

Symbol

float()	number with decimal point
str()	string
int()	integer
len()	the length of the word or string

Multiply

string *	Repeat those thing for the number of time
string *	Crash!
number *	Multiply like in math

Exponents

string ** number	Crash!
number ** number	Exponent in Math
number ** string	Crash!

Rule for naming the variable

Rule for naming variables

letters
numbers
underscore (_)
can either start with letter or underscores ONLY
no space

Example

Hello_there
me2

Rule for naming the variable (cont)

_mynumber

Invalid names

3my =cannot start with number
last name = no spaces allowed
last-name = dashes are not accepted

Define Function

```
var1 = 1
_var1 = 3
_var1 + 100
print( _var1)
def bacon(): # defines a function named bacon
    print ("hello it's
bacon")
    print ("line2 ")
    print ("line3 ")
    print ("line4 ")
    print ("line5 ")
    print ("line6 ")
    print ("line7 ")
    return #exit the function
bacon()
bacon()
bacon()
def myprint (text):
    print ("*** "+ str(text)
+ "*** ")
    return
myprint(1)
myprint("hello")
```

Define Function (cont)

```
> myprint(2.5)
def myprintnew (text, decoration):
    print (decoration + str(text) + decoration)
    return
myprintnew (1,"+++")
myprintnew ('hello','-----')
myprintnew (1,"@@@@@@")
def doubleit(number):
    return number * 2
print (doubleit(3))
print (doubleit(doubleit(4)))
myvar = 12
myvar = doubleit(myvar)
myvar = doubleit(myvar)
print(myvar)
Result
3
hello it's bacon
line2
line3
line4
line5
line6
line7
hello it's bacon
line2
line3
```



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cheatography.com/pear-tan/

Published 11th February, 2016.

Last updated 13th May, 2016.

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Define Function (cont)

```
> line4
line5
line6
line7
hello it's bacon
line2
line3
line4
line5
line6
line7
1
hello
2.5
+++1+++
-----hello-----
@@@@@@@1@@@@@@@
6
16
48
```

Example

```
firstname = input("What is your
fisrt name?")
lastname = input( "What is your
last name?")
fullname = firstname + " " +
lastname
print( ful lname)
letter number = input( "What is
the letter of number ?")
```

Example (cont)

```
> letternumber = int(letternumber)
if letternumber>len(fullname):
    print("Invalid letter number, try again")
else:
    print(fullname[letternumber])
times = input("How many times to print
the letter?")
times = int(times)
if times>100:
    print("Too many letters to print")
else:
    print(fullname[letternumber]*times)
Result
What is your fisrt name? Pear
What is your last name? Tan
Pear Tan
What is the letter of number? 4
r
How many times to print the letter? 12
rrrrrrrrrr
```

Example

```
mystr = "hello123"
numbers = [1,2,3 ,4,5,6]
print (numbers)
shoppi nglis = ['shoe s', 'ba -
gs' , 'p ant s', 'sh irts']
print (shopp ing list)
mixed = [1, 'hello', 2.5, True,
False]
```

Example (cont)

```
> print (mixed)
letter_num = 0
while letter_num < len(mystr):
    print (mystr[letter_num])
    letter_num = letter_num + 1
for myletterisawesome in mystr:
    print(myletterisawesome)
for tientien in shoppinglist:
    print(tientiem)
out = 0
for mrtim in shoppinglist:
    out = out + 1
Result
[1, 2, 3, 4, 5, 6]
['shoe', 'bags', 'pants', 'shirt']
[1, 'Hello', 2.5, True, False]
```

word per line

```
mystr = input(" Please enter
your word")
letter_num = 0
while letter_num < len(my str):
    print (mystr [le tte -
r_num])
    let ter_num = letter_num
+ 1
Result t
Please enter your word1,2,3,
1
,
2
```



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Published 11th February, 2016.

Last updated 13th May, 2016.

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word per line (cont)

```
>,
3
,
```

The area of circle

```
while True:
    use_r_r adius =
input( " Enter the radius of the
circle s")
    radius = float( use -
r_r adius)
    pi = 3.1415
    #
    answer = pi * (radiu -
s**2)
    pri nt( "The area of the
circle is", answer)
```

Result

```
Enter the radius of the circles3
The area of the circle is
28.273 500 000 000002
```

Palindrome

```
word = input("Please enter a
string: ")
letter_num = 0
reverse = " "
while letter_num <le n(w ord):
    reverse = word[l ett -
er_num] + reverse
    let ter_num = letter_num
+ 1
if word == reverse:
    pri nt( "It is palind -
rom e")
else:
    pri nt( "It is not
palind rom e")
```

Group work

```
"""
Group Members: Earn, Pop, Pear
Class: 1005
" " "
import random
# create a list
mylist = ['earn', 'pear', 'pop',
'jaja', 'roong']
random _item = random.ch oic -
e(m ylist)
#print
print( " myl ist :",m ylist)
# ask the user to input the word
chance = 5
score = 0
while chance!= 0:
    use r_guess = input( " -
Guess a word: ")

    if user_guess == random -
_item:
        score = score +
100

        pri nt( " That's
correc t!", " Sco re", score)
        ran dom _item =
random.ch oic e(m ylist)

    else:
        chance = chance
- 1

        pri nt( " -
Chances Remain ing :",c hance)

        #check if that
word is in the list
        if user_guess in
mylist:
            print
("Sorry, wrong choice ")
        else:
            pri -
nt( " Sorry, that is not even in
the list!")
```

Group work (cont)

```
> if chance == 0:
    print(random _item)
    print("Final score:",score)
Result
mylist: ['earn', 'pear', 'pop', 'jaja', 'roong']
Guess a word: pear
Chances Remaining: 4
Sorry, wrong choice
Guess a word: earn
Chances Remaining: 3
Sorry, wrong choice
Guess a word: pop
Chances Remaining: 2
Sorry, wrong choice
Guess a word: jaja
Chances Remaining: 1
Sorry, wrong choice
Guess a word: roong
That's correct! Score 100
Guess a word: jaja
Chances Remaining: 0
Sorry, wrong choice
pear
Final score: 100
```

Function	
input()	information that receive from user
print()	show information in the screen

Addition or Plus	
string + string	combine those strings together
string + number	program will be crash
number + number	add together like doing math

Symbol	
+	plus or add
-	subtract
*	multiply
**	exponent
/	divide and quotient (result) is float
//	divide and quotient (result) is integer
%	remainder (modulo)
==	equal to
!=	not equal to
<=	less than or equal to
<	less than
>	more than

Symbol (cont)	
>=	more than or equal to
#	one line comment that will not included in the code
"""	Multi-line comment
True or anything	Always true
False and anything	False

The area of circle 2
<pre>def areaOfCircle (user_radius): if user_r adi us<=0: return " Error: invalid radius " pi = 3.1415 area = pi*(us er_ rad - ius**2) return area user_r adius = float(inp - ut(" Enter the radius: ")) print('The area of the circle is', areaOf Cir cle (us er_ - radius) Enter the radius: 3 The area of the circle is 28.273 500 000 000002</pre>

Meaning of the word
<pre>def printDefinition(word): # write a definition in your own words for the following words: # use multi-line strings to print the definition #va riable</pre>

Meaning of the word (cont)
<pre>> if word == "variable": print(""" A variable is thing that can be changed """) elif word == "function": #function print (""" A function is a thing that reuse block or quote. """) elif word == "parameter": #parameter print(""" A parameter is thing inside blacket of function """) elif word == "agument": #argument print(""" A argument is the same thing as parameter. It is thinfg inside blacket f function """) elif word == "function call": #function call print(""" Function is the thing make fuction run. """) elif word == "string": #string</pre>



Meaning of the word (cont)

```
> print("""
A string is a list of character
""")
else:
    print("unknown word")
while True:
    word = input("Enter the word")
    printDefinition(word)
```

Result

Enter the wordvariable

A variable is thing that can be changed

Enter the wordfunction

A function is a thing that reuse block or quote.

Enter the wordargument

A argument is the same thing as parameter. It is thinfg inside blacket f function

Enter the wordfunction call

Function is the thing make fuction run.

Enter the wordstring

A string is a list of character

Enter the wordpear

unknown word

Count down

```
user_number = input("What is the
number?" )
number = int(us er_ number)
countd own _string = ''
while number > 0:
    cou ntd own _string =
countd own _string + str(nu -
mber)
    number = number-1
print( cou ntd own _st ring)
```

Result

What is the number? 5
54321

List

```
import random
# Create a list of integers
intlist = [1,2,3,4]
random_int = random.ch oic e(i -
ntlist)
print( int lis t,r and om_ -
int )#print the entire list and
the random item
# Create a list of floating
point numbers
fplist =[1.1, 2.2 ,3.3 ,4.4]
random_fp = random.ch oic e(f -
plist)
print( fpl ist ,ra ndo m_fp)
# Create a list of strings
strlist=[ 'ph one ',' pen -
cil ',' com puter']
random_str = random.ch oic e(s -
trlist)
print( str lis t,r and om_str)
mylist = [1,2,3 ,4, -
1.1 ,2.2 ,3.3, 4.4 , 'p hon -
e', 'pe nci l', 'co mpu ter']
```

List (cont)

```
> random_item = random.choice(mylist)
print(mylist,random_item)
#create a list of follwing veraibles
myvar1 = 1
myvar2 = 2
myvar3 = 3
varlist = [myvar1,myvar2,myvar3]
random_var = random.choice(varlist)
print(varlist,random_var)
```

Result

[1, 2, 3, 4] 3
[1.1, 2.2, 3.3, 4.4] 3.3
['phone', 'pencil', 'computer'] phone
[1, 2, 3, 4, 1.1, 2.2, 3.3, 4.4, 'phone', 'pencil',
'computer'] pencil
[1, 2, 3] 2

Guess game with random

```
import random
# create a list
mylist = ['lion ',' che eta -
h', 'pa nth er' ,'c oug -
ar' ,'l eop ard']
random_item = random.ch oic e -
e(m ylist)
print( ran dom _item)
#print
print( myl ist[0])
# ask the user to input the word
user_guess = input( " Guess a
word: ")
```



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Published 11th February, 2016.

Last updated 13th May, 2016.

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Guess game with random (cont)

```
> if user_guess == random_item:
    print("Correct")
else:

    #check if that word is in the list
    if user_guess in mylist:
        print("Yes, it is in the list")
    else:
        print("No, it is not in the list")
```

List

```
myself= "hello123"
numbers = [1,2,3 ,4,5,6]
print( num bers)
shoppi nglist = ['shoe ',' bag -
s', 'pa nts ',' shirt']
print( sho ppi nglist)
mixed= [1, 'He llo ',2.5, True,
False]
print( mixed)
letter_num = 0
while letter_num < len(my str):
    print (mystr [le tte -
r_num])
    let ter_num = letter_num
+ 1
for mylett eri saw esome in
mystr:
    pri nt( myl ett eri -
saw esome)
for tientien in shoppi nglist:
    pri nt( opal)
shoppi nglist. append ('t ies')
print( sho ppi nglist)
out = 0
```

List (cont)

```
> for mrtim in shoppinglist:
    out=out + 1
    print(mrtim)
print (out)
largelist = range(100)
for num in largelist:
    print(num)
```

Decision making

```
f 3 < 2: #if statement must
compare two Booleans
    print ('3 is less than2 ')
elif 4 < 2: #can have 0 or more
elif statements
    print ('4 is less than
2')
elif 5 < 2:
    print ('5 is less than
2')
else: #can have 0 or 1 else
statement at the end
    print ('none of the
above are True')
```

Function

```
def nameOfFunction():
    print ('This function
has no parame ters')
    print ('This function
has no return value')
    return # no value,
just exits the function
#function call
nameOf Fun ction()
#function with 1 parame -
ter /ar gument
def testFu nct ion (pa ram):
    print ('This function has 1
parame ter')
```

Function (cont)

```
> print (param)
#function call
testFunction ("this is the parameter value")
#function with 2 parameters and a return
value
def function3(param1, param2):
    print('This function has 2 parameters')
    return param1 + param2 # return value
#function call and store the result in a
variable
returnValue = function3(2, 3)
print (returnValue)
```

Determine zero positive and negative

```
num = int (input("Enter a
number"))
if num>0:
    print (num,"is positi -
ve")
elif num<0:
    print (num,"is negati -
ve")
else:
    print (num,"is zero")
```

Divisible by 3

```
num = int(input(" Enter a
word"))
remainder = num%3
if remainder ==0:
    pri nt( num ,"is divisible
by 3")
else:
    pri nt( num ,"is not
divisible by 3")
```

Fibonacci from 0 to 50

```
num1 = 0
num2 = 0
fibonacci = num1+num2
myoutput = " 0,1 "
while fibonacci < 50:
    myoutput = myoutput + " , " + str(fibonacci)
    num1=num2
    num2 = fibonacci
    fibonacci = num1+ num2
print(myoutput)
0,1,1, 2,3 ,5, 8,13,...
```

Sample

```
def test() :
    while True:
        use r_input = input( " Please enter a word: ")
        if user_input == 'quit':
            break
    return test()
    keep asking word till input quit
```

Vocabulary

variable	A value or thing that can be changed
string	A list of character such as letter or symbol

Vocabulary (cont)

boolean	True False
modulo	Find the remainder
syntax	There are error such as grammar or structure of language
float	A number with decimal point
integer	Rounded number which do not have decimal point

Condition

while...	While this is true loop the command under the conditional
while True	Forever loop
for each item in name of list	For every item in the list repeat the command under the loop that many times. (a string is a list too)
If... then... else	If the statement in 'if' is true, it will follow the statement in 'then'. If it is not, it will follow statement under 'else'.

The largest value

```
#write a function that returns the largest of two values
#name : max2
#arguments: num1, num2
# return: largest value
# write a function that returns the largest of three values
# name : max3
#arguments: num1, num2, num3
# return: largest value
def max2(num1 ,num2):
    if num1 >= num2:
        max_value = num1
    if num2 > num1:
        max_value = num2
    return max_value
num1 = input( 'Enter the first value')
num2 = input( 'Enter the second value')
print (max2( num1,num2))
def max3(num1 ,num2, num3):
    if num1 >= num2 and num1 >= num3:
        max_value = num1
    if num2 > num1 and num2 >= num3:
        max_value = num2
    if num3 >= num2 and num3 >= num1:
        max_value = num3
    return max_value
```

The largest value (cont)

```
> num3 = input('Enter the the third value')
print (max3(num1,num2,num3))
# write a function that returns the largest
value
# name: maxlist
#argument : list
#returns the largest value in the list
def maxlist(list):
    maxvalue = list(0)
    for item in list:
        if item > maxvalue:
            value = item

    return maxvalue
mylist = [1,2,3,4,55,66,777,0,1]
print (maxlist(list))
```

Area of Triangle & Volume of prism

```
# write a function that computes
the area of triangle
# name : areaOf Tri angle
# parameters :b,h
# return : area
def areaOf Tri ang le( b,h):
    if user_b ase <=0:
        return " Error:
invalid radius "
    if user_h eig ht<=0:
        return " Error:
invalid radius "
    area = 0.5 h
    return area
```

Area of Triangle & Volume of prism (cont)

```
> user_base =float(input('Enter the base of
the triangle:'))
user_height = float(input('Enter the height of
the triangle: '))
print ('The area of the triangle is',areaOfTr-
iangle(user_base,user_height))
#write a function that computes the volume
of a prism
# name: volumeOfPrism
# parameters :b,h,l
# return : volume
def volumeOfPrism(b,h,l):
    volume = b*h
    return volume
user_length = float(input('Enter the length of
the prism:'))
print('The volume of the prism is', volume-
OfPrism(user_base,user_height,user_l-
ength))
Result
Enter the base of the triangle:12
Enter the height of the triangle: 6
The area of the triangle is 36.0
Enter the length of the prism:3
The volume of the prism is 216.0
```

Useful Function for Name

```
mystr = "hello THERE"
print (mystr.up per()) > HELLO
THERE
print (mystr.lo wer()) > hello
there
print (mystr.ca pit ali ze()) >
Hello there
print (mystr.ti tle()) > Hello
There
```

How to convert to binary

```
user_number = input("Please
enter a number")
number = int(us er_ number)
binary _string = ''
while (number > 0):
    rem ainder= number%2
    bin ary _string =
str(re mai nder) + binary -
_string
    number= number//2

print( " Binary string is",
binary _st ring)
Result
Please enter a number 36
Binary string is 100100
```

Guess a word

```
# create a list
mylist = ['lion ',' che eta -
h', 'pa nth er' ,'c oug -
ar' ,'l eop ard']
#print
print( myl ist[0])
# ask the user to input the word
user_guess = input( " Guess a
word: ")
#check if that word is in the
list
```


Guess a word (cont)

```
> if user_guess in mylist:
    print("Yes, it is in the list")
else:
    print("No, it is not in the list")
```

Boolean

```
print(True)
print (2<3)
print (2 != 2)
```

Reverse

```
word = input("Please enter a
word to reverse: ")
letter_num = 0
reverse = " "
while letter_num < len(word):
    reverse = word[len(word) -
letter_num] + reverse
    letter_num =
letter_num + 1
print( " Reverse: " ,reverse)
```

Result

```
Please enter a word to reverse:
0123456
Reverse: 6543210
```

Range

```
#creates a list of numbers from
0 to the specified
number
numberlist = range(5)
# is the same as creating the
following list
numberlist2 = [0, 1, 2, 3, 4]
for num in range( 100):
```

Range (cont)

```
> print (num) # prints all numbers from 0
- 99
for num in range(5, 50):
    print(num) #prints all numbers from 5 -
49
```

For loop with list

```
forlist = [3, 4, 5, 2, 1]
for item in forlist:
    print( item)
print all items in the list
```

While Loop with List:

```
thelist = [4, 3, 2, 1, 0]
index = 0 # start at the first
item
while index < len(thelist):
    print (thelist[
index]) #prints each item
    index = index
+ 1
```

Lists

```
mylist = [2,3,4,5] # create a
list
#select an item from a list
print (mylist[0]) #selects
first item and displays 2
# len() determines the length of
the list
print (len(mylist)) # displays
4
mylist.append(5) # adds an item
to the end of the list
```

Condition while loop

```
count = 0 # start at zero
while count < 10: # loop while
count is less than 10
    print( -
count) #will print numbers 0 - 9
    count =
count + 1 # must increase count
```

palindrome

```
def palindrome(word):
    letter_num = 0
    reverse = " "
    for letter_num in word:
        reverse =
letter_num + reverse
        if word == reverse:
            return True
        else:
            return False
while True:
    user_word = input( " -
Please enter a word: ")
    if user_word != "quit":
        print( "This
word has" ,len(user_
word) ,"letters")
        if user_word == "quit":
            break
        if palindrome(user_
word) == True:
            print( use
r_word ,"is palindrom e")
        else:
            print( use
r_word ,"is not palindrom e")
```

Result

```
Please enter a word: 321
```

palindrome (cont)

```
> This word has 3 letters
321 is not palindrome
Please enter a word: 212
This word has 3 letters
212 is palindrome
Please enter a word: quit
```

Example from sheet (cont)

```
> Result
0
01
012
0123
01234
```

while loop with counting number

```
num = -100
while num < -1:
    print(num)
    num = num + 2
num = 0
while num < 100:
    num = num + 2
    print(num)
```

Positive integer count

```
evencount = 0
oddcount = 0
while True:
    num = int
    (input ("Enter a positive
integer"))
    if num < 0:
        print ("Even number s:", -
eve ncount)
        print ("Odd number s:",odd
count)
        break
    else:
        if (num%2) == 0:
            eve ncount =
evencount + 1
        else:
            odd count =
oddcount + 1
program that repeatedly recieve
positive integers from the user.
When the user enters a negative
integer, exit the loop and print
how many of the numbers were odd
and even
```

Example from sheet

```
mystring = " "
count = 0
while count < 5:
    mystring =
mystring+ str(count)
    print (mystring)
    count = count + 1
mystring = " "
for num in range(5):
    mystring =
mystring+ str(count)
    print (mystring)
```