle \mathbb{E} \cdot \mathbb{E} \text{ print }, 'f \hat{\sim} \dagger \hat{\sim} \dots \mid^{\mathbb{M}} \mathbb{E} \dagger \cdot \dots \langle f \cdot \hat{\sim}^{\mathbb{M}} \mathbb{E} \dagger \cdot \dagger \hat{\sim} \cdot \langle \cdot \hat{\sim} \cdot f \hat{\sim} \hat{\sim}^{\mathbb{M}} \mathbb{E} \dagger \cdot (\text{end}) \rangle \langle \mathbb{E} \dagger \mid^{\mathbb{M}} \cdot \dagger \hat{\sim} \cdot f \cdot \rangle \langle \mathbb{E} \dagger \hat{\sim} (\text{space}) \rangle \dagger \cdot \langle \mathbb{E} \cdot \mathbb{E} \dagger \mathbb{E} f \cdot \dagger \mathbb{E} \dagger \dagger \hat{\sim} ', \hat{\sim} \dagger \dagger \mathbb{E} \sim (\text{line break})$.

```

S^~<...žf† ž,™•□ <™£†• †^•<™f_„•™•••<£ ž•<^_„,£•f†™ž™fŠ†<^~<£†□™•™ append <™£††<f“•f††™£ ž•<^~,
...ž~œ•£•£-£œ•^†••...<•,•ž'™££†•...<f<™•<™f_„•™••_„f ž,^††<f““ ž,™•<•□•••<£ ž•<^,<£žŠ†™†<^~<^
ž•,f_„...†•†^<£~ ž•<^~,^žž“ ž•,†Š†<^~<£ ž•<^•<£†•†<™žœ print “~f<£†<£žŠ†•f.

```

• ...<•, <^|f†™†™<†•<EŽ••<^„, E•f†™Ž™fŠ†<^~<E†•™•™ sort <EŽ••<^~. Š•†~f•E†^†~f“...†~“<^Ž”Ÿ•<•...<f^E<E E†•™•™~•ŽE,•~•f<E†•~f<EŽ••<^~“f••†•Žf•<, ~•f†f^<,™Ž™Ž™fE††EŽ••<^,^E<E••†~fE•f~™,“^Ž...<™†<,...Ž™Ž™E•™EŽ••™E†™f•E†Ÿ™Ž™••f,~. 'E<...•†~fŽ™E•††™™<†•Ž™†<^~...<f™fŽ••<~••†~f†<^ŸŽE<~(mutable)~“f™f•E†Ÿ™Ž™••f,~^†<“ŸŽE<~(immutable).

[illegible]

$\mathbb{S}''\dagger\propto\check{Z}\langle\bullet\ \dagger^{\wedge}\ \dagger\rangle,\dots\langle\bullet\ \dots\check{Z}\bullet\ \langle f^{\sim}\ \dagger\bullet\alpha\dots\mathbb{M}\mathbb{E}^{\sim}\ \check{Z}\mathbb{E}^{\mathbb{M}}\mathbb{M},\bullet\mathbb{M}\dagger\langle\wedge f^{\sim}\check{Z}\dots\ \langle\mathbb{E}\ \check{Z}\bullet\langle\bullet\ \wedge\ \dagger\langle f''\bullet\mathbb{f}\dagger\mathbb{M}\mathbb{E},\ \mathbb{M}\mathbb{f}\langle''\mid\bullet\ \langle\mathbb{M}$
`help(list)` $\dagger f^{\wedge}\check{Z}\bullet\check{Z}\mathbb{M}\dagger,\bullet\mathbb{f}^{\sim}.$

$$\in - \bullet f(\mathbb{E} \mathfrak{a}^{\wedge})$$
[illegible][illegible]
$$\pm f \check{Z} \check{Z}^{\prime} f'' \dots \sim_n, \langle f \dagger^{\mathbb{M}} \check{Z}^{\mathbb{M}} f^{\mathbb{M}} \rangle \dagger \langle f, \bullet f \rangle_{\mathbb{M}} \sim, \bullet f \check{Z} \bullet, f \check{Z} \check{S} \bullet \bullet f \dots \check{Z}^{\mathbb{M}} f \dagger f \bullet \dagger \check{Z} \bullet f \dagger f \bullet \bullet f \dagger, \langle f \bullet f^{\mathbb{M}}, f \dots \dagger \bullet f \check{Z} \dots \check{Z}^{\mathbb{M}} \rangle_n, \bullet \bullet \langle f, \dagger \check{Z}^{\mathbb{M}}, \bullet \bullet \dagger \bullet \check{Z} \bullet f \dagger \bullet \rangle, \bullet \bullet \bullet f \dots f \langle f \bullet f \check{Z} \check{Z}^{\mathbb{M}} \bullet \rangle \dagger \langle f \dagger \check{S} \bullet \bullet f \check{Z} \bullet f \check{Z} \bullet f \bullet \rangle \dagger \langle f \dagger \check{S} \bullet \check{Z}^{\mathbb{M}} f \bullet, \langle f \dagger^{\mathbb{M}} \check{Z}^{\mathbb{M}} f^{\mathbb{M}} \rangle \dagger \langle f \bullet \bullet \check{Z} \check{Z}^{\mathbb{M}} \bullet \rangle \bullet f.$$
$$\in^{\wedge}, \bullet \bullet f' \dagger^{\wedge}:$$

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
# Filename: using_tuple.py

zoo = ('ⓂⓂⓂ', 'ⓂⓂⓂ', 'ⓂⓂⓂ') # 动物园
print('动物园', len(zoo))

new_zoo = ('ⓂⓂⓂ', 'ⓂⓂⓂ', zoo)
```

```

print(' £ •fŽ¤†• <> • ~' •Š•Ž-• ‡<• •" • ‡>• •' •-Ž~† ~£™• „, ••Ž',
len(new_zoo))
print(' -' • <• ‡-• ‡<• •" • ‡>• •' •-Ž~† ~£™• „, ••Ž', new_zoo)
print(' -' • <• ‡-• ™•Š "«„f•• •™† <•• ™•' Ž† ‡>• •' •-Ž~† ~£™• „, ••Ž',
new_zoo[2])
print(' • <„' „Š<•, • ‡-• ™•Š "«„f•• •™† <•• ™•' Ž† ‡>• •' •-Ž~† ~£™• „, ••Ž',
new_zoo[2][2])
print(' £ •fŽ¤†• <> • ‡->• ™•Š „, ••Ž ‡<• •" • ‡>• •' •-Ž~† ~£™•',
len(new_zoo)-1+len(new_zoo[2]))

```

‡ ‡™•™~:

```

$ python using_tuple.py
£ •fŽ¤†• <> • ‡->• ‡<• ‡>• •' •-Ž~† ~£™• „, ••Ž 3
£ •fŽ¤†• <> • ~' •Š•Ž-• ‡<• •" • ‡>• •' •-Ž~† ~£™• „, ••Ž 3
-' • <• ‡-• ‡<• •" • ‡>• •' •-Ž~† ~£™• „, ••Ž (' ^•²^•Ÿ', ' ^•^£' •',
(' ™Ÿ¤>•••', ' „' "«••<••', ' ™Ž~•Š, •••'))
-' • <• ‡-• ™•Š "«„f•• •™† <•• ™•' Ž† ‡>• •' •-Ž~† ~£™• „, ••Ž (' ™Ÿ¤>•••',
' „' "«••<••', ' ™Ž~•Š, •••')
• <„' „Š<•, • ‡-• ™•Š "«„f•• •™† <•• ™•' Ž† ‡>• •' •-Ž~† ~£™• „, ••Ž
™Ž~•Š, •••
£ •fŽ¤†• <> • ‡->• ™•Š „, ••Ž ‡<• •" • ‡>• •' •-Ž~† ~£™• 5

```

€Š~ •™£Ž•«f:

² ‡<^ŸŽ£¤¤ zoo ^†^-, •<^f •• ‡f^ ŽŽ•f" •^ •<™f„•> ‡. °Ž Ž™£†• ...<f £ £†", <£•£ len ‡Ž™, •• ‡^ „, £•f†™Ž™f£¤¤ 'f^ ‡^ Ž", •f <™ ‡¤™™~ <£~ ŽŽ•f" •^~. ' £<... •Ž•£~ ••„†•f ...<f £ ŽŽ•f" •^ •†^f •Ž•£~ " ^f ‡f^ ^"™Ž™£¤¤^.

•Š, ^†<^"†™«†• ^£<^ <^ -Š~ •• ‡^ ‡™ ->™Ž™'f" ... "¤Ž™ •Ž•f•¤™ Ž^Žf... "Ž•†•f. ¢£†•ŽŠ~, £ ŽŽ•f" •^ the new_zoo Ž•f „f "™Ž™f~ -Š^ Ž™£ Ÿ, ••™†<^f¤£•"•, ‡^-. ‡<^ -Š^ Ž™£ -•, ^† ^Ž... <™† Ž^Žf... ->™Ž™'f" ... "¤Ž™. €••> •<£† Ž, ^'†<^f" ...<£<, •£†•fŠ•< ...<f ‡f^ ŽŽ•f" •^ ‡ •^ •• ‡f^ ŽŽ•f" •^ •• „†•f <£† <^£<...<£<" <£~.

-Ž™, ™«†• ‡^ „™£†•Ž, ...Ÿ•^£ •<^†<f"••†•††† •^ •<£† ŽŽ•f" •^, " ^¤™, •-™†<^~ <£¤ •£ <™£ •<™f„•™£† •^ •• ‡^ -£' "f ^' "«Ž~, ^, fŸŠ~ ...Ž>~ "™†††. 'f^ <f~ ŽŽ•<~. ' £<... ™†™†" -<^f <•Ž••¤~ ••, •Š~, •^•~Ž (indexing operator). €^, ‡™£†• <™ <, <™ •<™f„•™† •^ •<™ new_zoo " ^¤™, •-™†<^~ new_zoo[2] " ^f Ž^, ‡™£†• <™ <, <™ •<™f„•™† ‡ •^ •<™ <, <™ •<™f„•™† •<£† ŽŽ•f" •^ new_zoo " ^¤™, •-™†<^~ new_zoo[2][2]. A£<... •†^f Ž™Ž« ^ŽŽ... "Ž^† " ^f „•< " ^<Ž"Ÿ•f <™f••> ‡^.

€^, •†•£•fŽ

' ‡ " ^f™f Ž^, •†¤ ••f~ •†^f Ž, ™^f, •<f" ~, •' Š Ž, ™<†Š Ž"†<^† <f~ „> 'f^ ‡^ "™†> -^†•, ... <f ^£¤¤ ••†^f ‡f^ ŽŽ•f" •^, •f•f" " •Ž•f•¤™ ^Ž™-•«' <^f £ ^•"-•f~. 'f^ Ž^, " ••f'†^, <™ print(1, 2, 3) " ^f <™ print((1, 2, 3)) •£†^†™£† •£™ •f~™, •<f" Ž, " '†<^ -<™ ‡•† <£ŽŠ†•f <, •f~ ^, f¤†™«~, ^†<¤•<^ <™ •• <£ŽŠ†•f ‡f^ ŽŽ•f" •^ (£™Ž™•^ Ž•f „f <, •f~ ^, f¤†™«~).

€-•f£¤^†•0 1•Š•f„•^

-f~ " ••f^ ŽŽ•f" •^ •™†•<^f ^Ž... ‡^ " ••f™ -£' "f Ž^, •†¤ ••> ‡ ...Ž>~ <™ myempty = (). €"†<^~, ‡f^ ŽŽ•f" •^ ‡• ‡^†™†• <™f„•™† •†•†^f <...™ ^ŽŽ¤. €, Ž•f ‡^ <£† " ^¤™, •••< „, £•f†™Ž™fŠ†<^~ ‡^ "™††††•<^ <™ Ž, Š<™ " ^f†™†^f" ... <™f„•™†, <•f Š•< £ Python ‡^†™™, ••†^ •f~™, ™Ž™f•• ‡f^ ŽŽ•f" •^ ^Ž... ‡^ -£' "f Ž^, •†¤ ••> ‡ Ž™£ Ž^, ‡Ÿ"Ž™£† <™ ^†<f"••†•™ •• ‡f~ "-, ^£, •£Ž~•¤ Ž, Ž•f ‡^ " ^¤™, •-•< singleton = (2 ,), •"†•†™••< ...<f¤ Ž•<•†f^ ŽŽ•f" •^ Ž™£ Ž•f „f <™ •<™„•™† 2.

' ~†••¤•~ žf^ \$•"Ž', •ž, ^††^šf•šćž š~ž Perl

—f^ ž•<^† •^ ••†f^ ž•<^ ••† „" ‡f <£† <^£<...<£<" <£~ •£ž.™f ž•<•~ ••† f•™ž••š†™†<^f ...ž> ~ •<£† Perl. •™••f™ f„«f' f^†f^ žž•f" •^† •^ ••†f^ žž•f" •^, œ' f^†f^ žž•f" •^† •^ ••†f^ ž•<^, œ' f^†f^ ž•<^† •^ ••†f^ žž•f" •^, ".<.ž. ¢• ...,<f ^—™, " <£† Python, ^£<" •†^f †...†™ ^†<f" •†•†^ ž™£ ^ž™¤£"•«™†<^f „, £•f†™ž™fš†<^~ ‡^ "žž™ ^†<f" •†•†™, "f ^£<... •†^f ...ž™.

®•«fj ...

j ‡^ ž•|f" ... •†^f •^† ‡^~ <£ž•—> ‡f" ...~ " ^<" ž™'™~ ...ž™£ ‡ž™, ••< ‡^ ž, ••< <£ •f•«£†•£ œ "žž^ •<™f„•^ •žf"™f†> ‡^~ 'f^ ‡^ " <™†™, ' ‡>, •—™†<^~†...†™ <™†™†" <™£/<£~, •£ž^•œ •£•„•<—™£†• j —fœf£ (™†™†^••^†) ‡• š††ćž (ž•ž<™†, •f•). ¢£†•fš•< ...<f <™ "ž•f•ž, ž•f ‡^ •†^f ‡™†^•f"..., ‡• <™† ••f™ <, ...ž™ ž™£ ••¤^†ž™, ••< ‡^ ž, ••< <^ •> <^ •<™f„•^ •žf"™f†> ‡^~ " ž™f™£ ^† „•<•«™ " <™†^† •<™ ••f™ ...†™†^.

¢£†•fš•< ...<f ‡ž™, ••< ‡^ „, £•f†™ž™fœ••< ‡...†™ ^†•<" žž£<^ ^†<f" •†•†^ (...ž> ~ •£†ž™ž™••f, ~) 'f^ <^ "ž•f•f" <™£ ž•|f"™«, ^žž" ‡ž™, ••< ‡^ „, £•f†™ž™fœ••< ••< ^†•<" žž£<^ ••< ‡•<žž£<^ ^†<f" •†•†^ 'f^ <f^ <f† ~ <™£ ž•|f"™«. ' £<...™£f•<f" " •£†^•†f ...<f ž, ž•f ‡^ „, £•f†™ž™fœ••< ‡...†™ ^žž" ^†<f" •†•†^ 'f^ "ž•f•f".

Ã•£' ", f^ "ž•f•fš† " ^f <f†š† " ^¤™, •—™†<^f •<™ ž•|f" ... „, £•f†™ž™fš†<^~ <™ •£†ž™ž™f•†... d = {key1 : value1, key2 : value2 }. €^, ^£ž, œ•< ...<f <^ —•£' ", f^ "ž•f•—<f†œ •f^„>, •—™†<^f ‡• •fžžœ <•ž••^ " ^f <^ —•£' ", f^ •f^„>, •—™†<^f ‡•<^|« <™£~†• " ...††^<^ " ^f ...ž^ ^£<" ž•, f"ž•™†<^f •• ‡^ —•£' ", f" " "f•<, > ‡.

¶£†£¤••< ...<f <^ —•£' ", f^ "ž•f•—<f†œ •• ‡^ ž•|f" ... ••† <^|f†™†™«†<^f ‡• " ^† ‡^ <, ...ž™. ' ‡¤ ž•<†f^ •f•f"œ ••f, " <^|f†...†£•£~, <...< ž, ž•f ‡^ <^ <^|f†™†œ••< ^ž... ‡...†™f •^~ ž, ‡<^ „, £•f†™ž™fœ••<.

•^ ž•|f" " ž™£ ¤^ „, £•f†™ž™fœ••< •†^f £ž™•< " •f~/^†<f" •†•†^ <£~ "ž" •£~dict.

€^, "••f†^:

```
#!/usr/bin/python
# Filename: using_dict.py

# 'ab' is short for 'address book'

ab = { 'Swaroop' : 'swaroop@swaroopch.com',
       'Larry' : 'larry@wall.org',
       'Matsumoto' : 'matz@ruby-lang.org',
       'Spammer' : 'spammer@hotmail.com'
}

print("Swaroop's address is", ab['Swaroop'])

# Deleting a key-value pair
del ab['Spammer']

print('\nThere are {0} contacts in the address-book\n'.format(len(ab)))

for name, address in ab.items():
    print('Contact {0} at {1}'.format(name, address))

# Adding a key-value pair
ab['Gui do'] = 'gui do@python.org'
```

```
if 'Guido' in ab:
    print("\nGuido's address is", ab['Guido'])
```

```
j |™•™~:
```

```
$ python using_dict.py
Swaroop's address is swaroop@swaroopch.com
```

```
There are 3 contacts in the address-book
```

```
Contact Swaroop at swaroop@swaroopch.com
Contact Matsumoto at matz@ruby-lang.org
Contact Larry at larry@wall.org
```

```
Guido's address is guido@python.org
```

```
€Š~•™£Ž•«:f:
```

```
¥£†™£, '™«†• <™ Ž•|f" ... ab „, £•†™Ž™fŠ†<^~ <™ •£†Ÿ™Žf•†... Ž™£ œ•£ •£-£œ•^†•. •...<• •f•" '™£†• -•£' ", f^
"Ž•f••-<†œ " ^™™, •-™†<^~ <™ "Ž•f••, „, £•†™Ž™fŠ†<^~ <™† <•Ž••œœ •£, •<£, •^•£~ (indexing operator) ...Ž> ~
•£-£œœ££•• <™ ^Ž...Ž•^†^ <† ‡Žf•<Š† " ^f ŽŽ•f" >†. €~, ^<£, œ•<• <£† ^ŽŽœ •«†<^!£.
```

```
-Ž™,™«†•†^ •f^', " ³™£†• -•£' ", f^ "Ž•f••-<†œ „, £•†™Ž™fŠ†<^~ <™† ŽŽf...†^~ -Ž™, <£†•†<™Žœ del . £†••
^ŽŽ" " ^™™, •-™£†• <™ Ž•|f" ... " ^f <™† <•Ž••œœ •£, •<£, •^•£~ 'f^ <™ "Ž•f•• Ž™£ œ^ ^-^f, •œ•• " ^f <^ Ž•, ‡"†•
•<£†•†<™Žœ del . ¥•†•†^f ^†^' " ^™™†^†>, ••<• <£† <†œ Ž™£ ^†<f•<™f„•• <™ "Ž•f••'f^ ^£œ <£ Ž•f<™£, '•^.
```

```
j Ž•f<^, •f•" '™£†• " "œ• -•£' ", f "Ž•f••-<†œ <™£ Ž•|f"™« „, £•†™Ž™fŠ†<^~ <£† œ™™ i t e m s <™£ Ž•|f"™«, £
™Ž™• ^ ^Žf<, -f†f^ Ž••<^ ŽŽ•f" >†, ...Ž™£ " "œ• ŽŽ•f" ^ Ž•, f„f†^ -•£' ", f •<™f„••>† -<™ "Ž•f••
^™Ž™£œ™«†•†™ ^Ž... <£† <†œ. '†^"™«†• ^£<... <™ -•£' ", f " ^f <™ •„>,™«†• •<f~†•<^ŸŽ£<~ name
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```
#!/usr/bin/python
```

```
# Filename: seq.py
```

```
shoplist = ['apple', 'mango', 'carrot', 'banana']
```

```
name = 'swaroop'
```

```
# Indexing or 'Subscription' operation
```

```
print('Item 0 is', shoplist[0])
```

```
print('Item 1 is', shoplist[1])
```

```
print('Item 2 is', shoplist[2])
```

```
print('Item 3 is', shoplist[3])
```

```
print('Item -1 is', shoplist[-1])
```

```
print('Item -2 is', shoplist[-2])
```

```
print('Character 0 is', name[0])
```

```
# Slicing on a list
```

```
print('Item 1 to 3 is', shoplist[1:3])
```

```
print('Item 2 to end is', shoplist[2:])
```

```
print('Item 1 to -1 is', shoplist[1:-1])
```

```
print('Item start to end is', shoplist[:])
```

```
# Slicing on a string
```

```
print('characters 1 to 3 is', name[1:3])
```

```
print('characters 2 to end is', name[2:])
```

```
print('characters 1 to -1 is', name[1:-1])
```

```
print('characters start to end is', name[:])
```

```
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```

```
$ python seq.py
```

```
Item 0 is apple
```

```
Item 1 is mango
```

```
Item 2 is carrot
```

```
Item 3 is banana
```

```
Item -1 is banana
```

```
Item -2 is carrot
```

```
Character 0 is s
```

```

Item 1 to 3 is ['mango', 'carrot']
Item 2 to end is ['carrot', 'banana']
Item 1 to -1 is ['mango', 'carrot']
Item start to end is ['apple', 'mango', 'carrot', 'banana']
characters 1 to 3 is wa
characters 2 to end is aroop
characters 1 to -1 is waroo
characters start to end is swaroop

```

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j <^ƒ £ shoplist[1:3] •Žƒ•<, —ƒ ‡^ <†œ†^ <£~ ^"™Ž™£¤•^~ ^, „•-™†<~ •<£ ¤ •£ 1, Ž•, ƒŽ^†Ÿ"†•ƒ <£ ¤ •£ 2, ^ŽŽ" •<†^ <^"•ƒ <£ ¤ •£ 3, •£†•ŽŠ~, •Žƒ•<, —•<^ƒ ‡^ Ž•"‰ •«™ ^†<ƒ"•ƒ† ‡> ‡. €^, ...†™ƒ^, £ shoplist[:] •Žƒ•<, —ƒ ‡^ ^†<' , ^-™ ...Ž£~ <£~ ^"™Ž™£¤•^~.

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```

>>> shoplist = ['apple', 'mango', 'carrot', 'banana']
>>> shoplist[:1]
['apple', 'mango', 'carrot', 'banana']
>>> shoplist[:2]
['apple', 'carrot']
>>> shoplist[:3]
['apple', 'banana']
>>> shoplist[::-1]

```



```

object!

del shoplis[0] # I purchased the first item, so I remove it from the
list

print('shoplist is', shoplis)
print('mylist is', mylist)
# notice that both shoplis and mylist both print the same list without
# the 'apple' confirming that they point to the same object

print('Copy by making a full slice')
mylist = shoplis[:] # make a copy by doing a full slice
del mylist[0] # remove first item

print('shoplist is', shoplis)
print('mylist is', mylist)
# notice that now the two lists are different

```

```
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```

```

$ python reference.py
Simple Assignment
shoplist is ['mango', 'carrot', 'banana']
mylist is ['mango', 'carrot', 'banana']
Copy by making a full slice
shoplist is ['mango', 'carrot', 'banana']
mylist is ['carrot', 'banana']

```

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```
#!/usr/bin/python
# Filename: str_methods.py

name = 'Swaroop' # This is a string object

if name.startswith('Swa'):
    print('Yes, the string starts with "Swa"')

if 'a' in name:
    print('Yes, it contains the string "a"')

if name.find('war') != -1:
    print('Yes, it contains the string "war"')

delimiter = '_*_'
mylist = ['Brazil', 'Russia', 'India', 'China']
print(delimiter.join(mylist))
```

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```
$ python str_methods.py
Yes, the string starts with "Swa"
Yes, it contains the string "a"
Yes, it contains the string "war"
Brazil_*_Russia_*_India_*_China
```

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E•š Ÿž ž™£†•ž™žž ~†•¤...™£~ <£~ •£†Ÿ™ž™••f, " ~ •••†, 'f^ . ≥†¤™•™~ startswith „,£•f†™ž™f••<f'f^†^†^" ^ž«³™£†. ^†££ •£†Ÿ™ž™••f, " ^, „-•f†• <£ •™¤••^ •£†Ÿ™ž™••f, ". ± <ž••œ~ in „,£•f†™ž™f••<f'f^†^ž' |f^†££•™¤••^ •£†Ÿ™ž™••f, " ••†^††,™~ <£~ •£†Ÿ™ž™••f, " ~.

≥†¤™•™~ find „,£•f†™ž™f••<f'f^†^†^" ^ž«³f <£¤ •£ <£~ •™¤••^~ •£†Ÿ™ž™••f, " ~ •<£ •£†Ÿ™ž™••f, "œ•žf<, -f-1 •"†••†•žf<«„f <£† ^†^" "ž£³£ <£~ £ž™•£†Ÿ™ž™••f, " ~ (substring). ≥ "ž"•£ str •ž••£~ „f <£†>, ^•†™™ join 'f^†^†š†f <^ •<™f„•^†f^~ ^"™ž™£¤•^~,†• <£ •£†Ÿ™ž™••f, "†^•†, '••^•f^„, f•<f" ... (delimiter) ^††••^ •• " "¤. •<™f„•™ <£~ ^"™ž™£¤•^~, " ^f •žf<, -f†f^†•^ž«<•,£ •£†Ÿ™ž™••f, " '•††£† ‡£ ^ž... ^£<....

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2. •^†<,'^~^~—ž••~ž,ž•f‡^~ž™¤£"•£<™«†••‡^"•‡<,f"...~"•ž™.
3. •^†<,'^~^~—ž••~^ž™¤£"•«™‡<f••‡^•£†žf••†‡™^,„•™.
4. •™...†™†^<™£•£†žf••†‡™£^,„•™£••‡^f£<,„™£•^£†,™†£†^~"~fŠ,^.
5. ¬,£•f†™ž™f™«†•<£'‡>•æ•†<™žæzi p ž™£••‡^f•f^¤•f†£••"¤•«'„,™†£•f^†™†æLinux/Unix.±f„,æ•<~Windows†ž™,™«†‡^<£†•'~^<~æ•™£†^[1]~ž...<£••ž•^<™£,'™£^[2]"~f‡^ž,™•¤•™£†<£•f^„™†æC:\Program Files\GnuWin32\bin•<™•«<£†"™£~"~<"žž£ž>~†•<^Ÿž£æž•,fŸ"žž™‡<™~,...ž~„™£†•æ•£•f'f^<£†‡^†Š,f•£<™£•f•,†£†•£æPython.££†•fŠ•<...<†ž™,••<‡^„£•f†™ž™fæ••<•"¤••~^,†™'æ^„•f™¤<£•£~,^,"••‡^•f^¤<f',^††æ•†<™žŠ‡"~f‡^†ž™,••‡^••<•••†<™ž~^ž...<™ž,...',^††"†~.

--''•~

'-™«™ „••f^†...~<™£ž,™',„††^<™~•<^¤•,™ž™fæ¤£"•,†ž™,™«†•‡^','"ž™£†•<™‡"Š•f"~ž™£^ž™<ž•<£†"-•'••~•~<£~ž•£~†~.

```
#!/usr/bin/python
# Filename: backup_ver1.py
```

```
import os
import time
```

```
# 1. ¥f -†™† €Ž"™¤†' ~f fĖŠ„' ‡•••Ė f"•f~•^†† f‡••^f ,f„ ••, •~™„
~•¤•f, i ••<•Ž ‡„ ^Ž• ' , ‡<•
source = [ 'C:\\My Documents' , 'C:\\Code' ]
# > ‡™„' 'æŠ• ŠŽ •‡ž"Ž €„-~<Ė •„"f' •' „, <Ė •ĖŠ...† ŠŽ† "¤"‰™™™" •„ ‡•† '„f
••†^<• •f¬„, >• ^„ ~„••Ÿ• ¬•f•~<Ėf„•

# 2. ¥f fĖŠ^' ‡f•f f"•f~•^†† -†'-•„ Ėf f-™¤Ž, •¤Š™-Ė "• ' Ėf , •ĖŠ‡„, ...
«' ~„' •
target_dir = 'E:\\Backup' # $¤"ŽĖ•^Š• Ėf f~•æ•Š• Š™Ė ••, •~™ -†™†‡„"™™-
‡„ •Š<†•™•Š ¤• -fž‡ž^•™•ŽĖ‡„<„

# 3. ¥f fĖŠ^' ‡f•f f"•f~•^†† f-™¤Ž, •-™ĖŠf„ "• ' Ėf "¤"-„•"™ Ė™ f‡••^™
# 4. ¥™ ...Ė™"f Š™¤ "¤"-„•"™ Ė™¤ f‡••^™¤ •^Ėf„ Ž Š‡'•™¤"f Ž"•‡™"ŽĖ^f ,f„
-f•
target = target_dir + os.sep + time.strftime('%Y%m%d%H%M%S') + '.zip'

# 5. '„ Š•~™-„• ŠŽĖ •ĖŠ™~ž zip '„f ŠŽĖ •„"f'•'ž Š•Ė f‡••^•Ė "Š™
‡Š^™Ž„‡"•• •f¬„, •
zip_command = "zip -qr {0} {1}".format(target, ' '.join(source))

# '„ Š' ~•"Ž Š™¤ -†™† ‡•"™fŠ™†
if os.system(zip_command) == 0:
    print('Successful backup to', target)
else:
    print('Backup FAILED')

i |™•™™:
```

```
$ python backup_ver1.py
```

```
Successful backup to E:\Backup\20080702185040.zip
```

```
•Š, ^Ÿ,f•"™†^<• •<Ė æ•i†^•Šfi -"•Ė "ˆf •Ž '„™Ė†• ^† <™ ž, ...', ^††" †^~ Ž•f<™Ė, '•• •><". ' ‡ ••
Ž•f<™Ė, '•• ...ž~ ¤^ ¤ Ž^†•,™-••Ž™Ė†• ‡^ ^'••<^†^Š!••"†• (debug) <™ ž, ...', ^††^, •ĖŽ^æ ‡^
•f™, ¤Š•™Ė†• <^ ' 'æ, •%Ž% (bugs) <™Ė ž,™', "††<™™.

' ‡ <™ ž^, ^ž"‡> ž, ...', ^††^ •• Ž•f<™Ė, '•• ž,™•¤ •< †f^ •‡<™žæ print(zip_command) ž, f‡ <Ė‡ "žæ•Ė
<™Ė ^, ¤, Š†<™™ os.system "ˆf •"•Ž •< <™. •Š, ^, ^††f', "ž<• <Ė‡ •< Ž••Ė <Ė™ zip_command "ˆf
•žf"™žžæ•< <Ė‡ •<™ <„ †^<f"™'f†^ ••<• ^† •"•Ž•<^††...†Ė <Ė™ >• <". ' ‡ ^ž™<„•f, •••< <™ •'„•f, ••f™ <Ė™
zip •‡<™žæ~ 'f^ žf¤^†" •-™ž†^<^ ' ‡ •žf<„•f, •ž ' |<• <™‡ žĖ'^™ "Š•f"ˆ ^† <^f,f"-f ^ž...žĖ<^ ‡• <™‡
"Š•f"ˆ <™Ė ž,™', "††<™™ ž^, ^ž"‡>.

€Š~ Ž•f<™Ė, '••:

¶^ž^, ^<Ė, æ••< žŠ~ „™Ė†•†<^<, ž•f <Ė '•f•‰'••• ^™•†^‰•<^•f^"™.

€, Š<^„, Ė•f™ž™f™¤†• <^<^, ¤, Š†<^ os "ˆf time †• <Ė‡ •f•'^>'æ <™Ė™. ¤<Ė •Ė‡ „•f^,™, •-™Ė†• <^<^, „•^
"ˆf <™Ė™ -"™ ž™Ė™ ž,™™ ^, „•f™¤ <Ė•Ė <Ė ž••<^ source. ± -"™•ž™™ ž,™™,f•†™¤, ...ž™Ė ^ž™¤Ė"•«™‡<^f <^
^†<^, ^-^ ^-^ž••^,™, •-•<^f •<Ė †•<^ŸžĖæ target_dir. •™ ...†™†^ <™Ė •Ė‡žf•† ‡™Ė ^, „•™Ė ž™Ė ¤^
•Ė†f™Ė, 'Ė¤• •†ˆf Ė <, „™ĖĖ Ė†•,™†Ė†• "ˆf Š, ^ "ˆf ž^, "™•<^f ^Ė<™†<^ ^ž... <Ė •Ė‡", <Ė•Ė
time.strftime(). •™ ^, „•™ ¤^ „•f •ž•ĖĖ <Ė‡ "ˆ<™žĖĖ. zip "ˆf ¤^ ^ž™¤Ė"•Ė<• •<™ -"™•ž™™
target_dir.
```

[illegible]

©•"Š•, ~ Ć; ě••~

≥ ž, Š<Ě "•™•Ě <™Ě ž,™', "††^<...†~ ž•f<™Ě, '••. ^•<...™, †ž™,™«†•†^ "†™Ě†• "ž™f•~ ^žž^' ~ •• ^Ě<...
 Š•<•†~ Ÿ•ž<f> ě••Ě „, ě•Ě <™Ě •• " ^ěĚ†•, f†ě Ÿ••Ě. ' Ě<...™†™†~ -•<^f•<"•f™ •"†Š , ~•~ž <™Ě ž™'f•†f"™«.
 -f^ ^ž... <f~ Ÿ•ž<fŠ••f~ ž™Ě ě•Š, Ě•^ „, ě•f†Ě •†^f™ ^žž<•,™~ †Ě„^†f•†...™†™†^••~ <> † ^, „•> † -†• <Ě
 „, ě•Ě <Ě~™...%„ 'f^ <™ ...†™†^ <™Ě ^, „•™Ě •†<...†~ -^ ž™Ě " ^f†• <Ě† <, „™Ě•^ ••f...••-%> ~ ...†™†^
 -^ ž™Ě •†<... <™Ě "•†<, f"™« -^ ž™Ě ^†<f', "→ † ^•-ž••~. •™ ž, Š<™ žž•™† " <Ě† ^•†^f...<^†<', ^-^
 ^•-^ž••~ ^ž™ĚĚ•«™†<f••f•, ^, „f" ě•™†ě " ^f•ž™† †~ •†^f žžž« žf™ •«™ž™† ^<^ •f^„f,f•<••<•. •™
 ••<•,™ žž•™† " <Ě† ^•†^f...<^™†...†^<^ ^, „•> † •†^f ^f•ěĚ<"†f", ...<•, ^. •™ <,•<™ žž•™† " <Ě† ^•†^f...<f™f
 †„>, f•<™. -"•ž™f ě^•~ Ÿ™Ěě•™Ě† †~ žž'†<••† „<••Ě†f™Ě, 'ě•f †^†<', ^-™ ^•-^ž••~ ^f^
 " ě•Ě†, ^, ••™† †™Ě...<f™ -"•ž™ ě^•Ě†f™Ě, 'Ěě•†...†™ ^†Ěž", „f ě•Ě †^†<', ^-™ ^•-^ž••~ ^f^ <Ě†
 Ě†, ^•••†Ě.

```
#!/usr/bin/python
```

```
# Filename: backup_ver2.py
```

```
import os
```

```
import time
```

```
# 1. Ÿf -†™† Ěž„™Ě†^ ^f fĚŠ„†••Ě f"••~„f† f†••^f,f„ ••, •~™„  

~•ě•f,†••<ž ž„ ^ž•',†<•
```

```
source = [ 'C:\\My Documents', 'C:\\Code' ]
```

```
# >†™' 'ěŠ• Šž •†žžž Ě„~<Ě •„'f'•', <Ě •ĚŠ...† Šž† " ě„%„™~™"•„†† '„f  

••†^<•••f~„, >• ^„ ~„••Ÿ• ~•f•<Ěf„•
```

```
# 2. Ÿf fĚŠ^†f•f f"•f~^f† -†'-•„ Ěf f-™Ĉž, •ěŠ™-Ě "•'Ěf, •ĚŠ†„, ...  

«'~„'•
```

```
target_dir = 'E:\\Backup' # Š„žĈ•^Š• Ěf f~•ě•Š• Š™Ě ••, •~™ -†™™†„ "™-  

†„•Š<†•™•Š ě•~fžžž•™•žĚ†„<„
```

```
# 3. Ÿf fĚŠ^†f•f f"•f~^f† f-™Ĉž, •-™ĚŠf„ "•'Ěf " ě„-„•"™ f†••^™
```

```
# 4. Ě Š†•™ě" f žž'†f •Ěf„ Š™ ...Ě™" f Š™ě ě-™•f, ' ~™ě "Š™Ě , •ĚŠ†„, ...  

«'~„'•
```

```
today = target_dir + os.sep + time.strftime('%Y%m%d')
```

```
# Ÿ™ ...Ě™" f Š™ě " ě„-„•"™ f†••^™••^Ěf„ žž'•™ě" f <†f
```

```
now = time.strftime('%H%M%S')
```

```
# ©ž„™Ě†^ ^f Š™ě ě-™•f, ' ~™ě fĚ Ě•Ě ě-†••„ žĚž
```

```
if not os.path.exists(today):
```

```
    os.mkdir(today) # make directory
```

```
    print('Successfully created directory', today)
```

```
# Ÿ™ ...Ě™" f Š™ě " ě„-„•"™ f†••^™ě
```

```
target = today + os.sep + now + '.zip'
```

```
# 5. '„ Š•~™-„• ŠžĚ •ĚŠ™~ž zip '„f ŠžĚ •„'f'•ž Š•Ě f†••^•Ě "Š™
```

```
†Š™ž„†^"•••f~„,•
```

```
zip_command = "zip -qr {0} {1}".format(target, ' '.join(source))
```

```
# 'Š' ~•"Ž Š™Œ -‡™' ‡•" "fŠ™†
if os.system(zi p_command) == 0:
    print('Successful backup to', target)
else:
    print('Backup FAILED')
```

```
j |™•™~:
```

```
$ python backup_ver2.py
Successfully created directory E:\Backup\20080702
Successful backup to E:\Backup\20080702\202311.zi p

$ python backup_ver2.py
Successful backup to E:\Backup\20080702\202325.zi p
```

€Š~Ž•f<™Œ, '••:

•™ ‡•' ^Ž<<•,™ ‡,™~ <™Œ Ž,™', "††^<™~ Ž^, ^† ‡•f••f™. ±f ^ŽŽ^' ~ •†^f ...f •Ž '„™Œ†• ^† ŒŽ", „f —" •Ž™~
†• ...†™†^ <Œ† <, „™Œ•^ Œ†, ^ •†<... <™Œ "•†<,f"™« —^" Ž™Œ <> ‡ ^†<f', "→ ‡ ^•—^Ž••^~ ‡• <Œ „,œ•Œ <Œ~
•Œ†", <Œ•Œ os.path.exists. ' ‡•†ŒŽ", „f, <™•Œ†f™Œ, '™«†• ‡• <Œ •Œ†", <Œ•Œ os.mkdi r.

Ÿ,•Š~ €jœ••~

≥ ••«<•,Œ "•™•Œ Ž•f<™Œ, '•• "ž™' ^ ...<† "†> ž™ž™" ^†<', ^—^ ^•—^Ž••^, ^ŽŽ" ...<† ŒŽ", „f žŽŒœŠ, ^
^†<f', "→ ‡,†™Œ •†^f •«"™ž™ ‡^ |•„>, ••> <™ " ^œ ‡^ ^Ž... ^Œ<". 'f^ Ž^, "••f'†^,†ž™, ••†^ 'f†^† "™žf•~
•Œ†^†<f" ~ ^ŽŽ^' ~ •• ‡^ ž, ...', ^††^ œ†f^ ž^,™Œ••Œ " ^f œ Ž> ‡^ •Œ••<•> <f~ ^ŽŽ^' ~ ^Œ< ~ ‡• <™
...†™†^ <™Œ •Œ†žf•† ‡™Œ ^, „•™Œ. ' Œ<...†ž™, ••«"™ž™ ^†^ •žf<Œ„œ•• •žf•Œ† ž<™†<^~ ‡^ •„...žf™™, f•† ‡™ ^Ž...
<™ „,œ•<Œ <™ ...†™†^ <™Œ •Œ†žf•† ‡™Œ ^, „•™Œ.

' ~†••œ•~

•™ ž^, ^" " <> ž, ...', ^††^ ••† Ž•f<™Œ, '••,™ž...<† Œ†^ ^†Œ•Œœ••<•, ž^, ^" ^ŽŠ ž^, ^"™ž™Œœœ•<• 'f^<•
ŒŽ", „f ‡^†"œŒ†^ ••Š.

```
#!/usr/bin/python
```

```
# Filename: backup_ver3.py
```

```
import os
import time
```

```
# 1. ¥f -‡™† €Ž"„™œ†' ^f fŒŠ„' ‡•••Œ f"••~„f† f†••^f, f„ ••, •~™™  
~•œ•f, j ••<Ž ‡„ ^Ž• ', ‡<•  
source = ['C:\\My Documents', 'C:\\Code']  
# >†™†'œŠ• ŠŽ •†ž"Ž €„~<Œ „"f'•'„, <Œ •ŒŠ...† ŠŽ† "œ"‰™™™™"„ ‡•† '„f  
••†^<•• •f~„, >• ^„ ~„••Ÿ• ¬•f•~<Œf„•
```

```
# 2. ¥f fŒŠ^' ‡f•f f"•f~•^f† -‡'—„ Œf f-™ŒŒŽ, •œŠ™—Œ "• 'Œf, •ŒŠ†„, ...  
<™~„'•  
target_dir = 'E:\\Backup' # Šœ"ŽŒ•^Š• Œf f~~œ•Š• Š™Œ ••, •~™™ -‡™™†„ "™—  
†„ •Š<†•™•Š œ• ¬fž†ž^•™•žŒ†„<„
```

```

# 3. ¥ƒ ƒ(ĚŠ^' ‡ƒ•ƒ ƒ"•ƒ~•^ƒ† ƒ-™ĈŽ, •-™ĚŠƒ„ "•' (ƒƒ "¤"-„•" " ' Ě™ ƒ‡••^™
# 4. Ě Š‡••™¤"ƒ Ž" ' ‡ƒ •^Ěƒ„ Š™ ...Ě™"ƒ Š™¤ ¤-™•ƒ, ' ~™¤ "Š™Ě , •ĚŠ‡„, ...
«' ~„' •
today = target_dir + os.sep + time.strftime('%Y%m%d')
# The current time is the name of the zip archive
now = time.strftime('%H%M%S')

# ^ŽŠŽ"Š• ƒ-... Š™ •‡Ž"ŠŽ ' (ƒƒ "•...~„™ '„ƒ ŠŽĚ •-„"- (ƒƒ•Ž Š™¤ "Š™ ...Ě™"ƒ Š™¤
‡Š^™Ž„‡^"••Š •ƒ~„, •Š
comment = input('Enter a comment --> ')
if len(comment) == 0: # «~•'•™† '„ƒ ŠŽĚ -‡™"ĈŽ, Ž Š™¤ "•™~^™¤
    target = today + os.sep + now + '.zip'
else:
    target = today + os.sep + now + '_' +
        comment.replace(' ', '_') + '.zip'

# ©Ž„™¤‡' ^ƒ Š™¤ ¤-™•ƒ, ' ~™¤ ƒĚ €•Ě ¤-•‡•„ ŽĚŽ
if not os.path.exists(today):
    os.mkdir(today) # make directory
    print('Successfully created directory', today)

# 5. `` , Š•~™-„• ŠŽĚ •ĚŠ™~Ž zip '„ƒ ŠŽĚ •„ƒ'•' Ž Š•Ě ƒ‡••^•Ě "Š™
‡Š^™Ž„‡^"•••ƒ~„, •
zip_command = "zip -qr {0} {1}".format(target, ' '.join(source))

# `` , Š' ~•"Ž Š™¤ -‡™' ‡•"ƒŠ™†
if os.system(zip_command) == 0:
    print('Successful backup to', target)
else:
    print('Backup FAILED')

j |™•™™:

```

```

$ python backup_ver3.py
File "backup_ver3.py", line 25
    target = today + os.sep + now + '_' +
                                         ^
SyntaxError: invalid syntax

```

€Š~ (••‡) Ž•ƒ<™Ě, '••:

• €...- " ...%••%•%Ž- •†- , ‡‡Ž•... "†! ? Python ^†^- , ƒ ...<ƒ ĚŽ" , „ƒ •Ě‡<^" <ƒ" ... •- "Ž†^ , Ž™Ě •Ě†^•‡ƒ ...<ƒ <™
••†" , ƒ™ ••† ŽŽĚ,™• <Ě† ^†††•†...†•†Ě •™†œ <Ě Python. ' ‡ Ž^ , ^<Ě, œ•™Ě†• <™ •- "Ž†^ Ž™Ě ^†^- , •<^ƒ, ¤^
•™«†• " ^ƒ Ž™« •†<™Ž••<Ě"•. μ•"ƒ†™«†• Ž™ƒŽ...† <Ě† %€•' ' % , œŽĴ ' • <™Ě Ž,™' , "††^<™~ ^Ž... ^Ěœ <Ě ' , ^††œ.
-• Ž,™••" <ƒ"œ Ž^ , ^<œ, Ě•Ě, ¤^ •™«†• ...<ƒ Ě††œ Ž™' ƒ"œ ' , ^††œ „ƒ „> , ƒ•<••••«™ -Ěƒ" ~ ' , ^†† ~ „> , •
†^™ , •™Ě†• ...<ƒ ^Ě< ~™ƒ •«™ Ž"†•†^-•. ° ^•ƒ" , Ě Python Ÿ, œ"• <™† <•Ž••œ Ž, ...•¤•Ě~ (+) „> , •~ " "Ž™ƒ†
<•Ž••<™ •^Ěœ <Ě Ž™' ƒ"œ ' , ^††œ " ^ƒ " ^< " •Ě† Ž•ƒ^ ••† | , ƒ ŽŠ~†^ •Ě†•„••ƒ. ¶Ě†Ě¤••<• ...<ƒ ‡Ž™,™«†•†^
•ĚŽŠ•™Ě†• <Ě •Ě† „ƒ•Ě <Ě Ž™' ƒ"œ ' , ^††œ~ •<Ě† •Ž...†•†Ě -Ěƒ•œ ' , ^††œ†• <Ě „, œ•Ě†ƒ~ ••|ƒ"~ ŽŽ"ƒƒ~
" ^¤ <™Ě •<™ < Ž™~ <Ě~ -Ěƒ•œ~ ' , ^††œ~. j <ƒ •ƒ™ , ¤Š†™Ě†• <™ Ž, ... , ^††"†^~. ' Ěœ Ě •ƒ... , ¤•Ě , ...<†

•‡<™Ž•-™Ě†••-™Ž†^<^,^Ž™" ^Ž••<^fœf...,•œ•~•<^-†ĚŠœ‡.

ŸĚŠ^,Š~ Ćjœ••~

```
#!/usr/bin/python
# Filename: backup_ver4.py

import os
import time

# 1. Ƴf -†™† ĚŽ"™œ‡' ^f fĚŠ„' ‡••Ě f"••~„f† f‡••^f ,f„ ••, •~™„
~•œ•f,j••<•Ž ‡„ ^Ž•' ,‡<•
source = ['C:\\My Documents', 'C:\\Code']
# >†™" 'œŠ• ŠŽ •‡Ž"Ž Ě„-~<Ě „"f' •'„ ,<Ě •ĚŠ...† ŠŽ† "œ"‰™™™"„ ‡•† '„f
••†^<• •f¬„,>• ^„ ~„••Ÿ• ¬•f•~<Ěf„•

# 2. Ƴf fĚŠ^' ‡f•f f"•f~•^f† -†'-„ Ěf f-™ĚŽ,•œŠ™-Ě "•' Ěf ,•ĚŠ‡„, ...
«'~„'•
target_dir = 'E:\\Backup' # $œ"ŽĚ•^Š• Ěf f~•œ•Š• Š™Ě ••,•~™ -†™™‡„"™™-
‡„ •Š<†•™•Š œ• ¬fŽ‡Ž^•™•ŽĚ‡„<„

# 3. Ƴf fĚŠ^' ‡f•f f"•f~•^f† f-™ĚŽ,•-™ĚĚf„ "•' Ěf "œ"-„"™™ Ě™ f‡••^™
# 4. Ě Š‡'•™œ" f Ž"†f •^Ěf„ Š™ ...Ě™" f Š™œ œ-™œ•f, ' ~™œ "Š™Ě ,•ĚŠ‡„, ...
«'~„'•
today = target_dir + os.sep + time.strftime('%Y%m%d')
# The current time is the name of the zip archive
now = time.strftime('%H%M%S')

# ªŽŠŽ"Š• f-... Š™ •‡Ž"ŠŽ 'Ěf "•...™™ '„f ŠŽĚ •-„"-Ěf•Ž Š™œ "Š™ ...Ě™" f Š™œ
‡Š^™Ž„†^"••Š •f¬„,•Š
comment = input('Enter a comment --> ')
if len(comment) == 0: # check if a comment was entered
    target = today + os.sep + now + '.zip'
else:
    target = today + os.sep + now + '_' + \
        comment.replace(' ', '_') + '.zip'

# ©Ž"™œ‡' ^f Š™œ œ-™œ•f, ' ~™œ fĚ Ě•Ě œ-•‡•„ ŽĚŽ
if not os.path.exists(today):
    os.mkdir(today) # make directory
    print('Successfully created directory', today)

# 5. `` ,Š•~™-„• ŠŽĚ •ĚŠ™~Ž zip '„f ŠŽĚ •„"f' •'Ž Š•Ě f‡••^•Ě "Š™
‡Š^™Ž„†^"•• •f¬„,•
zip_command = "zip -qr {0} {1}".format(target, ' '.join(source))

# `` ,Š'~•"Ž Š™œ -†™† ‡•" fŠ™†
if os.system(zip_command) == 0:
```


– œf^œf_i ^••^ ^†Ě' Š"«~Ž –•žf•†f_i •"

į „™Ě†•™Ž™"ŽĚ, Š••f <^ •f"–™, ^•ŠĚœf^ <Ě~ •f^•f" ^••^~ •Ě' ', ^–œ~ Ž™'f•†f"™«. ' '™Ž™Ě•• †f^ •«†™žĚ ž^, ^" " <> :

1. •f (' †" ŽĚ•Ě)
2. ∈Š~ (Ĉ„••f^†...~)
3. ĈĚ' ', ^–œ (• Ž™ž™•Ě•Ě)
4. į Ž•' „™~ (¥™"†~ " ^f ^ž™•–^Ž†" <> •Ě)
5. ¬, œ•Ě (©•f<™Ě, '•^ œ ^†" ž<Ě†Ě)
6. ĈĚ†œ, Ě•Ě (°•Ž<> •Ě)

± •Ě†f•<Š†•†™~ <, ...ž™~ •Ě†f™Ě, '•^~ ž,™', ^††" <> ‡ ••†^f Ě •f^•f" ^••^ ž™Ě ^"™ž™Ěœ•^†• 'f^ <Ě •Ě' ', ^–œ <™Ě ••†^, •™Ě •Ě†f™Ě, '•^~ ^†f', "→ ‡ ^–"Ž•f^~: ' ‡~ž«•<• " ^f •„•f" •<•. μ•"†œ•<• <Ě† •–^, †™'œ †• †f^ ^žžœ "•™•Ě. ¥™"†" •<• " ^f •ž '†<• 'f^ •–"Ž†^<^. ¬, Ě•†™ž™fœ•<• <Ě† •–^, †™'œ 'f^ ‡^ •••<• ^† ž•f<™Ě, '•• ...ž> ~ •^ ~ ž^<•. ∈,™•••<• ‡ ^ „^, ^" <Ě, f•<f" " " ^f •Ě†•„•<• •ž^†^ž^†Ÿ"†™†<^~ <™† "«"Ž™ ĈĚ' ', ^–œ-į Ž•' „™~¬, œ•Ě ...••~ –™, ~ ^ž^f<••<^f. ®^ •Ě†" •<• ...<f Š• –•žf•†f_i... į ^–f•, ž••Š^f, œ•† į ^Š^•į •"Ě•Š^f.

' "†•Ě~

į „™Ě†•••f <™† <, ...ž™ •Ě†f™Ě, '•^~ <> ‡ •f"Š† †^~ ž,™', ^††" <> ‡/••†^, •> ‡ Python " ^f <^ •f"–™, ^•<"•f^ •† žf†Ě~ 'f^ <Ě •Ě' ', ^–œ <™Ě~. ¶|^ •^~ –^†•„, œ•f†™ ‡^ •Ě†f™Ě, 'œ••<• <^ •f" " •^~ ž,™', "††^<^ †• <Ě †••™•™ž™'•^ ž™Ě ^"™ž™Ěœ•^†•••^Ě<... <™ "•–"Ž^f™, <f Š•<• ‡^ ^ž™" <œ••<• •Ě„, •f^ †• <Ě† Python " ^f <Ě† •ž•žĚ•Ě ž,™ŸŽĚ†" <> ‡.

Ĉ<Ě •Ě† „f^ •^ •Ě–Ě<œ•™Ě†• 'f^ <™† ^†<f" •†•†™•<, •–œ ž,™', ^††^<f†....

- ∈,™Ě'™«†•†™ • Šž...†•†™
- ∈••> •<^ ž•, f„...†•†^

References

- [1] <http://gnuwin32.sourceforge.net/downloads/zip.php>
- [2] <http://gnuwin32.sourceforge.net/packages/zip.htm>
- [3] <http://docs.python.org/3.0/library/time.html#time.strptime>
- [4] <http://docs.python.org/3.0/library/zipfile.html>

Python el: • ‡ſf_i •ft•‡••Š, •< ž ' , •ž, ^††^ſf•†...ž

ſf•^žœž

„ž~<^ž, ™', „††^<^ž™E', „ž^†•† „, f•<ſ'†œ~, <^•„••f••^†•†•<E „, œ•E•E†^, <œ••> ‡, •Ež~œ†žž™„
•†<™žŠ† ž™E „, f, •—™†<ſ ••™†††. 'E<œE††™•™~ ^ž™„^ž••<ſ •ſ%•†^%•†•ž...†' „ ž, ™', ^††^<ſ•†...~.
•ž", „, f „^f „žžE†™•™~ •E', ^—œ~ ž, ™', ^††^<†, E™ž™•^ •E†•E"—f ••™††† „^f ž•f<™E, 'f"...<E<^
•†ž•, f„ž•™††<^<^ •• ‡^†ſf••†•†™. ≥†™•™~ ^E<œ™††™"—<^f %—ž†^†•†—•ž...†' „ ž, ™', ^††^<ſ•†...~.
œE†œœ>~E „, œ•E•f•f•^f™•<, •—™~ ž, ™', ^††^<ſ•†™«^, „•, ^žž" ^†', "—<•†•"ž^ ž, ™', „††^<^œ
^†ſ†<^ž•—<•†ž, ...žžE†^ž™E•†EžE, •<••<ſ „^ž«<, ^~ž... ^E<œ<E†™•™, ‡ž™, •<•†^ „, E•f†™ž™œ••<
<„†f" ^†ſf•ft•‡••<, •—™~ ž, ™', ^††^<ſ•†™«.

±f „ž" ••f „^f <^†ſf••†•†^ •†^f™f •™ „, f~ž<E„ ~<™E^†ſf•ft•‡••<, •—™~ ž, ™', ^††^<ſ•†™«. —f^
i—E~•E†™E, '•• ‡††™žœE„ ...ž™E<^†ſf_i•†•†^ •†^f>E•'žœ'†„ (instances) <E~„ž"•E~. —f^†^ž™'•
œ<^††•†<^žžE<~<™E<<ž™E int „^f†•<—, „—<^f^†<•<™f„^ž'™†<^~...ſ™f†•<^žžE<~ž™E
^ž™œE„•«™E†^„, ^™E~^, f††™~ •†^fEž™<•••f~ (^†ſf••†•†^<E~„ž"•E~ int.

'~†••œ~žf^', •ž, ^††^ſf•Šœž•Š^ſf_i†ž~œ••††

€„™•|<...ſ^~„...†E„^f™f^„, f††™. ^†ſ†<^ž•—™†<ſ>~^†ſf••†•†^ (<E~„ž"•E~ int). œ•
^†<•œ•E†•<E C++ „^f Java (ž, f†<E† „™•E 1.5), ...ž™E™f^„, ^™f •†^f^„ „'™†™f^<...—™f<<ž™f
••™††† (primitive native types). ¥••< <E†•†<™žœ hel p(int) 'f^ž•, f••...<•, •~ž•ž™†, •f~
•„<ſ"†•<E†„ž"•E.

±f ž, ™', ^††^<ſ•<~C# „^f Java 1.5 œ^ž, ™E†™†™f...<E<~†•<E† boxing and unboxing ‡†™f^.

•^†ſf••†•†^~ž™œE„•«™E† ••™††††•<E „, œ•E „™f†Š††•<^žžE<Š† ž™E %—„^>—<™^†ſf••†•†™. ±f
†•<^žžE<~ž™E^†œ™E† •• ‡^†ſf••†•†™œ„ž"•E^†—, ™†<ſ>~'•œ• (fields). •^†ſf••†•†^†ž™,™†
•ž••E~†^ •†^f ž•f<™E, 'f"†•<E „, œ•E•E†^, <œ••> ‡ ž™E %—„^>— ••†f^„ž"•E. •<™f~•E†^, <œ••f~
^ž™„^ž™«†<ſ†œ•œ•f <E~„ž"•E~. ≥™,™ž™•^ ^E<œ •†^f •E†^†ſfœ•f...ſ†~žf<, ž•f††|„>, ••™E†•
^†•|", <E<~•E†^, <œ••f~ „^f†•<^žžE<~ž... ^E<~ž™E^†œ™E† •• ‡^†ſf••†•†™œ„ž"•E. Š^œžžf", <^
ž•••^„^f™f†™•™f^†—, ™†<ſ>~fœf„^, ^i Š~, f•Šf_iE (attributes) ^E<œ~<E~„ž"•E~.

•^ž•••^ •†^f •™ <<ž>††ž™, ••†^†œ™E†•<E†Ež...<^E/†ſf••†•†™<E~„ž"•E~œ•<E†•f^<E†„ž"•E.
'ž™„^ž™«†<ſ†Š—~Šœž"'...Š~•~ž (instance variables) „^f†Š—~Šœž_i—E~ž^†<•<™f„^.

—f^„ž"•E•E†™E, '••^††•<Ež|E~ž•f•cl ass. •^ž••~„^f™f†™•™f<E~„ž"•E~^ž~, f††™«†<ſ••†f^
žž™„••^„Š•f^~•••„œ.

—†•Š^—~Š self

±f†™•™f„ž"•E~„™E††f^•E'„„, f††E•f~™, „^ž...ſf~™f†~•E†^, <œ••f~ž, ž•f†^„™E††^
•žžžž™†...†™†^„^fž, ž•f††ž, ™•<•œ••<E†^„œ<E~ž••<^ž^, ^†<, ‡, •••~œ„, fE^aŠ~f†™, •••<
†f^††œ ••^E<œ<E†ž^, „†•<™...<^†„^ž••< <E†™•™, •^~<™ž^, „, fE Python. 'E<œE•E'„„, f††E
†•<^žžE<œ^†—, <^f<™~†•<™^†ſf••†•†™„^f„^<^•E†œœE, <E~^ž™••••<^f<™...†™†^sel f.

€^„ž™ž™E†ž™, ••<†^•Š••<™ž™f™œž™<...†™†^••^E<œ<E†ž^, „†•<™, '„—†žœž%<™...†™†^†•<^žžE<œ~
sel f —™ž™f™œž™<„žž™...†™†^ •†^f^ž~|f>ſf"...•ž", „™E†žžžž™žž™†•œ†^<^f^<E „, œ•E•†...
ž, ...<Ež™E™†...†<™~†•<^žžE<œ~™„œ•^†^†Š•<E~<™E„Š•f„^<™Ež, ™', „††^<™~•^œ<™^†^††, ••f
„†••. '„...†E„^f', ^—f"ž•, fž"žž™†<^†ž<E|E~ž™f•f™™« (Integrated Development Environments) œ^
•^~•E†•, „™E††, ^†„, E•f†™ž™f••<™...†™†^†•<^žžE<œ~sel f.

'~†••œ~žf^', •ž, ^††^ſf•Šœž C++/Java/C#


```
print('Hello, how are you?')
```

```
p = Person()
p.sayHi()
```

```
# ħſ... Š™ "–[Š™™™ –f†•€•„' "f ſf "–™†™–" • [f '†f•Š•^ ,f„ •†
Person().sayHi()
```

```
i ħ™•™~:
```

```
$ python method.py
Hello, how are you?
```

€Š~ •™[ž•«f:

Š•Š Ÿž ž™[†• <[†•<^Ÿž[œ sel f •••, "•[. €^, ^<[œ•< ž> ~ [† ħ™•™~ sayHi ••• „<^f ž^, ^† <, ™[~, ^žž" •†ž•, f"ž••f <[†•<^Ÿž[œ sel f •<™†™, f•†... <[~ •[†", <[•[~.

- †ſ••œ•ž __init__

• ž", „™[† ž™žž" ™†...†<^†••...> †ž™[„™[† •f•f"œ •[†^••^ •ſ"ž" ••f Python. •Š, ^•^ •™«†• <[•[†^••^ <[~†••...™[__init__.

≥ † ħ™•™~ __init__ •" <ž••<^f†...žf~ †^†ſ"••††™†f~ "ž" •[~ ^, „f"ž™f••<^f. ≥ † ħ™•™~ ^[œ •†^f „œ†[† ^f^ <[† " <"žž[œ[œ %„•†^•€•~•'• ž™[• žf[††••<• 'f^ <™ ^†ſ"••††™ •^~. €^, ^<[œ•<• <f~ •fžž~ " " < ž^«ž~ •<[†^, „œ " ^f•<™ < ž™~ <™[™™†...†^<™~.

€^, "••f'†^:

```
#!/usr/bin/python
# Filename: class_init.py
```

```
class Person:
    def __init__(self, name):
        self.name = name
    def sayHi(self):
        print('Hello, my name is', self.name)
```

```
p = Person('Swaroop')
p.sayHi()
```

```
# ħſ... Š™ "–[Š™™™ –f†•€•„' "f "–™†•^ [f '†f•Š•^ ,f„ •†
Person('Swaroop').sayHi()
```

```
i ħ™•™~:
```

```
$ python class_init.py
Hello, my name is Swaroop
```

€Š~ •™[ž•«f:

Š•Š ™, •–™[†• <[† ħ™•™ __init__ †^ž†Ÿ"†f> ~ ž^, "†•<, ™ <[† name (†^–•†• <[††• •œ sel f). •Š, ^, •[†f™[™, '™«†• †^†™ žž•™ ž™[^ž™"~žž••<^f •ž••[~ name. €, ™• ħ<•...<f ž, ..."•f<^f 'f^ •«™ •f^–™, •ſ"~†•<^Ÿž[œ~ ž^, ...<f ^†^–, ™†<^f " ^f ™f •«™ > ~ 'name'. ¥†ž ž, ..."•f<^f †^ [žž", ħf •«' „f[œ ••Š •f...<f ™

• f " • ‹ f " < ™ ~ • € † Ÿ ™ ž f • † ... (dotted notation) sel f. name • € † ^ ‡ • ‡ f ... ‹ f € ž " , „ • f ž ™ € ž ' • < ^ f " name " " ^ f • ‡ ^ f † , ™ ~ < ™ € ^ ‡ ‹ f " • f ‡ ‡ ™ € ž ™ € ž ' • < ^ f " self " • ‡ š < ™ " ž ™ name • ‡ ^ f † f ^ < ™ ž f " œ † • < ^ Ÿ ž € œ . ' ž ™ - • « ' ™ € † • < € • « ' „ f • € † • < ^ | < > ‡ • « ™ , ^ - ™ « € ž ™ • • f " ‡ « ™ € † • , € < " • • ž ™ f ... name ^ ‡ ^ - , ... † ^ • < • .

• ™ • € † ^ ‡ ‹ f " ... < , ™ , ž , ™ • | < • ... ‹ f • • ‡ " ^ ž ™ € † • , € < " < € † « ™ • ™ __ i n i t __ , ^ ž ™ " † • < ^ - , ™ € † • < ^ ™ , • • † ^ < ^ • ‡ < ... < > ‡ ž ^ , • ‡ « • • > ‡ † • < " < ™ ... ‡ ™ † ^ < € ~ " ž " • € ~ , ... < ^ ‡ • € † f ™ € , ' ™ « † • † f ^ ‡ ^ € ž ... • < ^ • € < € ~ " ž " • € ~ . ' € < œ • • ‡ ^ f € f • f ^ • < • , € • € † ^ • • ^ < € ~ † • « ... • ™ € .

- ž ™ , ™ « † • ž ™ ™ ‡ ‡ ^ „ , € • f † ™ ž ™ f œ • ™ € † • < ™ ž • • ™ sel f. name • ‹ f ~ † • « ... • ™ € ~ † ^ ~ " ^ f ž ^ , ™ € • f " - • < ^ f • < € † † « ™ • ™ sayHi .

%o.Š^--~Ščž i -€•~ž i ^f ^†šfi •f†č†•"

j „ ™ € † • œ • € • € - € œ • • f < € ž • f < ™ € , ' f " ... < € ^ < > ‡ " ž " • • > ‡ " ^ f ^ ‡ ‹ f " • f ‡ ‡ (• € ž ^ • œ † • « ... • > ‡) , ^ ~ † " « ™ € † • < š , ^ ' f ^ < ^ • • • ™ † ‡ ^ . • ^ • • • ™ † ‡ ^ , • € ž ^ • œ < ^ ž • • ^ , • • ‡ • ‡ ^ f ž ^ , " • € ‡ € « f • ‡ ‡ • † • < ^ Ÿ ž € < ~ " ^ f • • • ‡ • Ÿ ‡ ž • č - ž % ‡ ^ ž ... < ™ € ~ „ | , • " ž • ‡ • † € š « ‡ (namespaces) < > ‡ " ž " • • > ‡ " ^ f ^ ‡ ‹ f " • f ‡ ‡ ‡ . ' € < ... • € † ^ • ‡ f ž , ^ " ‹ f " ... ‹ f < ^ ™ ‡ ... † ^ < ^ € < " • • ‡ ^ f ' " € , ^ † ... ‡ ™ • ‡ < ... ^ € < š ‡ < > ‡ " ž " • • > ‡ " ^ f ^ ‡ ‹ f " • f ‡ ‡ ‡ . ' f ^ € < ... ^ ž ™ " ^ ž ™ « ‡ < ^ f name spaces .

• ž " , „ ™ € ‡ • « ™ < « ž ™ f € † • j - (fields) - † • < ^ Ÿ ž € < ~ " ž " • € ~ " ^ f † • < ^ Ÿ ž € < ~ ^ ‡ ‹ f " • f ‡ ‡ ‡ " ^ f ™ f ™ ž ™ • • ^ < ^ ‡ ‡ ™ † ™ « ‡ < ^ f ^ ‡ " ž ™ ^ † • < € ‡ " ž " • € œ ^ ‡ ‹ f " • • † • ‡ ™ ž ™ € ‹ f ~ % ž f • ‡ ^ ‡ • • < ™ f „ ^ .

± f | ‡ ž % š , • ž f „ ^ œ ' • „ • • ‡ ^ f " ™ f ‡ ... „ , € • < ~ - ‡ ž ™ , ™ « ‡ ‡ ^ ž , ™ • ž • ž ^ • < ™ « ‡ ^ ž ž • ~ ‹ f ~ € ž ™ • < " • • f ~ ^ € < œ ~ < € ~ " ž " • € ~ . • ž " , „ f † ... ‡ ™ ‡ ^ ^ ‡ < ' , ^ - ™ < € ~ † • < ^ Ÿ ž € < œ ~ " ž " • € ~ " ^ f ... < ^ ‡ " " ž ™ f ™ ^ ‡ ‹ f " • • † • ‡ ™ < , ™ ž ™ ž ™ f œ • • f < € † • < ^ Ÿ ž € < œ ^ € < œ , € < , ™ ž ™ ž ™ • € • € « ^ • • ‡ ^ f • † - ^ ‡ œ ~ • • ... ž • ~ ‹ f ~ € ž ™ • < " • • f ~ .

± f • ‡ ž % š , • ž f „ % - ž ‡ ‡ f - • > ^ ‡ œ " ™ € ‡ ‡ † • ™ ‡ ‡ ‡ ‡ • • " " « ^ ‡ ‹ f " • • † • ‡ ™ / € ž ... • < ^ • € < € ~ " ž " • € ~ . € < € ‡ ž • , • ž < > • € ^ € < œ , " " « ^ ‡ ‹ f " • • † • ‡ ™ „ f < ™ • f " ... < ™ € ^ ‡ < ' , ^ - ™ < ™ € ž • • ™ € , • € ž ^ • œ • • ‡ • • ‡ ^ f " ™ f ‡ ... „ , € • < • ~ " ^ f • • ‡ • „ • < - ™ ‡ < ^ f • • " ^ † • ^ ž • , • ž < > • € † • < ™ • € ‡ ™ ‡ ... † < ™ ž • • ™ • • † f ^ • f ^ - ™ , • ‹ f " œ € ž ... • < ^ • € . j ‡ ^ ž ^ , " • • f ' † ^ « ^ † ^ ~ Ÿ ™ € « œ • • f • < € ‡ " ^ < ^ ‡ ... € • œ < ™ € :

```
#!/usr/bin/python
```

```
# Filename: objvar.py
```

```
class Robot:
```

```
    '''Represents a robot, with a name.'''
```

```
    # j „ f " • Š f % ~ ž š ž , ~ • " ž ‡ , - ™ « " • Š ‡ • Š ™ € f ‡ „ € " ... Š • € ‡ ™ " - ... Š
```

```
    populati on = 0
```

```
    def __init__(self, name):
```

```
        '''Initializes the data.'''
```

```
        self.name = name
```

```
        print(' (I n i t i a l i z i n g {0}) '.format(self.name))
```

```
        # - š f € € ž " „ ™ « ‡ ' • ^ š f „ Š ™ • Š ™ " ™ , - ‡ ™ " š ^ č • š f „ Š ™ ‡ ™ " - ... Š " Š ™ €
```

```
™ , ž « š ‡ ^ †
```

```
        Robot. populati on += 1
```

```
    def __del__(self):
```

```
        '''I am dying.'''
```

```
        print(' {0} is being destroyed! '.format(self.name))
```

```

Robot.population -= 1

if Robot.population == 0:
    print(' {0} was the last one.'.format(self.name))
else:
    print('There are still {0:d} robots
worki ng.'.format(Robot.population))

def sayHi (self):
    '''Greeting by the robot.

    Yeah, they can do that.'''
    print('Greetings, my masters call me {0}.'.format(self.name))

def howMany():
    '''Prints the current population.'''
    print('We have {0:d} robots.'.format(Robot.population))
howMany = staticmethod(howMany)

droi d1 = Robot(' R2-D2' )
droi d1.sayHi ()
Robot.howMany()

droi d2 = Robot(' C-3P0' )
droi d2.sayHi ()
Robot.howMany()

print("\nRobots can do some work here.\n")

print("Robots have finished their work. So let's destroy them.")
del droi d1
del droi d2

Robot.howMany()

```

```

i |™•™~:

```

```

(Initializing R2-D2)
Greetings, my masters call me R2-D2.
We have 1 robots.
(Initializing C-3P0)
Greetings, my masters call me C-3P0.
We have 2 robots.

Robots can do some work here.

Robots have finished their work. So let's destroy them.

```


„ ž^ <^ † žE "ž" •E~ (class members) (•E†ž•, fž^†Y^†™† †> † "f <> † †•žŠ† ••™† †> † (data members) •†^†f •••—' †% (public) "f ...ž•™†† †™™†f ••†^†††^—†f" (virtual) •<E† Python.

—f^ •| ^, ••E: 'f^ <E†™††^••^†•žŠ† ••™†† †> † † •<E „, œ•E <™E •†E, •¢ €...Ÿf•%ž•, ^œžj €%¢, %„ (double underscore prefix), ž„ __privatevar, E Python „, E•ft™ž™f•• " ^<" <†E•E™†...†^<™~ (name-mangling) 'f^†^™, f•<•E†•<^YžEœ>~f•f> <f"œ^ž™<•ž•†^<f"™.

½, ^, E •«†Y^•E ž™E ^™ž™Eœœ<^f •†^†f ...f E „, œ•E†f^~†•<^YžEœœ>†<...^ž™"ž•f•<f"™†f^~"ž" •E~œ •†...^†<f"•ft†™E,™—•ž•f†^|•"f†"††f^"™<>ž^«ž^"f...f...ž^<^Ež...ž™fž^™†...†<^•†^†E†...f^ (public) "f†ž™,™«††^„E•ft™ž™fE™«†^ž...„žž~"ž"•f~/^†<f"•††^„®^œE†"•<•...<f†fž"†††™'f^†f^•«†Y^•E"~f•†•žfY"žž•<f^ž...<E† Python (†•| ^, ••E <™•fžž...ž, ...œ†^"™<>ž^«ž^~).

™—~ , •††fj ...š~š^ (Inheritance)

j†^ ^ž...<^•E†^†<f"™—žE <™E ^†<f"•ft•†™•<, •—™œ~ ž, ™', ^††^<f•†™« •†^†E •' ^†^„~•ft•'•••~ (reuse) <™E "š•f" ^ "f †^~ ^ž... <™E~ <, ...ž™E~ ž™E •žf<E"™†<^f •†^†† > <™E†E„^†f•†™« <E~ ^, •...—••†~ž•ž%„•E† Ežžž™•E•E <E~ "žE,™†™†f"™<E<~†ž™,™«††††^<E—†<^<™«††^ ^ž«<•, ^>~†f^•E'††f^ž¢€> %†>€•ž¢€> (type and subtype)†<^†«<>†"ž"••†. ' ~Ež™œ •™E††...<f †ž•<†^', "ž•<†^ž, ...', ^††^ž™E" ^<^', "—f <™E~ " ^œE' E<~ " ^f <™E~††œE<~•†...™žž••™E. j„™E† "ž™f^"™f†"„^, ^" <E, f•<f"™—™†™†^<žš†E†™, Ežf"•^" ^f•f•œE†E " ^<™f"•^~. šž•E~, „™E††f•f•<•, ^„^, ^" <E, f•<f"™—†f•œ™••,††œ†^<^" ^f"••f" ^f <™E~ " ^œE' E<~, Y^†™ž™'•^" ^f•••^" <, ^'f^ <™E~††œE<~.

—ž™, ••<†^•E†f™E, 'œœœœœ •«™ ^†•|", <E<~ "ž"•f~'f^"™œ <«ž™ "f†^<f~žž•|, ' ^•<•<•, ^žž" E ž,™œœ" E•†...†™E "™f†™«„^, ^" <E, f•<f"™«œ ^ž<f<™«œ•<E†ž,™œœ" E <™E " ^f•<f~•«™ ^E<~ ^†•|", <E<~ "ž"•f~. š^<^†<"•«„E•<E^EœEž,™' 'f•E.

—f^" ^ž«<•Ež•Eœœ<†††^•E†f™E, 'Eœœ†f^"™fœ "ž"•E†•<™...†™†^ School Member " ^f " ^<...žf†™f "ž"•f~" ^œE' E<~ " ^f††œE<~†^, •...—••"•>~ž...^Eœœ, Ežž•œ†^'†™E† Ežž<«ž™f^E<™« <™E <«ž™E ("ž"•E) " ^f•<E•E†„f^†^ž,™œœ•™E†•f•f"™„^, ^" <E, f•<f"™••^E<™œ<™E~Ežž<«ž™E~.

•ž", „™E†žžžž žž™†•"œ†^<^•<E†ž,™' 'f•E^Eœœ. š†ž,™œœ•™E†•/žž"™E†•"ž™f^ž•f<™E, ' ^•<E† "ž"•E School Member, ^E<™†>~•†E†, š†™†<f " ^f™f Ežž<«ž™f. 'f^ž, "•f†^, †žž•™^, f†™« <^E<...<E<~'f^ <™E~††œE<~" ^f <™E~" ^œE' E<~•†^f•—f<...•«™ž^†•<E†ž,™œœ" E <™E •<E† "ž"•E School Member. ' <...•™,™f^žž~'™•††Ežž<«ž™•†žžE, "™E† <™E~"žž™E~Ežž<«ž™E~. j†^"žž™žž™† <E†^•†^†f...<f"††ž™,™«††^†^—,™™†••†^†<f"•††™" ^œE' Eœ††œEœ>~^†<f"•††™ School Member, œ†^~—†•„œ•ft™•" ^<^<•"•f~'f^<™† Ežžž™'f†...<™E•E†žž™«^, f†™« <>††žš† <™E "žžž••™E. ž f•f...<E<^Eœœ^ž™" ^žœ<f'•—†•, <f•†...ž (polymorphism) ...ž™E†^~Ežž<«ž™~†ž™, •†^†<f" ^<^<^œœ••"™œž,•ž<•Ež™Ež,†††™E†††^™†f"™<«ž™, Ežž•œ<™^†<f"•††™†ž™,™«††^<™„f, f•<™«†••†††f^Ež...<^•E<E~'™†f"œ~"ž"•E~.

€^, ^<E, œœœœž•E~žš~†E%-%...•†•œ•†•¢•†<™† "š•f" ^ <E~'™†f"œ~"ž"•E~" ^f••„f"~<^†^<™†žž†ž^†Y"†™E†, ••†<œœœœ†•<E†ž,•ž<•Ež™Eœ„E•ft™ž™f™«^†•^†•|", <E<~"ž"•f~.

ž "ž"•E School Member ••^Eœ<E†ž,•ž<•E™†™†"—•<fš%†^" ^,œ'• (base class) œ>€†...^,œ'• (superclass). †f "ž"•f~ Teacher " ^f Student ^ž™" ^ž™†<f €%„œ"j"†„^,œ'†„ (derived classes) œ>€•^,œ'†„ (subclasses).

¶^•™«†•<™ž~, "•f†^E<...<š, ^••†^ž, ...', ^††^.

```
#!/usr/bin/python
# Filename: inherit.py
```

```
class School Member:
    '''Represents any school member.'''
    def __init__(self, name, age):
```

```

    self.name = name
    self.age = age
    print(' (I n i t i a l i z e d   S c h o o l   M e m b e r :   {0})' . format(self.name))

    def tell(self):
        '''Tell my details.'''
        print(' Name: "{0}" Age: "{1}"' . format(self.name, self.age), end="
")

class Teacher(School Member):
    '''Represents a teacher.'''
    def __init__(self, name, age, salary):
        School Member.__init__(self, name, age)
        self.salary = salary
        print(' (I n i t i a l i z e d   T e a c h e r :   {0})' . format(self.name))

    def tell(self):
        School Member.tell(self)
        print(' S a l a r y :   "{0: d}"' . format(self.salary))

class Student(School Member):
    '''Represents a student.'''
    def __init__(self, name, age, marks):
        School Member.__init__(self, name, age)
        self.marks = marks
        print(' (I n i t i a l i z e d   S t u d e n t :   {0})' . format(self.name))

    def tell(self):
        School Member.tell(self)
        print(' M a r k s :   "{0: d}"' . format(self.marks))

t = Teacher(' M r s .   S h r i   v i   d y a ' , 40, 30000)
s = Student(' S w a r o o p ' , 25, 75)

print() # •, Š¤-<(E•„ „f , •(Ež ' ‡f" "ž

members = [t, s]
for member in members:
    member.tell() # works for both Teachers and Students

```

```

i | ™•™~:

```

```

$ python inherit.py
(I n i t i a l i z e d   S c h o o l   M e m b e r :   M r s .   S h r i   v i   d y a )
(I n i t i a l i z e d   T e a c h e r :   M r s .   S h r i   v i   d y a )
(I n i t i a l i z e d   S c h o o l   M e m b e r :   S w a r o o p )
(I n i t i a l i z e d   S t u d e n t :   S w a r o o p )

```

Name: "Mrs. Shri vi dya" Age: "40" Sal ary: "30000"

Name: "Swaroop" Age: "25" Marks: "75"

€ Š ~ • ™ € ž • « • f :

“ f ^ † ^ „ , € • f † ™ ž ™ f œ • ™ € † • “ ž € , ™ † ™ † f “ ... < € < ^ , † • < “ < ™ † ™ , f • † ... < ™ € ™ † ... † ^ < ™ ~ < € ~ € ž • , “ ž ” • € ~ , ž , ™ • • f ™ , • - ™ € † • < ^ ™ † ... † ^ < € ~ • • † f ^ ž ž • f “ • ^ . ‹ < € • € † „ f ^ , ž ^ , ^ < € , ™ « † • ... ‹ f € † † ™ • ™ ~ ____ i n i t ____ < € ~ € ž • , “ ž ” • € ~ “ ^ ž • • < ^ f , € < “ † • < € „ , œ • € < € ~ † • < ^ ž ž € < œ ~ s e l f ‘ f ^ < € † ^ , „ f “ ™ ž ™ • € • € < ™ € < † œ † ^ < ™ ~ < € ~ € ž • , “ ž ” • € ~ ž ™ € ^ † ‹ f • < ™ f „ • • < ™ ^ † ‹ f “ • • † • † ™ . Š • † ^ f • € † ^ † ‹ f “ ... † ^ † € † “ • < • ... ‹ f € Python • • † “ ^ ž • • ^ € < ... † ^ < ^ < ™ † “ ^ < ^ • “ • € ^ • < œ < € ~ € ž • , “ ž ” • € ~ , ž , ž • f † ^ “ ž € † • • ^ ž ... • † “ ~ .

€ ^ , ^ < € , ™ « † • • ž • • € ~ ... ‹ f † ž ™ , ™ « † • † ^ “ ^ ž • ™ € † • † • † ... • ™ € ~ < € ~ € ž • , “ ž ” • € ~ † • ž , ... † • † ^ • < ™ ... † ™ † ^ < € ~ “ ž ” • € ~ , ... < ^ † “ ^ ž ™ « † • < € † † ™ • ™ “ ^ f • < € • € † „ f ^ ž • , † “ € † • < ^ ž ž € < œ ~ s e l f † ^ - • † • < € „ ... † • † < ™ ž ~ .

€, ™ • | < • ž Š ~ † ž ™ , ™ « † • † ^ † • < ^ „ f , f • < ™ « † • ‹ f ^ € ž ™ • < “ • • f ~ Teacher œ Student > ~ ^ ž ž ~ € ž ™ • < “ • • f ~ < € ~ “ ž ” • € ~ School Member , ... < ^ † „ , € • f † ™ ž ™ f ™ « † • < € † † ™ • ™ t e l l < € ~ “ ž ” • € ~ School Member .

š ž • • € ~ , ž ^ , ^ < € , œ • < • ... ‹ f “ ^ ž • • < ^ f € † † ™ • ™ ~ t e l l < ™ € € ž ™ < € ž ™ € “ ^ f ... f € † † ™ • ™ ~ t e l l < € ~ “ ž ” • € ~ School Member . j † ^ ~ < , ... ž ™ ~ ‘ f ^ † ^ ‘ • † • f “ ^ < ^ † ™ € < ... • † † f ... ‹ f € Python ^ , „ • - • f † ^ 3 “ „ † • f € œ - ž % ‘ f ^ † • † ... • ™ € ~ < ™ † ž , ^ † † ^ ‹ f “ ... < € ž ™ , ... ž > ~ “ ^ f “ “ † • f • • ^ € œ < € † ž • , ž < > • € . ‘ † • • † ž , • f < € † † ™ • ™ , ^ , „ • - • f † ^ ^ † ^ - € < “ • ‹ f ~ † • † ... • ™ € ~ ž ™ € ^ † œ “ ™ € † • ‹ f ~ € ž • , “ ž ” • • f ~ † • < € • • f , “ ž ™ € „ ™ € † ™ , f • < • • < € † ž ž • f “ • ^ .

- f ^ • € † • • > • € • „ • ‹ f “ “ † • < € † ™ , ™ ž ™ ‘ • ^ - ^ † ž • , f • • ... < • , • ~ ^ ž ... † • ^ “ ž ” • • f ~ ž ^ , ^ < • † • † < ^ f • < € † ž ž • f “ • ^ “ ž € , ™ † ™ † f “ ... < € < ^ , ^ ž ™ “ ^ ž • • < ^ f < ... < • € • , % € , “ ^ , • ... • - • • † ^ - ž • ž %

‘ “ † • € ~

j „ ™ € † • > ~ < Š , ^ • | • , • € † œ • • f ‹ f ~ • f “ - ™ , • ~ ž < € „ ~ < > † “ ž ” • • † “ ^ f ^ † ‹ f “ • f † † • † , ... ž > ~ • ž • • € ~ “ ^ f ‹ f • • „ • ‹ f “ ~ ™ , ™ ž ™ ‘ • • . j „ ™ € † • • | • < “ • • f • ž • • € ~ < ^ > - ž € “ ^ f ‹ f ~ ž ^ ‘ • • • ~ < ™ € ^ † ‹ f “ • f † • † ™ • < , • - ™ « ~ ž , ™ ' , ^ † † ^ ‹ f • † ™ « . 2 Python • • † ^ f f • f ^ • < • , ^ ^ † ‹ f “ • f † • † ™ • < , • - œ ~ “ ^ f € ž , ™ • • “ ‹ f “ œ “ ^ < ^ † ... € • € ^ € < Š † < > † • † † ™ f Š † † • ^ • ^ ~ > - • ž œ • • f † ^ “ , ™ ž , ... † • † ^ .

‹ < € • € † „ • f ^ † ^ † “ ™ € † • ž Š ~ † ^ „ f , f • < ™ « † • < € † • • • ™ • ™ / | ™ • ™ “ ^ f ž Š ~ < € † ž , ™ • ž ž ^ • € ^ , „ • • † • † • < € † Python .

- €, ™ € ‘ ™ « † • † ™ • š ž ... † • † ™
- € • • > • < ^ ž • , f • „ ... † • † ^

References

[1] <http://www.ibm.com/developerworks/linux/library/l-cpdecor.html>

Python el:Š••œ•Ž Ć«•œ•Ž

Šf•^žǻž

¶^ ěž", |™Ě† " ^<^<" ••f~ ...ž™Ě <™ ž, ...', ^††" •~ ž, ž•f† ^žžĚž•žf•, " ••f†• <™ „, œ•<Ě. ``f^ ž^, " ••f'†^, ǻ^ ǻ ž•< †^ ž", •< ••™•™ ^ž... <™ „, œ•<Ě " ^f†•< †^ <Ěžš••< ž•> †, f" ^ž™<ž •†^<. — ž™,™«†• †^ <™ •žf<«™Ě†• ^Ě<... „, Ě•f†™ž™fš†<~ ^†<•<™f„ ^ <f~ •Ě†^, <œ••f~ input() ``f print().

``f^ |™•™ †ž™,™«†• †^ „, Ě•f†™ž™fœ•™Ě†• <f~ •f" —™, •~ †•ǻ...™Ě~ <Ě~ "ž"•Ě~ str (string). ``f^ ž^, " ••f'†^, †ž™, ••< †^ „, Ě•f†™ž™fœ••< <Ě † ǻ™•™ rjust 'f^ †^ ž", •< †f^ •Ě†Ÿ™ž™•f, ", Ě™ž™•^ •†^f ••|f" •<™f„f•† †Ě (right justified) •• †^ " ^ǻ™,f•† †™ •«,™~. Š™f<" |< <Ě help(str) 'f^ ž•,f•...<•, •~ ž•ž<™† , •f~.

| †~ ^ " ...†^ •Ě†Ěǻf•† †™~ <«ž™~ •f•...™Ě/•|...™Ě ••†^f™ „f,f•†... <> † ^, „•> † (files). ² f" ^†...<Ě<^ †^ •Ě†f™Ě, '•<•, •f^Ÿ" -•< " ^f†^ ', " —•< ^, „•^ •†^fŸ•f"œ •• ž™žž" ž,™', "††^< " ^f ǻ^ •|•, •Ě†œ•™Ě†• ^Ě<œ <Ě† ž<Ě„œ •• ^Ě<... <™ "•—" ž^f™.

Š••œ•Ž ^' ... š• „, •š~

```
#!/usr/bin/python
# user_input.py
```

```
def reverse(text):
    return text[::-1]
```

```
def is_palindrome(text):
    return text == reverse(text)
```

```
something = input('Enter text: ')
if (is_palindrome(something)):
    print("Yes, it is a palindrome")
else:
    print("No, it is not a palindrome")
```

```
| |™•™~:
```

```
$ python user_input.py
Enter text: sir
No, it is not a palindrome
```

```
$ python user_input.py
Enter text: madam
Yes, it is a palindrome
```

```
$ python user_input.py
Enter text: racecar
Yes, it is a palindrome
```

€š~ •™Ěž•«•f:

[illegible][illegible]
$$\in \cdot, \dagger^{\mathbb{M}} \mathbb{E} \dagger \bullet, \hat{\mathbb{E}} \prec \dots \prec^{\mathbb{M}} \bullet \bullet \dagger \bullet \dagger^{\mathbb{M}} \bullet \hat{f} \prec^{\mathbb{M}} \hat{\dagger} \hat{\bullet} \prec, -^{\mathbb{M}} \mathbb{E} \dagger \bullet, \check{S}'' \dagger \prec^{\mathbb{M}} \hat{\mathbb{E}} \boxtimes \dagger \prec f'' \dots \bullet \bullet \dagger \bullet \dagger^{\mathbb{M}} \bullet \hat{f} \prec^{\mathbb{M}} \hat{\dagger} \bullet \prec, \hat{\dagger} \dagger \dagger \dagger^{\mathbb{M}} \bullet \bullet \hat{f} \bullet \bullet \hat{\cdot}, \prec \dots \prec \bullet \prec^{\mathbb{M}} \bullet \bullet \dagger \bullet \dagger^{\mathbb{M}} \bullet \bullet \hat{f} \dagger \hat{\cdot} \check{Z} \hat{Z} \bullet \dagger \bullet, {}^{\mathbb{M}} \dagger^{\mathbb{M}} [1].$$
$$\check{S}, \hat{\cdot} \cdot \hat{\cdot} \hat{\cdot} f \hat{\cdot} \prec^{\text{TM}} \cdot \check{Z} \cdot \prec f:$$
[illegible]

● // ● ● ^

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 "ˆ<"ŽžEž~'f~ †~ •f•Ÿ™••f~ž... œ †~ ', „³•f•<™^, „•™. ² f™†™<E<~ †~ •f•Ÿ™-•f œ †~ ', "→f•<™^, „•™
 •†~ , <"<f~ž... <™† < , ...ž™ (mode) ž™E „•< "ˆœ™, ••f 'f~ <™ "†™f†~†~ <™E ^, „•™E. •...< <žf™™, ...<†
 <ž•fŠ••< †• <™^, „•™, "ˆž••< <E†™†™ close, †~ ž•f•<E†™ Python ...< <ž•fŠ••†•†• <E „, œE <™E
 ^, „•™E.

$$\in \hat{\cdot}, \cdot \cdot f' \dagger \hat{\cdot}:$$

```
#!/usr/bin/python
```

```
# Filename: using_file.py
```

```
poem = '''\n'''
```

Programming is fun

When the work is done

if you wanna make your work also fun:

use Python!

• • •

```
f = open('poem.txt', 'w') # open for 'w'riting
```

```
f.write(poem) # write text to file
```

```
f.close() # close the file
```

```
f = open('poem.txt') # if no mode is specified, 'r' read mode is assumed by default
```

```
while True:
```

```
line = f.readline()
```

```
if len(line) == 0: # Zero length indicates EOF
```

break

```
print(line, end=' ')
```

```
f.close() # close the file
```

i |™•™~:

```
$ python using_file.py
Programming is fun
When the work is done
if you wanna make your work also fun:
    use Python!
```

€Š~•™£Ž•«•f:

' , „f“ " ^†™•'•<• †^ ^, „•™ „,£•f†™Ž™fŠ†<~<£† •†>†^<>††£ •£†", <£•£ open " ^™,•-™†<~<£†
™†™††^••<™£ ^, „•™£ " ^f<™†<, ...Ž™†•<™†™Ž™•™ Ž™£†•†^†™•'•f<™ ^, „•™. ±<, ...Ž™~†Ž™, ••†^•†^††•
•f"Ÿ^†† ('r', read mode), †•', "Žf™ ('w', write mode) æ†•Ž, ...••£ ('a', append mode). —Ž™,™«†•
•Ž•£††^„f, f•<™«†• †^ ^, „•™ "f††™£ ('t', text file) æ†^•£^f" ... ^, „•™ ('b', binary file). £<£†
Ž, ^††^<f" ...£<£Ž", „™£†Ž", ^Ž™Ž™•<, ...Ž™f•f^••f†™f " ^f£ help(open) •^•~•Š•fŽ, f••...<•, •
Ž•Ž™†, •f•~'f^£<™«~. 'Ž...Ž,™•ŽŽ™'æ£ open() •>, ••<™ ^, „•™ >~ ^, „•™ "f††™£ ('text file) " ^f<™
^†™•'•f†•<™†<«Ž™'read.

£<™•f" ...†~Ž", „•f†^, ^, „f" " ^†™•'™£†•<™ ^, „•™ ••' , ^-æ " ^f„,£•f†™Ž™fŠ†<~<£† •™•™ write <™£
^†<f"•f††™£<™£ ^, „•™£, 'f^†^', "Ž™£†••<™ ^, „•™ " ^f<...<•Žf" "Ž•†™£†•(close) <™ ^, „•™.

Š<~Ž††^†™•'™£†•<™ •f™ ^, „•™ Ž"Žf'f^††††•£. ¥„,•f"-•<f†^ " ^™,••™£†• ††<«Ž™, 'f^<•£
'††††•£'•†^f™ Ž,™•^™, f††™~<, ...Ž™~. ¥f^Ÿ"-™£†• " "•', ^††æ <™£ ^, „•™£ „,£•f†™Ž™fŠ†<~<£†
†•™•™ read line ••Ÿ, ...™. '£æ££††™•™•Žf•<, -f†f^™Ž™"Ž£, >††£', ^††æ Ž•, fŽ^†Ÿ"†™†<~<™
„^, ^" <æ, ^†~', ^††æ~ (newline character) •<™ <Ž™~<£~', ^††æ~. „<†††f^æ•f% •£†Ÿ™Ž™•f, "
•Žf•<, -•<f, •£†^†•f...<f „™£†•-•"•f•<™ <Ž™~<™£ ^, „•™£ " ^f'!•-«'™£†•' (break) ^Ž...<™Ÿ, ...™.

'Ž...Ž,™•ŽŽ™'æ££†", <£•£ print() <£ŽŠ†f<™ "•††™ " ^Š~ " ^f†f^£<...†<£†^', ^††æ (newline)
•<£†™•™£. Š<^<•<Ž™£†•<£†^', ^††æ " ^™,•-™†<~ end=' ', •f...<£', ^††æ Ž™£•f^Ÿ"-•<f^Ž...<™
^, „•™æ£<ŽfŠ†f†•†^„^, ^" <æ, ^†~', ^††æ~. •...<•, <•Žf" "Ž•†™£†•(close) <™ ^, „•™.

•Š, ^, •Ž' |<•<^Ž, f•...††^<™£ ^, „•™£ poem.txt, 'f^†^•ŽfŸ•Ÿ^fŠ••<•...<f<™Ž, ...', ^††^„f
Ž, ^††^<f" ' , ^-«• " ^f•f^Ÿ•<••^Ž...£<...<™ ^, „•™.

Pickle

² Python Ž, „f†^Ž, ...£Ž™", •, >†^Ž™£™†™†"-•<f pickle " ^f„,£•f†™Ž™fŠ†<~<™†Ž™, ••<†^
^Ž™«£"«•<•'•f•æ'•Š•^†<f"•††™<£ Python ••†^ ^, „•™ " ^f^, '...<•, ^†^<™Ž^, †•<•Ž•>.'£<...
™†™†™"-•<f†£~•-•^Ž™æ"•£•£<™£^†<f"•f††™£ (persistently).

€^, „•f†^:

```
#!/usr/bin/python
# Filename: pickling.py

import pickle

# the name of the file where we will store the object
shoplistfile = 'shoplist.data'
# the list of things to buy
shoplist = ['apple', 'mango', 'carrot']

# Write to the file
f = open(shoplistfile, 'wb')
```

```
pickle.dump(shopl i st, f) # dump the object to a file
f.close()
```

```
del shopl i st # destroy the shopl i st variable
```

```
# Read back from the storage
```

```
f = open(shopl i stfi l e, 'rb')
```

```
storedl i st = pickle.load(f) # load the object from the file
```

```
print(storedl i st)
```

```
i |™•™~:
```

```
$ python pickl i ng. py
```

```
['appl e', 'mango', 'carrot']
```

€Š~•™£Ž•«•f:

“f^†^ž™¤£”•«•™£†• †^††f”•†•†™ •• †^, „•™, Ž, Ž•f^, „f” †^††™•|™£†• (open) <™ ^, „•™ †•<, ...ž™
'write 'binary " ^f †•<" †^ “^Ž •™£†• <£ •£†”, <£•£ dump <™£ ^, ¢, Š†^<™~ pi ckl e. ' £<££ •f^•f”^••^
™†††” -•<^f pickling.

Š^<...ž††, ^†^“<™«†• <™ ^††f”•†•†™ „, £•f†™ž™fŠ†^<~ <£ •£†”, <£•£ load <™£ ^, ¢, Š†^<™~ pi ckl e, £™ž™•^
•ž•<, -•f <™ ^††f”•†•†™. ' £<££ •f^•f”^••^™†††” -•<^f unpickling.

‘ “†•£~

i „™£†• •£-£<£••f •f”-™,™£~ <«ž™£~ •f•...•™£/•|...™£, “^¤Š~ •ž•£~ •f^„•, f•£ ^, „•™£ “^f „, ¢•£ <™£
^, ¢, Š†^<™~ pickle.

¤<£ •£† „•f^ ¢^•|•, •£†£•™£†• <£† ††™f^ <†•|^f, ••> † (exceptions).

• €,™£’™«†•†•†™ • Šž...†•†™

• €••> •<^ž•, f•„...†•†^

References

[1] <http://en.wiktionary.org/wiki/palindrome>

Python el:Š«^f, €••fž

Š«^f, €••fž

±f •| ^f, ••f~ •t-^†•™†<^f ...<^†™, f•††~ †ž%...†ž†^f„ „^<•<“•f~ •††Ÿ^†™†† •<™ ž, ...', ^†††” •~. ‘f^ ž^, “••f’†^, <f •††Ÿ^††f •“†ž, ...”f<^f†^ •f^Ÿ”••<• †^ ^, „•™ „^f<™ ^, „•™ ••††ž”, „f; ¾ <f •††Ÿ^††f •“†<™ •f^’, “³<• “^<”ž”•™~ ...<^†<™ ž, ...', ^†††< , „••; • <™f~ „^<•<“•f~ „f, •-™†<^f „, †††ž™fŠ†<^<^f •«^f, €••fž.

€^,™†™>~, <f •††Ÿ^††f •“†<™ ž, ...', ^†††” •~ ••.†, f”~ “E, ~ •†<™ž~; ‘†<...<™ „f, •-•<^f † Python †™ž™. ^•~; †††f<^ „f^<™ “^f•~ž •f...<f†ž”, „f †^ •<™-†^.

‘<™-†^Š^

€•-••<•†f^ ^žžœ “žœ•†<™ •††”, <™<™ print. •f •††Ÿ^††f ^††’, “³††• ^††, †...’, ^-^ Print ^†<•’f^<™>•<...print; €^, ^<™, œ•<•<™ “-^ž^™ P ^†<•’f^ p. €• ^†<™ <™žž, •ž<• •† Python %-%•††-††(raises) †^ •†<™ “<f”... •-”ž†^ (syntax error).

```
>>> Print('Hello World')
Traceback (most recent call last):
  File "<pyshell#0>", line 1, in <module>
    Print('Hello World')
NameError: name 'Print' is not defined
>>> print('Hello World')
Hello World
```

€^, ^<™, œ•<• ...f^††••f”†•<^f †^ NameError “^š~ •ž••†<™žžš†<^f “^f † •† ...ž™† ^†††•<^f™ •-”ž†^. ‘†<...•††žž™ “”††™ „f, f•<™ •-”ž†^<™~ (error handler) ‘f^†<™ •-”ž†^.

Š«^f, €••fž

¶^œ•†††••† (try) †^ •f^Ÿ”•™††•...™™ ^ž...<™ „, œ•<™. €f •<™ ctrl-d “^f”™f<”†<• <f •††Ÿ^††f.

```
>>> s = input('Enter something --> ')
Enter something -->
Traceback (most recent call last):
  File "<pyshell#2>", line 1, in <module>
    s = input('Enter something --> ')
EOFError: EOF when reading a line
```

² Python ^†^••f”†•<f †^ •-”ž†^, ž™†™†††”-•<^f EOFError, ž™†Ÿ^•f”” •††^††f ...<fŸ, œ”• †^ •††Ÿ™ž™ end of file (ž™† ^††žž,™>ž•<^f^ž...<™ ctrl-d), ...<†•†žž,††††^<™ •f.

¥•f,f•†•••«~f,¢••¤‡

–Ž™,™«†• ‡^ „f,f•<™«†• <f~ •|~f, ••f~ „,£•f†™Ž™fŠ‡<^~ <£‡ •‡<™Žœ try..except. ° ^•f““, <™Ž™¤•<™«†•
...Ž•~ <f~ •£‡œ¤•f~ •‡<™Ž ~ ‡ •^ •<£‡ ŽŽ™““ •^ try “^f...Ž™£~ <™£~ „f,f•< ~ •–^Ž†“<> ‡ •<£‡ ŽŽ™““ •^ except.

```
#!/usr/bin/python
```

```
# Filename: try_except.py
```

```
try:
```

```
    text = input('Enter something --> ')
```

```
except EOFError:
```

```
    print('Why did you do an EOF on me?')
```

```
except KeyboardInterrupt:
```

```
    print('You cancelled the operation.')
```

```
else:
```

```
    print('You entered {0}'.format(text))
```

```
i |™•™~:
```

```
$ python try_except.py
```

```
Enter something -->      # Press ctrl-d
```

```
Why did you do an EOF on me?
```

```
$ python try_except.py
```

```
Enter something -->      # Press ctrl-c
```

```
You cancelled the operation.
```

```
$ python try_except.py
```

```
Enter something --> no exceptions
```

```
You entered no exceptions
```

€Š~ •™£Ž•«•f:

•™Ž™¤•<™«†• ...Ž•~ <f~ •‡<™Ž ~, Ž™£ ••~ ^†••f“†«™£‡ •|~f, ••f~•–^Ž†^<^ ‡ •^ •<£‡ ŽŽ™““ •^ try “^f
†•<“ <™Ž™¤•<™«†• <™£~ „f,f•< ~ 'f^ <^ “^<“ ŽŽ£Ž^ •–^Ž†^<^/•|~f, ••f~ •<£‡ Ž, ...<^•£/ŽŽ™““ •^ except. ²
Ž, ...<^•£ except ‡Ž™, •• ‡^ „f,f•<•• ‡^ “^f ‡...†™ “^¤™,f•† ‡™ •–^Ž†^ œ •|~•, ••£, œ ‡f^ Ž•<^
•–^Ž†“<> ‡/•|~f, ••‡ ‡ ‡ •^ •• Ž^, ‡¤••£. Š† ••‡ Ž^, „™‡<^f “^¤...Ž™£ ™‡™†^••~ •–^Ž†“<> ‡ œ
•|~f, ••‡ ‡, <...<^£ Ž, ...<^•£ except ¤^ „f,f•<•–, ‡„ <f~ •|~f, ••f~ “^f <^ •–^Ž†^<^.

¢£†•fŠ•<• ...<f Ž, Ž•f ‡^ £Ž“, „f <™£Ž“ „f•<™‡ ‡f^ Ž, ...<^•£ except •£‡•••† ‡£†• “”¤• Ž, ...<^•£ try.
¥f^–™, •<f““ 'f^ Ž™f™ Ž...™ ‡^ „•< ‡f^ ŽŽ™““ •^ try;

Š“ ‡™Ž™f™•œŽ™<• •–^Ž†^ œ •|~•, ••£ ••‡ „f, ••<^f, <...< “^Ž•<^f™ Ž, ™“^¤™,f•† ‡™~ „f,f•<œ~ <£~ Python, ™
™Ž™,™~ •<^†^<“ •f <£‡ •“< Ž••£ <™£ Ž, ™', "††^<™~ “^f <£ŽŠ‡f ‡^ ‡œ‡£†^ •–^Ž†^<™~. •™ „™£†• •f œ•£ ••
•‡ , 'f^ Ž^, ^Ž“‡>.

–Ž™, ••< •Ž••£~ ‡^ „•< ‡f^ Ž, ...<^•£ else •£‡•••† ‡£†• ‡f^ ŽŽ™““ •^ try..except. H Ž, ...<^•£
else •“<Ž•<^f•“ ‡ ••‡ •£†Ÿ^†f “^††•^ •|~•, ••£.

¢<™ •Ž...†•†™ Ž^, “•f'†^ ¤^ •™«†• •Ž••£~, ŽŠ~ ‡^ Ž^, ‡™£†• <™ ^†<f“•†•†™ <£~ •|~•, ••£~, <f Š•<• ‡^
†Ž™,™«†• ‡^ ^†^“ <™«†• •ŽfŽ, ...¤•<•~ ŽŽ£, ™–™, ••~.

• ‡Œœ•f«~ Š¤‡ •«^f, ‡••¤‡ (Raising Exceptions)

—Ž™, ••< ‡~ %~%•f~Ž†Ž† •|~f, ••f~ „, Œ•f†™Ž™fŠ†<^~ <Œ† •†™Žœ raise, Ž^, „™†<^~ <Œ†™†™†^••^ <™Œ

•—”Ž†^<™~/•|~•, ••Œ~ “^f<™^†<f”••†•†™ <Œ~ •|~•, ••Œ~ •†^fŽ, ...”•f<^f†^ •Œ†Ÿ••.

•™ •—”Ž†^œ Œ •|~•, ••Œ Ž™Œ ‡Ž™, ••< ‡~^†^••|~•<•, Ž, Ž•f†^ •†^f “Ž”•Œ, Œ™Ž™•^ “†••œ ††••^ Ž, Ž•f†^ •†^fŽ^, “’>’Œ <Œ~ “Ž”•Œ Excepti on.

```
#!/usr/bin/python
```

```
# Filename: raising.py
```

```
class ShortInputException(Exception):
```

```
    '''A user-defined exception class.'''
```

```
    def __init__(self, length, atleast):
```

```
        Exception.__init__(self)
```

```
        self.length = length
```

```
        self.atleast = atleast
```

```
try:
```

```
    text = input('Enter something --> ')
```

```
    if len(text) < 3:
```

```
        raise ShortInputException(len(text), 3)
```

```
    # Other work can continue as usual here
```

```
except EOFError:
```

```
    print('Why did you do an EOF on me?')
```

```
except ShortInputException as ex:
```

```
    print('ShortInputException: The input was {0} long, expected at least {1}\'
```

```
        .format(ex.length, ex.atleast))
```

```
else:
```

```
    print('No exception was raised.')
```

```
if __name__ == '__main__':
```

```
    $ python raising.py
```

```
Enter something --> a
```

```
ShortInputException: The input was 1 long, expected at least 3
```

```
    $ python raising.py
```

```
Enter something --> abc
```

```
No exception was raised.
```

€Š~ •™ŒŽ•«f:

Š•Š •Œ†™Œ, ‘™«†• <™ •f”... †~ <«Ž™ •|~•, ••Œ~. ‘Œ<...™ ‡™~ <«Ž™~ •|~•, ••Œ~™†™†”~•<^f ShortInputException. ‡•f•«™ Ž•••^, <™ length, <™™Ž™™™ •†^f <™ †œ”™~ <Œ~ •™¤•••^••f•...™Œ “^f<™ atleast Ž™Œ •†^f<™ •Ž”„f•<™ †œ”™~ Ž™Œ <™ Ž, ...’, ^††^ Ž•, •†•†•.

‡<Œ† Ž, ...<^Œ except, ^†~—,™Œ†• <Œ† “Ž”•Œ <™Œ •—”Ž†^<™~ Œ™Ž™•^¤^Ž™¤Œ”•«•<^f•^† (as) <™...™††††•<^ŸŽŒœ~ <™™Ž™™™ •Œ’”, ^<•• <™^†<•<™f”™^†<f”••†•†™ •—”Ž†^<™~/•|~•, ••Œ~. ‘Œ<... •†^f^†”Ž™™†•<fŽ^, ^†<,™ŒŒ~ “^f<^™, ••†<^••†f^ “ŽœŒ •Œ†”, <Œ•Œ~. —•^••^Œœ <Œ†•f•f”œ Ž, ...<^Œ except, „, Œ•f†™Ž™f™«†•<^ Ž•••^ length “^f atleast <™Œ^†<f”•f††™Œ <Œ~ •|~•, ••Œ~,’f^†^ <ŒŽŠ•™Œ†•†^

"^<"ŽŽŹŽ™†œ†£†^•<™„œ•<Ź.

Try .. Finally

• Ž™¤•<•...ſ•f^Ÿ"-•<•†^Ń,„••™••<™Ž,...',^††"•~. €Š~•žfŸ•Ÿ^fŠ†•<•...ſ<™^†ſ"•†•†™<™£^,„••™£
„•f"Ž•f•<•"Ń†™†f",••<•£•†^•,••£^†^••„œ"•••<•...„f; '£<...†Ž™,••†^'•†•f„£•f†™Ž™fŠ†<^~<£†
žŽ™""^fi nally. ££†•fŠ•<•...ſ†Ž™,••<•†^„£•f†™Ž™fœ•<•†f^Ž,...^•£except†^~•†•<£†žŽ™""^
fi nally 'f^<£†•f^†ſ<™f„™«•^žŽ™""^try. €,ž•f†^•†>†^Š••<•<£†f^†•^•<£†"ŽŽ£,•"†
¤Ž•<•†^„£•f†™Ž™fœ••<•"Ńſ~•«™.

```
#!/usr/bin/python
# Filename: finally.py

import time

try:
    f = open('poem.txt')
    while True: # our usual file-reading idiom
        line = f.readline()
        if len(line) == 0:
            break
        print(line, end='')
        time.sleep(2) # To make sure it runs for a while
except KeyboardInterrupt:
    print('!! You cancelled the reading from the file.')
finally:
    f.close()
    print('Cleaning up: Closed the file!')
```

i |™•™~:

```
$ python finally.py
Programming is fun
When the work is done
if you wanna make your work also fun:
!! You cancelled the reading from the file.
(Cleaning up: Closed the file)
```

€Š~•™£Ž•«f:

Š"†™£†•<™•«†£¤•~•f"Ÿ^†^Ń,„••™£,^ŽŽ"Ń£¤•,•<^„™£†••f""•fŠ«Ž†>•£<'f^2••£<•,...Ž•ž<^~™«
<£ž>¤¤£""¤•',^††œ„£•f†™Ž™fŠ†<^~<£•£†",<£•£time.sleep<•fŠ•<•<™Ž,...',^††^†^<,„•f
^,'"(£Python^Ž...<£~«•£<£~<,„•fžŽŽ'„œ'™,^). Š^¤Š~<™Ž,...',^††^<,„•f^"...†^,žf•<ctrl-c
'f^†^•f^"...³•</^"£,Š••<•<™Ž,...',^††^.

€^,<£,œ•<•...ſ•£†Ÿ^•†f£•†^•,••£KeyboardInterrupt"Ńf<™Ž,...',^††^•'"^<^Ž•ž•<^f. €"†<>~,
ž,f†<™Ž,...',^††^•'"^<^Žf—¤•,£Ž,...^•£finally•"Ž••<^f"Ńſ<™^†ſ"•†•†™<™£^,„••™£ž"†<
"Ž•†•<^f.

– •†Š•– with

≥ ˆŽ...“ <E•E •†... Ž...,™E •<E† ŽŽ™“”•ˆ try “ˆf ˆ“™Ž™«» ˜ E ˆŽ•Ž•E« ,> •E <™E Ž...,™E •<E† ŽŽ™“”•ˆ finally •†ˆf †ˆ •E†E«f•† †™ †™<•Ÿ™. “f ˆE<... <™ Ž...™ EŽ”, „f “ˆf E •†<™Žœ with, E™Ž™•ˆ <™ “” †ˆf f“ˆ†... †ˆ ‘•†ˆf†• “ˆ«ˆ, ...<, ...Ž™:

```
#!/usr/bin/python
# Filename: using_with.py

with open("poem.txt") as f:
    for line in f:
        print(line, end='')
```

€Š˜ •™EŽ•«f:

≥ |™•™˜ «ˆ Ž, •Ž•†ˆ •†ˆf•fˆ†• <™ Ž,™E'™«†•†™ Žˆ, “••f'†ˆ. ≥ •fˆ–™, “••Š •†ˆf ...<f „, E•f†™Ž™f™«†• <E •E†“, <E•E open †• <E† •†<™Žœ with. A–œ†™E†• <™ “Ž••f†™ <™E ˆ, „•™E †ˆ ‘•†ˆf ˆE<...†ˆˆ†• <™ with open.

‘ E<... Ž™E •E†Ÿˆ•†ˆf Žˆ, ˆ•“E†fˆ“” •†ˆf ...<f EŽ”, „f †ˆ Ž,> <...“™ŽŽ™ Ž™E „, E•f†™Ž™f™«†• <E† •†<™Žœ with. °, †ˆf <™ ˆ†ˆf“•†•†™ Ž™E •Žf<„ –E“ˆ Ž... <E† •†<™Žœ open. ‘ ˜ <™™†™†” •™E†• Š thefile< •• ˆE<œ <E† Ž•, •Ž<> •E.

«œ–Ž% “ˆŽ• <E •E†“, <E•E thefile.__enter__ Ž,f†ˆ, „••f E ŽŽ™“”•ˆ <™E “Š•f“ˆ“”<> ˆŽ... ˆE<... “ˆf €œ–Ž% “ˆŽ• <™ thefile.__exit__, ˆ–™« <•Ž•fŠ•f E ŽŽ™“”•ˆ <™E “Š•f“ˆ.

j <•f™ “Š•f“ˆ˜ Ž™E «ˆ ••ˆ†• ‘, “³•f ••†fˆ ŽŽ™“”•ˆ finally «ˆ Ž, •Ž•†ˆ–,™†<–•ˆ†ˆ ˆE<...†ˆˆ†ˆ ˆŽ... <E † «™™ __exit__. ‘ E<... •†ˆf Ž™E †ˆ˜ Ÿ™E«”•f †ˆ ˆŽ™–«’™E†• †ˆ „, E•f†™Ž™f™«†•, E<˜ •†<™Ž˜ try.. finally •Žˆ†ˆfŽE†††˜.

€•,f••...<•, E •E–œ<E•E ‘fˆ ˆE<... <™ «†ˆ •†ˆf Ž, ˆ ˆŽ... <™ Ž••™ ˆE<™« <™E ŸfŸŽ™E, <•f Žˆ, ˆ“ˆŽŠ ˆ†ˆ–, «••<• <™ PEP343^[1], fˆ ŽŽœ, E•Ž•|œ’ E•E.

‘ “†•E˜

j „™E†• •E–E<œ•f <E† „,œ•E <>† •†<™ŽŠ† try..except “ˆf try..finally. j „™E†• ••f Ž>˜ †ˆ •E†f™E, ‘™«†• <™E˜ •f“™«˜ †ˆ˜ <«Ž™E˜ •|ˆf, ••>† “ˆf Ž>˜ †ˆ ˆ†ˆ••f”†«™E†•, •Ž•E˜, •|ˆf, ••f˜.

Šˆ<...Žf† «ˆ •|•, •E†œ•™E†• <E† Ž, ...<EŽE ŸfŸŽf™«œ“E <E˜ Python (Python Standard Library).

-
- €,™E’™«†•†™ • ŠŽ...†•†™
 - €••> •<ˆ Ž•,f•„...†•†ˆ

References

- [1] <http://www.python.org/dev/peps/pep-0343/>

Python el:€ , ...Š''' ~ -f--f•• i ~

Šf•^žžž

² ž, ...<€ž€ ŸfŸžf™œ"€ <€ Python ž, f „f ††† <•, "•<f™ ^, f††... „, œ•f††† ^, †, > †" <> † -----Insert non-formatted text here----- [[http://www.example.com link title]] " ^f •†^f †, ™ " " " œ• ž, ...<€ž€ "• " ^<" •<^•€ Python. Š•†^f •€†^†f" ... †^ •|™f"•f> œ••<• †• <€† ž, ...<€ž€ ŸfŸžf™œ"€, •ž•f•œ ž™žž" ž, ™Ÿžœ†^<^ †žž, ™«†† žž€™«† ', œ'™, ^•"† ••<• •|™f"•f> ††™f†• <™ •«, ™~ <> † ž, ^'†" <> † ž™€ †žž, ™«††† ^ " "†™€†† ™fŸfŸžf™œ"•~.

¶^ •|•, •€†œ•™€†• †•, f" " ^ž... <^ žf™ •€†€œ††† †^ ^, †, Š†^<^ •• ^€œœ <€ ŸfŸžf™œ"€. —ž™, ••<• †^ Ÿ, ••<• ™žž" žž, > † †•~ žž<™†, •f•~ 'f^ ...ž^ <^ ^, †, Š†^<^ <€ ž, ...<€ž€ ŸfŸžf™œ"€, •<™ 'Library Reference' section [1] <€~ <•†€, > •€~ ž™€ •€†™••œf " " œ• •' " ^<" •<^•€ <€ Python.

A~ •|•, •€†œ•™€†• †•, f" " „, œ•f†^ ^, †, Š†^<^.

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Š†† Ÿ, ••<• <^ œ †^<^ •• ^€... <™ "—"žf™ žžžžœ ž, ™„>, €††† (advanced) †žž, ••<• †^ ž^, ^ž••³•<• ^€... <™ "—"žf™. €"†> ^, •' Š •^^ •€†f•<Š†† •žf•<, ³•<• •• ^€... <™ "—"žf™, ...<^†† †fŠœ•<• žf™ "†•<^ ž, ™', ^†††<•-™†<^~†• Python.

Ÿ•€, •, †^ sys

•™ " , †, > †^ sys ž, f „f ž•f<™€, 'f' ...<€^ •f•f" 'f^ <™ •«•<€†^ . i „™€†• œ•€ •f ...<€ ž•<^ sys. argv ž, f „f<™, •†^<^ <€~ ', ^††œ~†žžžž.

• žžœ <™€†• ...<f œ žž€†• †^ •ž ' |™€†• <€† "•™•€ <€ Python žž€ „, €•f†™žžf•• <™ •«•<€†" †^~, <f Š•<• †^ •žfŸ•Ÿ^fŠ•™€†• ...<f „, €•f†žžf™œ†• <™€žž" „f<™† <€† "•™•€ 3. •™ " , †, > †^ sys †^~ •†f ^€œœ <€ ž•f<™€, '•^.

```
>>> import sys
>>> sys.version_info
(3, 0, 0, 'beta', 2)
>>> sys.version_info[0] >= 3
True
```

€Š~ •™€žž•œf:

™ " , †, > †^ sys „f <€†žžf"•^ versi on_i nfo žž€†^~ •†f <€†žž€, ™—™, •^ 'f^ <€† "•™•€. ² ž, Š<€ " ^<^ „Š, €•€ •†^f € "«f^ "•™•€. ' €<... †žž, ™«††† <™ •ž ' |™€†•, 'f^ žž, "•f†^, 'f^ †^ •žfŸ•Ÿ^fŠ•™€†• ...<f <™ ž, ...', ^†††<, „f†...†™ €žž... <€† Python 3.0:

```
#!/usr/bin/python
# Filename: versioncheck.py
import sys, warnings
if sys.version_info[0] < 3:
    warnings.warn("Need Python 3.0 for this program to run",
                  RuntimeWarning)
else:
    print('Proceed as normal')
```

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' , , f " " , Ž ' "™£† • Ž™£™ Ž•f<™£, ' f " • « <£† ^ , , £•f†™Ž™£™£† • , Ž ' "™£† <^ <£ •£†Ÿ™Ž™£ • f , " Ž™£ • Ž f < , - < ^ f ^ Ž... <£† platform. platform() (' f ^ Ž • , f • • • < , , ~ ŽŽ£,™—™, • • • < <£† import platform; help(platform)). Š"† •† ^ f Windows •† — ^† •™£† • <™† home drive, <™ — " " • Ž™ home " ^ f <™ ...†† ^ <™£ ^ , , "™£ (filename) ...Ž™£ • Ž™£† • † ^ Ž™££ " • « •™£† • < f ~ ŽŽ£,™—™, • • • , •™Ž™££ • Š† <^ ^ ££ " ^ < , • ^ † , £† ^ — , Ž ^ , †™£† • <£†™Ž™£Ž£ , † †£ • ££™££ ^ , , "™£. ' f ^ " ŽŽ• ~ ŽŽ ^ — , † ~ , ^ Ž ^ f < • • < f † | ,™£† • † ...†† <™ — " " • Ž™ home <™££ , , ££ <£ " ^ f Ž ^ , †™£† • <£† ŽŽ££ , ££ • ££™££ ^ , , "™£.

[illegible]

TODO

```
import sys
```

```
import json
```

YAHOO_APP_ID =

```
query = input('What do you want to search for? ')
for result in search(query)['Result']:
    print("{0} : {1}".format(result['Title'], result['Url']))
```

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TODO

$$\in \check{S} \sim \bullet^{\text{TM}} \text{f} \check{Z} \bullet \ll \bullet f:$$
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JSON.

K"†™£†• †f^ •«†•••£ •• ^£<œ <£ •f•«£†•£ (URL) „£•†™ž™fš†<^~ <£ •£†", <£•£ url lib. request. url open() "ˆf ž•, †™«†• ^£<... <™ ^, „•™ †^ <™ „f, f•<• £ j son. load(), (£™ž™. ^ ˆ •fˆŸ" ••f <™ ž•, f„...†•†™ "ˆf <£<...„™†ˆ ˆ <™ †•<^<, 3•f •• ††f„•†•†™ <£~ Python. •...< " "†™£†• Ÿ, „„™ †•> ^£<š† <† †™ž™<•ž••†™ <† "ˆf <™ ž•,™£•f"™£†••<™††<•žf„...„œ•<£.

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. ž“ , „™£† ž™žž“ ž•, f•...<•, ^ ‘f^ †^ •|•, •£†£™«† •<£† ž, ...<£ž£ ŸfŸžf™«œ“(£ ...ž> ~ (£ •• —^ž†” <> •£ [4], ™
„•f, f•†...~žfž™“ Š† <£‘ ‘, ^††œ••†<™žš† [5], ™f “^†™†f” ~ “—, ”•f” [6] “.<.ž.
± “^ž<<, ™™ <, ...ž™™ ‘f^ †^ •|•, •£†œ••<• ž•, f•...<•, ™ <£† ž, ...<£ž£ ŸfŸžf™«œ“(£ ••†^f, f•^Ÿ” -™†<^~ <£†
£ž , ™„£ ••f, ” <™£ Doug Hellmann's, Python Module of the Week [7].

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[illegible]

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- $\in \bullet \bullet \rangle \bullet \wedge \check{\text{Z}} \bullet, f_{g \dots} \dagger \cdot \ddagger^{\wedge}$

References

- [1] <http://docs.python.org/3.0/library/>
- [2] <http://bugs.python.org/issue3763>
- [3] http://search.yahooapis.com/WebSearchService/V1/webSearch?query=byte+of+python&appid=j122psvV34HELWhdfUJbfDQJzI2B57KFS_qs4I8D0Wz5U5_yC11Aww8.IBSfPhwr&results=20&start=1&output=json
- [4] <http://docs.python.org/dev/library/pdb.html>
- [5] <http://docs.python.org/3.0/library/getopt.html>
- [6] http://www.diveintopython.org/regular_expressions/index.html
- [7] <http://www.doughellmann.com/projects/PyMOTW/>

[illegible]

<code>~•†~</code>	<code>Š« ž~•~</code>
<code>__init__(self, ...)</code>	<code>' E«œ E† ˆ™•™~ " ^Ž••<^f^† •> ~ ž, f† •žf•<, ^~•• 'f^ ˆ, œ•E <™ ^†<f"•†•†™ ž™E†...žf~ •E†f™E, 'œˆE"•.</code>
<code>__del__(self)</code>	<code>Š^Ž••<^f^† •> ~ ž, f† " ^<^•<, ^~•• <™ ^†<f"•†•†™</code>
<code>__str__(self)</code>	<code>Š^Ž••<^f...<^† ˆ, (E•f†™ž™f™«†• <E•E†", <E•E print œ...<^† ˆ, E•f†™ž™f••<^fE str()).</code>
<code>__lt__(self, other)</code>	<code>Š^Ž••<^f...<^† ˆ, (E•f†™ž™f••<^f™ <•ž••<œ~ •f^~...-ž†...• %œ-n(<). ±†™•> ~, Ež", ˆ™E† •f•f" ~† ˆ™•™f'f^...ž™E~ <™E~ <•ž••< ~ (+, >, " žž.).</code>
<code>__getitem__(self, key)</code>	<code>Š^Ž••<^f...<^† ˆ, (E•f†™ž™f••<^f™ <•ž••<œ~ •E, •<E, ^•E~ x[key].</code>
<code>__len__(self)</code>	<code>Š^Ž••<^f...<^† ˆ, (E•f†™ž™f••<^fE•†•>†^<>††E•E†", <E•E len() 'f^ <™ ^†<f"•†•†™ ^™ž™Eˆˆ~.</code>

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 ©™fž...†, Ež", „f†††•f™† " <E†^†. '†Ežž™" "•••~ž•, f„f†...†™†f††™††fœ•†<™žœ, <...<†ž™, •••††<E†™, •••<•<E†••f^', ^††œ†††f^•E†œœ"Eœ††Ÿ, ...™, 'f^ž^, "••f††. •™žf™" " <> ž^, "••f††ˆˆž, ž•f††|•" ^ˆˆ, ••f" "ž> ~ <^ž, "†<^:

```
>>> flag = True
>>> if flag: print 'Yes'
...
Yes
```

€^, ^<E, œ•<•...<fE†™††•f"œ•†<™žœ„ (E•f†™ž™ž™f••<^f•<E†••f^ˆˆE" ^f...f>~|•„>, f•œžž™" "•••. €^, ...<f†ž™, •••††<™„ (E•f†™ž™fœ••<•^E<... 'f^††" "†•<•<™ž, ...', ^††" ••~"†f", ...<•,™", ••~•E†f•<š††^ž™-«'•<•^Eœœ<E†ˆ™•™•E†<...†•E•E~, " <...~...<^†•ž'„•<•'f^ž"œE, "E, >~'f^<•ˆˆ•††fž™ž«•E"™ž...<•,™††ž,™•ˆ••<†f^', ^††œ"Š•f" ^ˆ†„ (E•f†™ž™f••<•^††f"œ••™„œ"Š•f" ^.

Lambda Forms

²•†<™žœ | lambda „, (E•f†™ž™f••<^f'f^††•E†f™E, 'œ•f††^†<f"•†•††•E††, <œ••>†^†††<^•žf•<, ³•f" ^<" <E†••<ž••E.

```
#!/usr/bin/python
# Filename: lambda.py

def make_repeater(n):
    return lambda s: s * n

twice = make_repeater(2)

print(twice('word'))
print(twice(5))

i |™•™~:
```

```
$ python lambda.py
wordword
10
```

€Š~•™£Ž•«•f:

```
Š•Š „,£•f†™ž™f™«†• <£•£†“,<£•£ make_repeater 'f††•£†f™£,'œ•™£†• “^††™«„f††††•††††
•£††,<œ•••† “^<“ <£†• “<Ž••£ “^f††<^•žf•<, ³™£†•. ²•†<™Žœ lambda „,£•f†™ž™f••<^f'f††††
•£†f™£,'œ••f<™^††††•†††™•£††“,<£•£~.±£•f^<f““ £ lambda • „•<^f††ž^,“†<,™^“™ž™£™«†•†£^ž...
†f†††††•f“œ “—,^•££™ž™•^††•<^f<™•Š†^<£~•£††“,<£•£~ “^f£††œ^£œ~<£~ “—,^•£~•žf•<, —•<^f
^ž...<£††^•£††“,<£•£.££†•fŠ•<•...<f™«<• “^†††††•††<™Žœ print ••†ž™,••††„,£•f†™ž™f£™«†•†••††
lambda,†...††•“—,“••f~.
```

TODO

```
—ž™,™«†•†† “”††£†•†† list.sort() ž^, „™†<~††††•£††“,<£•£•«’“,f•£~•£†f™£,'£††£^ž...
††† lambda;
```

```
points = [ { 'x' : 2, 'y' : 3 }, { 'x' : 4, 'y' : 1 } ]
# points.sort(lambda a, b : cmp(a['x'], b['x']))
```

™^Š^†...~•~—f•Š!†

² “^<^†...£•£žf•<Š† (List comprehension) „,£•f†™ž™f••<^f'f††††•|”™£†•††††^ž••<^ž...†††£—f•<”††£.
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ž••<^ž™žž^žž^f^††††£~•ž•2†...††™...<^†™••f™~™^,f††...•††††•^ž«<•,™~^ž...2.² “^<^†...£•£ž••<^
•††††•^††œ'f^<™f~ž•,fž<Š••f~.

```
#!/usr/bin/python
# Filename: list_comprehension.py
```

```
listone = [2, 3, 4]
listtwo = [2*i for i in listone if i > 2]
print(listtwo)
```

j |™•™~:

```
$ python list_comprehension.py
[6, 8]
```

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Š•Š, „™£†••|”’•f††††^ž••<^™,•™†<~†† „f,f†... (2*i) ...<^††^††ž™f••<^f††††£†œ“£ (i f i > 2).

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•™žž™† “<£†^<£~ „,œ•£~ “^<^†...£•£žf•<Š†•††††...<f††††f<£†ž™•...<£<^<™£•ž^†^ž^†Ÿ^††††††™£
“Š•f”^ž™£^ž^f<••<^f...<^†„,£•f†™ž™f™«†•Ÿ,...™£~'f††•ž•|•,'^<™«†• “”™•††<™f„•^††^ž••<^
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<™ž,„™•†^*œ<™**^†<•<™f„^.'£<...„,£•f†•«f'f††ž^,†™£†•†††<^Ÿž£<...^,f††...™,f•†”<†••
†††•£††“,<£•£.

```
>>> def powersum(power, *args):
...     '''Return the sum of each argument raised to speci fied power.'''
...     total = 0
...     for i in args:
```


- •"†€ , Š~•~ repr

² •€†", <€•€ repr „, €•f†™ž™f••<^f'f^†ž"Ÿ™€†•†f^"††™†f"™ž™f€††€^†žž", "•<^•€>~•€†Ÿ™ž™••f, "~<™€^†žž"•f†††™€. •™•†•f^—,™†††,™~•†^f...<f¤^„•< eval (repr(object)) == object <fž•, f••...<•, •~—™, ~.

```
>>> i = []
>>> i.append('i tem')
>>> repr(i)
"['i tem']"
>>> eval(repr(i))
['i tem']
>>> eval(repr(i)) == i
True
```

°^•f" ", €•€†", <€•€ repr „, €•f†™ž™f••<^f'f^†ž"Ÿ™€†•†f^•€^†"††>•<€" ^f •" <žžŠ•f†€^†žž", "•<^•€<™€^†žž"•f†††™€. —ž™, ••<†^•ž'†•<•<f•žf•<, —™€†™f"ž"•f~•^~'f^<€•€†", <€•€repr™, •—™†<~<€†¤™•™__repr__•<€†"ž"•€.

' "†•€~

§^ž«³^†•†•, f" ~^" ...†^•€†^<...<€<~<€~ Python •' ^€<... <™"•—"ž^f™, ^žž" ^fžž"žf••†<f~„™€†• ^ž«³f...ž~. ^<...•™, •' ^€<... <™•<"•f™„™€†•†fžž••f<^ž•, f••...<•, ^ ^ž... <^„^, ^" <€, f•<f" "ž™€¤^„, •f^•<••<••<€†ž, "†€. ' €<"•†^f^, "•<"'f^†^†•f†žž••<†•™ž™f^•žž™<ž,™', "††^<^"™žž•«<•†^•€†f™€, 'žž••<•. €<€•€†„•f^, ¤^•™«†•žš~†ž™, ••<†^•†•, •€†žž••<•<€† Python ^" ...†^žž, f••...<•,™.

- € ,™€'™«†•†™• šž...††™
- €••> •<^žž, f„...††^

References

[1] <http://docs.python.org/3.0/reference/datamodel.html#special-method-names>

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' ‡ • f ^ Ÿ " • ^ < • ž , ™ • • " < f " " ‡ „ f • • Š ^ f < ... < ™ Ÿ f Ÿ ž • ™ , " ^ f • | ^ • " f f f " ^ < • ‡ • < f • f ' ' , ^ - œ ž ™ ž ž Š ‡ ž , ™ ' , ^ † † " < ‡ , < ... < • ‡ ^ ž , ž • f ‡ ^ ‡ f Š ‡ • < • " ‡ • < " ^ f ™ f " • • ‡ • < f ™ Python. ¶ | ^ „ < • ž f ‡ ^ ‡ • < ^ < • f f ™ f , ' œ • • f ‡ • , f " ž , ™ ' , " † † ^ < • • Python ' f ^ ‡ ^ ™ " f " • • < < f ' ‡ Š • • f ^ • ^ " ^ f ' f ^ ‡ ^ • " œ • • < < f f " ^ ‡ • < f < ^ • ^ • . ' ‡ • • ‡ < ™ „ • < • " ‡ • f œ • f , ‡ ^ ž , ž • . Š ^ f < Š , ^ < f ' • ‡ • < f ; a • ™ « f ^ ž ™ , • ^ !

Š f • f ™ « ‡ ^ f ‡ ^ • „ ™ ž f œ • • < • ‡ • ^ f < ... < ™ ž , ... Ÿ ž f ‡ :

¥ f f ™ f , ' œ • • < ™ • f " ... • ^ ~ š t š , ^ • • ‡ f Ÿ - ' f | - • • ' , ^ † † œ • ‡ < ™ ž Š ‡ , ‡ • < f „ œ • f < ™ f ™ ž ™ f œ ^ ‡ ž ™ , • • < ‡ ^ ž , f f ' œ • • < , ‡ ^ ž , ™ • ‡ < • • , ‡ ^ • ž • | • , ' " - • • < , ‡ ^ • f ^ ' , " - • • œ ‡ ^ ^ ‡ ^ - f < " < < f • ž ^ - ~ • ^ ~ , ... ž • ~ < ™ f ~ - ž ™ f ~ , < f ‡ ™ f " ™ ' ‡ • f ^ œ < ™ f ~ • f ‡ • , ' " < ~ • ^ ~ , " ^ f < f ~ ž ž f , ™ - ™ , • • < ™ f ~ ... ž • ~ < f • f • f œ ‡ • • f ^ ž ž f ™ ' , ^ - • ^ ~ < ™ f ~ " ^ f / œ < ™ f < f ™ f ~ -> ‡ • < ™ f ~ . ± f ž • ž < ™ † , • f • ^ ‡ ^ ž , ž • f ‡ ^ ž ™ f œ " • « ™ ‡ < f ' f ^ ‡ • ž ž ™ ‡ < f " œ ž , ™ • ž ž ^ œ .

' f < ... • ‡ ^ f • „ • < f " " • « ™ ž ™ ^ ‡ < ™ • " - • • < • Ÿ " • • f ... ž • ‡ • • ^ • ž ^ ‡ • ‡ „ f < Š , ^ . ' ‡ ^ " ... ‡ „ f " - • • < • ™ • f • • ^ ' f ^ < ™ ž Š ~ ‡ ^ ž , ™ „ > , œ • • < • ™ , • • < ‡ f ^ f ž ... • • f | f :

2' ... œ • f « ~ (% ~ ‡ Š ~ œ f ^ - f • • Š •)

¥ f f ™ f , ' œ • • < ‡ f ^ " ž " • f ž ™ f œ ^ ‡ ^ ž ^ , f • < " < f ~ ž ž f , ™ - ™ , • • ‡ • ~ ^ < ... ‡ ™ f . ¬ , f f ™ ž ™ f œ • • < ‡ ^ ž • | f " ... ' f ^ ‡ ^ ^ ž ™ f œ " • « • • ^ ‡ < f " • • ‡ ^ ^ ‡ ‡ , Š ž • ‡ ‡ • < ™ ... ‡ ™ ‡ " < ™ f ~ > ~ " ž • f • • . ¬ , f f ™ ž ™ f œ • • < < ™ " , ‡ , > ‡ ^ pickle ' f ^ ‡ ^ ^ ž ™ f œ " • « • • < ^ ‡ < f " • • ‡ ^ ‡ ^ ‡ ™ ‡ ^ • < ™ • • • " ™ . ¬ , f f ™ ž ™ f œ • • < < f ~ ‡ • > ‡ ^ < ‡ ‡ • ‡ • • ™ f ~ < ‡ ž • | f " Š ‡ ' f ^ ‡ ^ ž , ™ • ‡ • • < , ‡ ^ • f ^ ' , " 3 • • " ^ f ‡ ^ • ž • | • , ' ^ • • < • • < < ™ f ~ ^ ‡ ‡ , Š ž ™ f ~ .

„ < ^ ‡ ‡ ^ ‡ ™ , • • < ‡ ^ < ™ " " ‡ • • ^ f < ... , ‡ ^ ‡ ™ , • • < ‡ ^ ^ f < ™ ^ ž ™ " ^ ž • • < • ž , ™ ' , ^ † † ^ < f • < ~ < f ~ Python. • Š , ^ • • • ž < • ™ f ^ ‡ ^ > ~ ‡ ^ email [2] • f „ ^ , f • < Š ‡ < ^ ~ ‡ • ' f ^ ^ f < ... < ™ • ž ™ f • ^ ™ Ÿ f Ÿ ž • ™ ; -) . ' f < ... < ™ Ÿ œ ‡ ^ • • ‡ ^ f ž , ™ ^ f , • < f " ... ^ ž ž " ž , ™ < • f ‡ • • ‡ • ‡ • . š ž • • f ~ , ž ^ , ^ " ^ ž Š • " - • • < • ‡ ^ ‡ ž < • ‡ ^ " " ‡ • • ‡ f ^ • f • ™ , " , ‡ ^ • f ‡ • f - , • • Ÿ • ž < f Š • • f • < ™ Ÿ f Ÿ ž • ™ œ ^ f œ œ < f ‡ • < " - , ^ œ ' f ^ ‡ ^ • < f , • | • < < f • f ^ , " œ ^ ‡ " ž < f | f ^ f < ™ « < ™ f Ÿ f Ÿ ž • ™ f .

' ‡ Ÿ , œ " ^ < • ^ f < ... < ™ ž , ... ' , ^ † † ^ • « ™ ž ™ , ™ , • • < • ‡ ^ ^ " ... ‡ :

• ž ™ ž ™ f œ • • < < f ‡ • ‡ < ™ ž œ replace [1] . ' f œ œ f • ‡ < ™ ž œ œ ^ ‡ < f " ^ f • < " ‡ f ^ • f ™ ž ™ • • f , " ‡ • ‡ f ^ " ž ž f • < ™ ž • • < ^ < ‡ ^ , „ • • > ‡ ž ™ f ž ^ , „ • < f .

2 • ‡ < ™ ž œ ^ ‡ < f " ^ < " • < ^ œ ~ ‡ ž ™ , • • ‡ ^ • • ‡ ^ f ... ™ ^ ž ž œ œ ... ™ • | • - f < f ‡ ‡ f ‡ ž • < , ^ ž ... ^ ž ž œ ^ ‡ < f " ^ < " • < ^ œ • f ™ ž ™ • • f , " ~ • Š ~ ^ ‡ ^ - œ < f • f ^ ‡ ™ < • Ÿ ^ (" ^ ‡ ™ ‡ f " ~ • " - , " • • f ~) .

- • < " ^ ž ' ^ f < ... , ‡ ^ ‡ • , f " ™ • ^ " ... ‡ ^ < , ... ž ™ f ' f ^ ‡ ^ • f ‡ • • • • < ™ < ^ | • • f • ^ ~ • < f ™ Python:

€ ^ , ^ œ • • ž ‡ ^ Š ^ i | œ f i ^

± " ^ ž « < • , ™ < , ... ž ™ ~ ' f ^ ‡ ^ ‡ " • • < • ‡ f ^ ' ž Š • • ^ ž , ™ ' , ^ † † ^ < f • ‡ ™ « • • ‡ ^ f ‡ ^ ' , " - • • ž ™ ž « " Š • f " ^ " ^ f ‡ ^ • f ^ Ÿ " - • • < ž ™ ž « " Š • f " ^ :

% • ™ , ' ™ PLEAC [2]

% ' ž ™ ‡ • < œ , f ™ " Š • f " ^ Rosetta [3]

% € ^ , ^ • • • ‡ ^ < ^ Python • < ™ java2s [4]

% • ™ Python Cookbook [5] • ‡ ^ f ‡ f ^ ^ ‡ • " < ‡ f < f • f ž ž ™ ' œ ^ ž ... • f ‡ < ^ ' ~ " ^ f • f ™ f ™ ž ~ ' f ^ < f ž « • f

• f ' " • " , f ‡ ‡ ž , ™ Ÿ ž f ‡ ^ < ‡ • • Python. ' f < ... • ‡ ^ f " " < f ž ™ f " " • • „ œ • < f ~ < f ~ Python ž , ž • f ‡ ^ • f ^ Ÿ " • • f .

Š, ȡŠ ••fŽ i ^f ^' ^†Š ••fŽ

```
% ŠŽ••Œ†•~ " ^Ž ~ " ^f " ^" ~ Ž, ^" <f" ~ <Œ~ Python [6]
% ŠŽ••Œ†•~ •Œ„† ~ •, > <œ••f~ <Œ~ Python [7]
% ŒŽ" †f•~ •, > <œ••f~ <™Œ Norvig [8]
% Š, > <œ••f~ " ^f ^Ž ^†<œ••f~ Python [9]
% Š, > <œ••f~ 'f^ <Œ† Python •<™ StackOverflow [10]
```

' "†-•"-ŒŽ i ^f i ...-' ^

```
% ŒŒ†Ÿ™ŒŽ ~ " ^f " ...ŽŽ^ <Œ~ Python [11]
% •™ Ž,™ „>, Œ† †™ Ž™' f•†f™Ž™f•™ <Œ~ Python [12]
% •™ Charming Python [13] •†^f†f^ •†^f, •<f"œ••f, " ^Ž... ", ȡ, ^ •„•<f"" †• <Œ† Python ^Ž... <™† David Mertz.
```

±f—•^, •, Ž^•••Ž, -•~• †^Š^ i ^f—•†Š••

©™'f"" <™ •Ž...†•†™ Ÿœ†^†•<" ^Ž... ^Œ<... <™ ŸfŸŽ•™ •†^f†^ •f^Ÿ" ••<• <™ " ^<^ŽŽŒ" <f" ... ŸfŸŽ•™ Dive Into Python [14] <™Œ Mark Pilgrim <™™Ž™™†Ž™, ••<• •Ž••Œ~ †^ Ÿ, ••<• •>, •"† •<™ •f^••" <Œ™. •™ ŸfŸŽ•™ Dive Into Python •†•, •Œ†•• ȡ†^<...Ž> ~™f " ^†™†f" ~ •"—, " ••f~, Œ •Ž•†•, ' ^••^ XML,™f ŒŽŒ, •••~ •f" <«™Œ, <™ unit testing, ".ŽŽ. ••Ž•Ž<™†, •f^.

½ŽŽ•~ „, œ•†•~ ŽŒ' ~ •†^f:

```
% ShowMeDo Ÿ•†<•™ 'f^ <Œ† Python [15]
% GoogleTechTalks Ÿ•†<•™ 'f^ <Œ† Python [16]
% ≥ •" <•<^† †Œ Ž••<^ Ÿ™ŒŒŒ†" <> † <Œ~ Python ^Ž... <™ Awaretek [17]
% ≥ Effbot's Python Zone [18]
% ±f •«†•••†™f •<™ < Ž™~ " " ȡ• †Œ†«†^<™~ Python-URL! [19]
% •^ Python Papers [20]
```

' "ȡ Š~•~

' † ••†Ž™, ••<• †^†•™ŽŽœ••<•†' †^Ž, ...ŸŽŒ†^•<Œ† Python, " ^f ••†, •<• Ž™f...† †^, > <œ••<•, <...<• Œ™†" •^ •Œ-œ<Œ•Œ~ comp.lang.python [21] •†^f™ " ^Ž«<•,™~ „Š,™~ 'f^†^, > <œ••<•.

Œf'™Œ, •Œ<••<•...†> ~ Ž, Š<^...<f <™ ∃"†^<•, "•<" ^Ž...†™f•~ " ^fŽ,™•Ž^œœ•^<•†^ Ž«••<• <™ Ž, ...ŸŽŒ†^.

ŠŒœ ••fŽ

' † ȡ Ž•<•†^†^ȡ•†•<•<^†•...<•, ^ ^Ž...<™† " ...†™ <Œ~ Python, <...<• Ž^, ^" ^Ž™Œœœ•<• <™† ŠŽ••Œ†™ ŽŽ"†Œ<Œ Python [22] " ^f/œ <™† [http://www.planetpython.org ' †•Ž•Œ†™ ŽŽ^†œ<Œ Python.

Python^[30].

' "†•£~ Š¤† •, ž~—•¤† GUI

¥£•<£„Š~ ••† £ž", „f " ^† †^ ž, ...<£ž™ •, ' ^ž•™ GUI ' f^ <£† Python. Šf•£'™«†^f †^ „, £•†™ž™fœ••<• †^ ^ž... <^ žf™ ž" †> •, ' ^ž•™, ^†ž™ ^† † <£† " ^<" •<^œ •^~. ± ž, Š<™~ ž^, "™†<^~ •†^f ^† ••<• •f^<•¤†† †™f †^ žž£, Š••<• ' f^ †^ „, £•†™ž™fœ••<• †^ •, ' ^ž•™ GUI. ± ••«<•,™~ ž^, "™†<^~ •†^f ^† † ž•<• <™ ž, ...', ^††" •^~ †^ <, „f †™†™ •• Windows, œ †™†™ •• Mac, œ †™†™ •• Linux, œ •• ...ž^~. ± <, <™~ ž^, "™†<^~ •†^f, ^† •f^ž | ^<• <£ž žž^<—, †^ Linux, ^† ••<• „, œ<£~ <™£ KDE œ <™£ GNOME.

' f^ †f^ žf™ ž•ž<™†•, œ " ^f žžœ, £ ^†ž££, ••<• <£ ••ž•^ 26 <™£ The Python Papers, •...†™~ 3, ••«„™~ 1 [31].

©f£< •, •ž "—•' •f ••fž

• ž", „™£† •£†œ¤> ~ •«™ †, £ •• †f^ ' žš••^ ž,™', ^††^<f•†™«: £ ' žš••^ " ^f <™ ž™' f•†f" ≥ ' žš••^ ••†^f <™ €™„', " —•<• " " <f. •™ ž™' f•†f" ... •†^f <™ žžž, ^††^<f" " •" <•ž•<^ ž,™', "††^<" †^~.

š†•• „, £•†™ž™fœ••^†• <™ ž™' f•†f" ... CPython ' f^ †^ •" <ž™«†• <^ ž,™', "††^<" †^~. ' †^—•, ...†^<• •' ^£<... >~ CPython •ž•f•œ •†^f', ^†† †™ •<£ ' žš••^ C " ^f •†^f™ •, %' †^—• •†ž...••—†ž„ ž•„ Python.

• ž", „f •ž•£~ " ^f " žž™ ž™' f•†f" ... †• <™ ž™ž™†ž™, ••<• †^ <, |•<• <^ ž,™', "††^<" •^~:

Python [32]

—f^ £ž™ž™•£•£~ <£~ Python žž£ <, „f •<£ž žž^<—, †^ Java. ' £<... •£†^†•f ...<f †ž™, ••<• †^ „, £•†™ž™fœ••<• <f YfYžf™œ"•~ " ^f <£~ žž" ••f~ <£~ Java † •^ ^ž... <£† Python " ^f <™ ^†<•¤•<™.

IronPython [33]

—f^ £ž™ž™•£•£~ <£~ Python žž£ <, „f •<£ž žž^<—, †^ .NET. ' £<... •£†^†•f ...<f †ž™, ••<• †^ „, £•†™ž™fœ••<• <f YfYžf™œ"•~ .NET † •^ ^ž... <£† Python " ^f <™ ^†<•¤•<™.

PyPy [34]

—f^ £ž™ž™•£•£~ <£~ Python ', ^††•†£ •• Python! ' £<... •†^f †^ •, •£†£<f" ... , '™ ' f^ <£žžž" „£†•£ " ^f •f•£ " ...ž£†•£ <£~ ž•ž<•> •£~ <™£ •f•, †£†•£œ ^—™«™ •f™™ •f•, †£†•£œ~ f†^f', ^†† †™~ •• †f^ •£†^†f"œ ' žš••^ (•• ^†<•¤•£ †• <f~ <^<f" ~ ' žš••~ ...ž~ ~ <£ C, <£ Java œ <£ C# <f~ <, •f~ £ž™ž™fœ••f žž£ ^†^— , ¤£ " ^†žf™ ž" †>).

Stackless Python [35]

—f^ £ž™ž™•£•£~ <£~ Python žž£ ••<f" —f•<£ž ^ž...•™•£ ž•† †£ •• †œ†^<^.

• ž", „™£† " ^f " žž•~ , ...ž~ ~ £ CLPython [36] -†f^ £ž™ž™•£•£~ <£~ Python ', ^†† †£ •• Common Lisp- " ^f £ IronMonkey [37] £™ž™•^ ••†^f †f^ †•<^—™, " <£~ IronPython Š•<• †^ •™£ž•«f ž" †> ^ž... ††† •f•, †£†•£œœ JavaScript ž, "††^<^ žž£ <, „™£† † •^ ^ž... <™žžž, f£' £œœf•<™« ("Ajax").

Š"¤•†f^ ^ž... ^£<~ <f~ £ž™ž™fœ••f~ „f <£ž •f•f"œ žž, f™„œ „, œ••> † •<£ž™ž™•^ •†^f „, œ•f†£.

' "†•£~

•Š, ^ —<" •^†• •<™ < ž™~ ^£<™« <™£ žfYžž™£, ^žž" •†^<• †™†™ •<£ž ^, „œ <™£ <^ |f•f™« †^~ •<£† Python. Š••<• žž^ f™^†™• ž,™', ^††^<f•< ~ <£~ Python " ^f „> , ~ ^†—fYžž•^ ••<• <™f†™f †^ žž••<• žžžž" ž,™žžœ†^<^ „, £•†™ž™fšž<^~ <£† Python. —žž, ••<• †^ ^, „••<• †^ ^£<™†^<™žžfœ••< žžžž" ž, "††^<^ •<™žž £žžž™' f•<œ •^~ žž£™«<• <^ —†<^—...•^<^†žf™ žžžf", œ †^ ', "ž•<• <^ •f" " •^~ žžf„†•f^, " ^f žžžž" žžžž" "žžž! ©™fž...†, <f žž, f† †•<•;

-
- €,[™]€'™«†•†™ • ŠŽ...†•†™
 - €••> •<^ Ž•,f•„...†•†^

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-

Python el: €^, €, Š~†^ Š-¤••€, f

' €<... <™ ' Ž> ••", f Ž•, f „•<^f †...†™ •ŽŽ€†f“œ †•<“—, ^ •€ <™€ ŸfŸŽ•™€ †• <€† “ ••f^ <™€ ^, „f“™« •€†f™€, '™«. ' † ^Ž™—^••••<• †^ •f^Ÿ“••<• <€† ^' ' Žf“œ “•™•€, œ †^ ^'™, “••<• †^ <€Ž> † †™ ^†<•', ^—™, •• ¤^ •€†Ž•, fŽ^†Ÿ“†f^€<... <™ ' Ž> ••", f.

Š' f-«Š• €†^ Ž, €††^:

A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|R|S|T|U|V|W|X|Y|Z

A

and

Ž™' f“ ... Š' a: <™ and •†^f †~ <Ž••œ~™™Ž™.™~ •Žf•<, —f False ^†™ Ž, Š<™~ <Ž••<™~ •†^f False, ^ŽŽfŠ~ €Ž™Ž™' ..•f “^f •Žf•<, —f <€† <†œ <™€ ••«<•,™€.

arguments

™, •†^<^

assignment

•“ „Š, €•€: € ^†“¤••€ †f^~ <†œ~ •• †f^ †•<^ŸŽ€œ. ``f^ Ž^, “••f'†^ •<€† •†<™Žœ x = 2 •“„>, ••<• € <†œ •«™ •<€ †•<^ŸŽ€œœ x.

associativity

•€•„ <f•€: •“—, “-•f <€ ••f, “ •“< Ž••€~ <Ž••<Š† <€~ ••f^~ Ž,™<•, ^f...<€<^~. €<€† Python, €•€•„ <f•€ '•†•<^f^Ž...^, f•<•, “ Ž,™~<^ ••|f“, ...Ž> ~^•†™†<^f™f <Ž••<~ •<™† Ž•†^“^ €•f, “ €Ž™Ž™' f•†™«

B

block

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bug

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C

class

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complex number

†f'^•f“...~^, f¤†...~

concatenation

•€† †> •€

constant

•<^¤•, “

D**data type**

<«Ž™f •••™† ‡> ‡

debug

^ž™•—^Ž†" <> •£

declaration

•œŽ> •£

definition

™, f•†...~

dictionary

Ž•|f" ...

E**escape sequence**

^"™Ž™£¤•^ •f^—£'œ~

exponentiation

«³> •£ •• •«†^†£: •f•†•, '••<^f †• <™† <•Ž••<œ ** " ^f •Žf•<, —•f <™ ^ž™< Ž••†^ <£~ «³> •£~ <™£
ž, Š<™£ <•Ž••<™£ •<£† •«†^†£ <™£ ••«<•,™£. ``f^ ž^, " ••f'†^ £ «³> •£ •• •«†^†£ 2 ** 3 •f^Ÿ" -•<^f
"•«™ •<£† <,•<£" " ^f •Žf•<, —•f 8.

expression

"—, ^•£

F**floating point**

^, f¤†...~ "f†£<œ~ £ž™•f^•<™žœ~

floor division

•f^•,••£ •<,™' '£ž™ž™f£† ‡£ ž,™~ <^ " " <> : •f•†•, '••<^f †• <™† <•Ž••<œ // " ^f •Žf•<, —•f <™†
"™†<f†...<•,™ (ž,™~ <^ " " <>) ^" , ^f™ •<™ ž£ž•"™.

function

•£†", <£•£

3**identifier**

^†^' ‡>, f•<f" ...

immutable

^†•<"Ÿž£<™~

integer

^" , ^f™~ ^, f¤†...~

L**lambda**

"—, ^•£Ž" †Ÿ•^

list

Ž••<^

literal constant

"£, f™Ž•" <f"œ •<^¤•, "

loop

Ÿ, ...™~

M**method**

† ¤™•™~

module

", ¤, > †^

O**object**

^†<f"••†•†™

operand

<•Ž••<™~: †^~ <•Ž••<™~ ••†^f †^ •••™† †™ Ž"†> •<™™Ž™•™ •f•†•, '••<^f †f^ Ž•f<™, '•^ ^Ž... †^†
<•Ž••<œ (ŸŽ.Ž.). ``f^ Ž^, "••f'†^ •<£ •œŽ> •£ 2 + 3™f ^, f¤†™• 2 " ^f 3 ••†^f™f <•Ž••<™f. ``f^
Ž•, f••...<, ^ •••<• <™ "—"Ž^f™ • ••Ž••< ~ " ^f •"—, "••f~.

operator

<•Ž••<œ~: †^~ <•Ž••<œ~ ••†^f †f^ •£' "•", f† †£ Ž•f<™£, '•^ Ž"†> •• "™Ž™f^ •••™† †^ ``f^ Ž^, "••f'†^™
<•Ž••<œ~ +™†™†"~•<^f ¢£†, " ^f†Ž™, ••†^ Ž,™•¤ ••f•«™ ^, f¤†™«~œ†^ •†Š••f•«™ •£†Ÿ™Ž™••f, ~.

or

Ž™'f" ... œ: <™ or ••†^f †^~ <•Ž••<œ~™™Ž™•™~ •Žf•<, —f True ^†™ Ž, Š<™~ <•Ž••<™~ ••†^f True,
^ŽŽfŠ~£Ž™Ž™'••f" ^f•Žf•<, —f <£† <f†œ <™£ ••«<•,™£. ``f^ Ž•, f••...<, ^ •••<• <™ "—"Ž^f™ • ••Ž••< ~
" ^f•"—, "••f~.

output

|™•™~

Q**quotes**

•f• ^' > 'f" "

R**raw string**

^†•Ž•| , ' ^•<€•€†Ÿ™Ž™••f, "

regular expression

" ^†™†f"œ "—, ^•€

S**scope**

•†Ÿ Ž•f^

slicing

"™††" <f ^•† ^: •f•†•, ' ••< ^f •<f~ •€ŽŽ™' ~ ^†<f"•f† † † (Ž••<•~, ŽŽ•f"••~, Ž•|f"") " ^f •Žf•<, —•f †f^ † ^
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% **OpenOffice.org.** -f^ •| ^f , <f"œ •™€•<^ , ^-••™€ †• •Ž•|• , ' ^<œ "•f† †™€, Ž~,™€f" ••f~ , Ž™'f•<f" " -œŽŽ~ " ^f • , ' ^Ž•• ^ „•••^€~ , ^-f" Š† , †•<^ | « " ŽŽ†. -Ž™ , •†• €•™Ž• ^† ^†™•|•f " ^f „f , f•<• ^ , „••^ MS Word " ^f MS PowerPoint. ŠŠ†^f •€†Ÿ^<... †• ...Ž~ •„•...† <^ Ž•f<™€, 'f" " •€<œ†<^ . [ÅOpenOffice ^[4]Å]

% **Mozilla Firefox.** Š•†^f • †ž†,†"•f-„ ŽŽ™€' €œ~f•<™« " ^f ^†<^' > †••<^f <™† Internet Explorer.
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% •™ •€' ' •† ~ Ž ,™Å...† Thunderbird •†^f Ž , ...' , ^††^ ^Ž™•<™Žœ~ " ^f ŽœŽ€~ €Ž•" < ,™†f"™« <^ „€ ,™†•™€. [ÅMozilla Firefox ^[5] , Mozilla Thunderbird ^[6]Å]

% **Mono.** €, ... "•f<^f'f^ <€† €Ž™Ž™•€•€† •† ^†™f" <... Ž™'f•†f" ... <€~ ŽŽ^<-... , †^~ .NET. Šžf< , Ž•f <€ •€†f™€, '•~ •-^ , †™' Š† .NET •• Linux, Windows, FreeBSD, Mac OS " ^f Ž™fž" Ž•f<™€, 'f" " . [ÅMono ^[7] , ECMA ^[8] , Microsoft .NET ^[9]Å]

% **Apache web server.** ± •€†™-fŽœ~ •| €ž€ , <€œœ~ •f" <™€ ^†™f" <™« Ž™'f•†f"™«. Ø<€† Ž , ^' †^<f" ...<€<^ , •†^f •••••' ,†f,ž†... „ •| €ž€ , <€œœ~ •f" <™€ <™† žŽ~†œ<€! Š| €ž€ , <••ž• , f••...< , •~ ^Ž... <f†f• ~ f•<™•Ž••~ <™€ f^•f" <™€. ®^f , > •< " •f^Ÿ" •^<• -™ Apache „f , •-•<^f ž• , f••...< , •~ f•<™•Ž••~ ^ž' ...<f™f" " ŽŽ~ Ž••f~ •€†™Žf" " (•€†ž• , fŽ^†Ÿ^†™† †™€ <™€ Microsoft IIS). [ÅApache ^[10]Å]

% **MySQL.** ¥€†™-fŽ •<^€ „••f^"œŸ" •€ •••™† †> †. ~^ , ^" <€ , ••<^f ^Ž... <€† < ,™†• , œ<^ „«<€" <€~. Š•†^f <™ M •<™ ' †> •<... Ž , ...<€ž™ LAMP (Linux-Apache-MySql-PHP) " ^f •†<™ž•-•<^f •<f~ ž• , f••...< , •~ f•<™•Ž••~ <™€ •f^•f" <™€. [ÅMySQL ^[11]Å]

% **VLC Player.** Š~^ , †™'œ ^†žž^ , ^' > 'œ~ Ž™Ž€† > †. -Ž™ , •†^ ^†žž^ , " ' •f<^ž" †<^: DivX, MP3, Ogg, VCDs, DVDs... Ž™f™~ •ž• ...<f •†† •†^f'f^ Ž€„^' > 'f"™«~ •"™ž™«~ <™ ^†™f" <... Ž™'f•†f" ...; ;) [ÅVLC media player ^[12]Å]

% **GeexBox** €, ... "•f<^f'f^ •f^†™†œ Linux " ^f „f •„•f•<•† ^ž~•-f<^f•~†...žf~ " "†€œ•• ^ž... <™ CD! [ÅGeexBox ^[13]Å]

≥ Ž•<^ ^€œ •†^f†™'f^†^ •~ž ,™Å••" ••f - €ž" ,™€† ^|f...Ž™'•~ Ž••f~ Š©©' S , ...ž~ ~ € ' ŽŠ••~ ž ,™' , ^††^<f•†™« Perl " ^f PHP , <™ •«<€†^ •f^„• , f•€~ ž• , f•™† †™€ Drupal , € •f" <€^"œ Ÿ" •€ •••™† †> † PostgreSQL , <™ ž^f„†•f ^' Š†> † ^€<™††œ<™€ TORCS , <™ ' , ^-f" ... ž• , fŸ" ŽŽ™† ^†^ž<€|€~ Ž™'f•†f"™« KDevelop , <™ ž , ...' , ^††^ ^†žž^ , ^' > 'œ~ <^f†Š† Xine ,™f •ž•|• , ' ^<œ~ " Š•f^ VIM " ^f Quanta+ , <™

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