Symbol

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

Multiply

string * number	Repeat those thing for the number of time
string * string	Crash!
number * 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
_mynumber
Invalid names
3my =cannot start with number

Rule for naming the variable (cont)

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 functio
named bacon
    print ("hello it's bacon")
    print ("line2")
    print ("line3")
    print ("line4")
    print ("line5")
    print ("line6")
    print ("line7")
    return #exit the fuction
bacon()
bacon()
bacon()
def myprint (text):
    print ("***"+ str(text)
+"***")
    return
myprint(1)
myprint("hello")
myprint(2.5)
def myprintnew (text, decoration):
    print (decoration + str(text)
+ decoration)
    return
myprintnew (1,"+++")
myprintnew ('hello','-=-=-=-=-
=-=-=-=')
```

Define Function (cont)

```
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
line4
line5
line6
line7
hello it's bacon
line2
line3
line4
line5
```

Define Function (cont)

```
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(fullname)
letternumber = input("What is the
letter of number?")
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[letternumbe
r]*times)
```

Example (cont)

```
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
rrrrrrrrrrrr
```

Example

```
mystr = "hello123"
numbers = [1,2,3,4,5,6]
print (numbers)
shoppinglist =
['shoes','bags','pants','shirts']
print (shoppinglist)
mixed = [1, 'hello', 2.5, True,
False]
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(tiemtiem)
out = 0
for mrtim in shoppinglist:
    out = out + 1
Result
[1, 2, 3, 4, 5, 6]
['shoe', 'bags', 'pants', 'shirt']
```

Example (cont)

```
[1, 'Hello', 2.5, True, False]
```

word per line

```
mystr = input(" Please enter your
word")
letter_num = 0
while letter_num < len(mystr):
    print (mystr[letter_num])
    letter_num = letter_num + 1
Result
Please enter your word1,2,3,
1
,
2
,
3
,
```

The area of circle

```
while True:
    user_radius = input("Enter the
radius of the circles")
    radius = float(user_radius)
    pi = 3.1415
    #
    answer = pi * (radius**2)
    print("The area of the circle
is",answer)
Result
Enter the radius of the circles3
The area of the circle is
28.273500000000002
```

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Palindrome

```
word = input("Please enter a
string: ")
letter_num = 0
reverse = ""
while letter_num <len(word):
    reverse = word[letter_num] +
reverse
    letter_num = letter_num + 1
if word == reverse:
    print("It is palindrome")
else:
    print("It is not palindrome")
```

Group work

```
"""
Group Members: Earn, Pop, Pear
Class: 1005
"""
import random
# create a list
mylist = ['earn', 'pear', 'pop',
'jaja', 'roong']
random_item =
random.choice(mylist)
#print
print("mylist:",mylist)
# ask the user to input the word
chance = 5
score = 0
while chance!= 0:
    user_guess = input("Guess a
word: ")

    if user_guess == random_item:
        score = score + 100
        print("That's
correct!","Score",score)
        random_item =
random.choice(mylist)
```

Group work (cont)

```
    else:
        chance = chance - 1
        print("Chances
Remaining:",chance)

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

Group work (cont)

```
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 eqaul to
<	less than
>	more than

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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

```
def areaOfCircle (user_radius):
    if user_radius<=0:
        return "Error: invalid
radius"

    pi = 3.1415
    area = pi*(user_radius**2)
    return area
user_radius = float(input("Enter
the radius: "))
print('The area of the circle is',
areaOfCircle(user_radius)
Enter the radius: 3
The area of the circle is
28.273500000000002
```

Meaning of the word

```
def printDefinition(word):
    # write a definition in your
own words for the folllowing words:
    # use multi-line strings to
print the definition
    #variable
    if word == "variable":
        print("""
        A variable is thing that
can be changed
```

Meaning of the word (cont)

```
        """)
    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
        print("""
        A string is a list of
character
        """)
    else:
        print("unknown word")
while True:
```

Meaning of the word (cont)

```
    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 wordagument
 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(user_number)
countdown_string =''
while number > 0:
    countdown_string =
countdown_string + str(number)
    number = number-1
print(countdown_string)
Result
What is the number? 5
54321
```

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List

```
import random
# Create a list of integers
intlist = [1,2,3,4]
random_int =
random.choice(intlist)
print(intlist,random_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.choice(fplist)
print(fplist,random_fp)
# Create a list of strings
strlist=
['phone','pencil','computer']
random_str =
random.choice(strlist)
print(strlist,random_str)
mylist =
[1,2,3,4,1.1,2.2,3.3,4.4,'phone','p
encil','computer']
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
```

List (cont)

```
[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','cheetah','panther','cougar
','leopard']
random_item =
random.choice(mylist)
print(random_item)
#print
print(mylist[0])
# ask the user to input the word
user_guess = input("Guess a word:
")
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(numbers)
shoppinglist =
['shoe','bags','pants','shirt']
print(shoppinglist)
mixed=[1,'Hello',2.5, True, False]
```

List (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(opal)
shoppinglist. append('ties')
print(shoppinglist)
out = 0
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')
```

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Function

```
def nameOfFunction():
     print ('This function has no
parameters')
     print ('This function has no
return value')
     return # no value, just exits
the function
#function call
nameOfFunction()
#function with 1
parameter/argument
def testFunction(param):
print ('This function has 1
parameter')
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 positive")
elif num<0:
    print (num,"is negative")
else:
    print (num,"is zero")
```

Divisible by 3

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

Fibonacci fron o to 50

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

Sample

```
def test() :
    while True:
     user_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
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'.

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The largest value

```
#write a function that returns the
largest of two values
#name : max2
#agruments: num1, num2
# return: largest value
# write a functrion that returns
the largest of three values
# name : max3
#agrument: 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 the first
value')
num2 = input('Enter the 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
num3 = input('Enter the the third
value')
print (max3(num1,num2,num3))
# write a function that returns the
largest value
```

The largest value (cont)

```
# 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 : areaOfTriangle
# parameters :b,h
# return : area
def areaOfTriangle(b,h):
    if user_base<=0:
        return "Error: invalid
radius"
    if user_height<=0:
        return "Error: invalid
radius"
    area = 0.5 b h
    return area
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',areaOfTriangle(user_base,user_h
eight))
```

Area of Triangle & Volume of prism (cont)

```
#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 l
    return volume
user_length = float(input('Enter
the length of the prism:'))
print('The volume of the prism is',
volumeOfPrism(user_base,user_height
,user_length))
```

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.upper()) > HELLO
THERE
print (mystr.lower()) > hello
there
print (mystr.capitalize()) > Hello
there
print (mystr.title()) > Hello
There
```

How to convert to binary

```
user_number = input("Please enter
a number")
number = int(user_number)
binary_string =''
while (number > 0):
```

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How to convert to binary (cont)

```
    remainder= number%2
    binary_string = str(remainder)
+ binary_string
    number= number//2

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

Guess a word

```
# create a list
mylist =
['lion','cheetah','panther','cougar
','leopard']
#print
print(mylist[0])
# ask the user to input the word
user_guess = input("Guess a word:
")
#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")
```

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[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):
    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:
```

palindrome (cont)

```
        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(user_word,"is
palindrome")
    else:
        print(user_word,"is not
palindrome")
```

Result

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

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)
```

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)g
```

Result

```
0
01
012
0123
01234
```

Positive integer count

```
evencount = 0
oddcount = 0
while True:
        num = int (input("Enter a
positive integer"))
        if num < 0:
                print ("Even
numbers:",evencount)
                print ("Odd
numbers:",odd count)
                break
        else:
                if (num%2) == 0:
                    evencount =
evencount + 1
                else:
                    oddcount =
oddcount + 1
```

Positive integer count (cont)

```
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
```

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