FILZA MANZOOR_CHAPTER 2

PRACTICE PROBLEMS

2.1

In [18]:

```
# a) The sum of first 5 positive integers
pos_int=[1,2,3,4,5]
x=sum(pos_int)
print("The sum of first 5 positive integers is: ", x)
```

```
The sum of first 5 positive integers is:  15
```

In [20]:

```
# b) The average age
s= 23
m= 19
f= 31
import math
x=int((s+m+f)/3)
print ("The average age among Sara, Mark and Fatima is: ", x )
```

```
The average age among Sara, Mark and Fatima is:  24
```

In [23]:

```
# c) The number of times 73 goes into 403
x=403//73
print(x)
```

```
5
```

In [25]:

```
# d) The remainder when 403 is divided by 73
x= 403%73
print(x)
```

```
38
```

In [26]:

```
# e) 2 to the 10th power
x=2**10
print(x)
```

```
1024
```

In [27]:

```
# f)The absolute value of the difference between Sara’s height (54 inches) and Mark’s h
eight (57 inches)
s_h= 54
m_h=57
x= (s_h-m_h)
print (abs(x))
```

```
3
```

In [28]:

```
#g) The lowest price among the following prices: $34.99, $29.95, and $31.50
lst=[34.99,29.95,31.50]
x=min(lst)
print (x)
```

```
29.95
```

2.2

In [30]:

```
# a) The sum of 2 and 2 is less than 4.
a= 2 + 2 < 4
print (bool(x))
```

```
True
```

In [34]:

```
# b) The value of 7 // 3 is equal to 1 + 1
x= 7 // 3 == 1 + 1

print(x)
```

```
True
```

In [42]:

```
# c) The sum of 3 squared and 4 squared is equal to 25
x=3**2
y=4**2
x + y == 25
```

Out[42]:

```
True
```

In [43]:

```
# (d) The sum of 2, 4, and 6 is greater than 12.
2+4+6>=12
```

Out[43]:

```
True
```

In [51]:

```
# (e) 1387 is divisible by 19.
1387 % 19==0
```

Out[51]:

True

In [52]:

```
# f) 31 is even. (Hint: what does the remainder when you divide by 2 tell you?)
31 % 2==0
```

Out[52]:

False

In [56]:

```
# (g) The lowest price among $34.99, $29.95, and $31.50 is less than $30.00.
min(34.99, 29.95, 31.50) < 30.00
```

Out[56]:

True

2.3

In [54]:

```
#(a) Assign integer value 3 to variable a.
a=3
print (a)
```

3

In [57]:

```
#(b) Assign 4 to variable b
b=4
print(b)
```

4

In [58]:

```
#(c) Assign to variable c the value of expression a * a + b * b
c= a*a + b*b
print(c)
```

25

2.4

In [79]:

```
s1 = 'ant'
s2 = 'bat'
s3 = 'cod'
print(' (a) For expression : "ant bat cod" :', s1+ ' '+ s2+ ' '+s3)
print(' (b) For expression : "ant ant ant ant ant ant ant ant ant ant " :', 10 * (s1 +
' '))
print(' (c) For expression : "ant bat bat cod cod cod" : ',s1 + ' ' + 2 * (s2 + ' ') +
2 * (s3 + ' ') + s3)
print(' (d) For expression : "ant bat ant bat ant bat ant bat ant bat ant bat ant bat "
: ',  7 * (s1 + ' '+ s2 + ' '))
print(' (e) For expression : "batbatcod batbatcod batbatcod batbatcod batbatcod" : ',
5* (s2 + s2 + s3+ ' '))
```

```
 (a) For expression : "ant bat cod" : ant bat cod
 (b) For expression : "ant ant ant ant ant ant ant ant ant ant " : ant ant
ant ant ant ant ant ant ant ant
 (c) For expression : "ant bat bat cod cod cod" :  ant bat bat cod cod cod
 (d) For expression : "ant bat ant bat ant bat ant bat ant bat ant bat ant
bat " :  ant bat ant bat ant bat ant bat ant bat ant bat ant bat
 (e) For expression : "batbatcod batbatcod batbatcod batbatcod batbatcod"
:  batbatcod batbatcod batbatcod batbatcod batbatcod
```

2.5

In [91]:

```
s= '0123456789'

s=[0]
print('a)',s)
s=[1]
print('b)',s)
s=[6]
print('c)',s)
s=[8]
print('d)',s)
s=[9]
print('e)',s)
```

```
a) [0]
b) [1]
c) [6]
d) [8]
e) [9]
```

2.6

In [101]:

```
words = ['bat', 'ball', 'barn', 'basket', 'badminton']
x= min(words)
print("The word that contains maximum words is:", x)
y=max(words)
print("The word that contains minimum words is:", y)
```

```
The word that contains maximum words is: badminton
The word that contains minimum words is: bat
```

2.7

In [106]:

```
grades = [9, 7, 7, 10, 3, 9, 6, 6, 2]
a= grades.count(7)
print("The grades counted till 7 are:", a)
b= grades[-1] = 4
print("A statement that changes the last grade to 4 is: grades[-1] = 4" )
c= max([grades])
print("Maximum grade is: ", c)
d= grades.sort()
print("The grades in ascending order are:", d )
e= int(sum(grades) / len(grades))
print("Average grades are: ", e )
```

```
The grades counted till 7 are: 2
A statement that changes the last grade to 4 is: grades[-1] = 4
Maximum grade is:  [9, 7, 7, 10, 3, 9, 6, 6, 4]
The grades in ascending order are: None
Average grades are:  6
```

2.8

In [123]:

```
#a
((2 + 3) == 4) or (a >= 5)
```

Out[123]:

```
False
```

In [133]:

```
#b
lst= [3,6,7,8,1,2,77,43,100,45,23,56]
(((lst[1]) * (-3)) < (-10)) == 0
```

Out[133]:

```
False
```

In [132]:

```
#c
lst= [3,6,7,8,1,2,77,43,100,45,23,56]
(((lst[1]) * (-3)) < (-10)) in [0, True]
```

Out[132]:

```
True
```

In [12]:

```
#d
4*(5**2)
```

Out[12]:

```
100
```

In [14]:

```
#e
4/2 in [1,2,3]
```

Out[14]:

```
True
```

2.9

In [134]:

```
#(a) False + False
a= type(False + False)
print (a)
```

```
<class 'int'>
```

In [135]:

```
#(b) 2 * 3**2.0
b= type(2 * 3**2.0)
print(b)
```

```
<class 'float'>
```

In [136]:

```
#(c) 4 // 2 + 4 % 2
c=type(4 // 2 + 4 % 2)
print (c)
```

```
<class 'int'>
```

In [138]:

```
#(d) 2 + 3 == 4 or 5 >= 5
d=type(2 + 3 == 4 or 5 >= 5)
print(d)
```

```
<class 'bool'>
```

2.10

In [140]:

```
# a) The length of the hypotenuse in a right triangle whose other two sides have length
s a and b
a=7
b=4
import math
c= int(math.sqrt(a**2 + b**2))
print("The length of the hypoteneous in a right angle triangle is: ", c)
```

```
The length of the hypoteneous in a right angle triangle is:  8
```

In [142]:

```
# b) The value of the expression that evaluates whether the length of the above hypoten
use is 5
a=7
b=4
import math
c= int(math.sqrt(a**2 + b**2))==5
print (c)
```

```
False
```

In [143]:

```
#c) The area of a disk of radius a
a=5
import math
c= int(math.pi* a**2)
print ("For area of disk is: ", c)
```

```
For area of disk is:  78
```

In [ ]:

```
#(d) The value of the Boolean expression that checks whether a point with coordinates x
and y is inside a circle with center (a, b) and radius r
```

2.11

In [17]:

```
#a
lst=[-7,-8,-5,-4,-3,-2,-1]
print("Sum of elements in given list is :", sum(lst))
```

```
Sum of elements in given list is : -30
```

In [145]:

```
#b
age_grp=[17,24,21,27]
import math
x=int(sum(age_grp)/3)
print ("The average age around the group is: ", x )
```

```
The average age around the group is:  29
```

In [146]:

```
#c
2**-20
```

Out[146]:

```
9.5367431640625e-07
```

In [148]:

```
#d
4356//61
```

Out[148]:

```
71
```

In [149]:

```
#e
4356 % 61
```

Out[149]:

```
25
```

2.12

In [151]:

```
#a
s1='-'
s2='+'
print (s1+s2)
```

```
-+
```

In [152]:

```
#b
print (s1+s2+s1)
```

```
-+-
```

In [153]:

```
#c
print (s2+s1+s1)
```

```
+--
```

In [155]:

```
#d
print (2*(s2+s1+s1))
```

```
+--+--
```

In [157]:

```
#e
print (10*(s2+s1+s1)+s2)
```

```
+--+--+--+--+--+--+--+--+--+--+
```

In [158]:

```
#f
print(5*(s2+s1+s2+s2+s2+s1+s1))
```

```
+-+++--+-+++--+-+++--+-+++--+-+++--
```

2.13

In [162]:

```
s = 'abcdefghijklmnopqrstuvwxyz'
s[0]
```

Out[162]:

```
'a'
```

In [163]:

```
s[2]
```

Out[163]:

```
'c'
```

In [164]:

```
s[-1]
```

Out[164]:

```
'z'
```

In [165]:

```
s[-2]
```

Out[165]:

```
'y'
```

In [166]:

```
s[-10]
```

Out[166]:

```
'q'
```

2.14

In [214]:

```
s="goodbye"
s[0]==g
```

Out[214]:

```
False
```

In [212]:

```
s[6]==g
```

Out[212]:

```
False
```

In [203]:

```
s[0]== g and a
```

Out[203]:

```
False
```

In [204]:

```
s[-2]==x
```

Out[204]:

```
False
```

In [205]:

```
s[3]==d
```

Out[205]:

```
False
```

In [206]:

```
s[0]==s[6]
```

Out[206]:

```
False
```

In [186]:

```
s[-1:-4]== 'tion'
```

Out[186]:

```
False
```

2.15

In [215]:

```
a='anachronistically'
b='counterintuitive'
len(a)+1> len(b)
```

Out[215]:

```
True
```

In [217]:

```
x= ['misrepresentation', 'misinterpretation']
x.sort()
print (x)
```

```
['misinterpretation', 'misrepresentation']
```

In [218]:

```
wrd= 'floccinaucinihilipilification'
if 'e' in wrd:
    print("E is in this word")
else:
    print("E is not in the word")
```

```
E is not in the word
```

In [219]:

```
word_1= 'counterrevolution'
word_2= 'counter'
word_3= 'resolution'

print(len(word_1) , "=" , len(word_2)+ len(word_3))
```

```
17 = 17
```

2.16

In [222]:

```
a=6
b=7
```

In [223]:

```
c=((b+a)/2)
```

In [224]:

```
inventory=['paper', 'staples','pencils']
```

In [227]:

```
first=' John '
middle='Fitzgerald'
last=' Kennedy '
```

In [226]:

```
fullname= str(first) + str(middle) + str(last)
print(fullname)
```

```
 John Fitzgerald Kennedy
```

2.17

In [233]:

```
#a
a=17
b=-9
c=(a+b)
c<=10
```

Out[233]:

```
True
```

In [240]:

```
#b
inventory=['paper', 'staples','pencils']
fullname='Filza Manzoor'
len(inventory) >= len(5*fullname)
```

Out[240]:

```
False
```

In [248]:

```
#c
c<24
```

Out[248]:

```
True
```

In [278]:

```
#d
a=range(-9,17)
6 in a
```

Out[278]:

```
True
```

In [280]:

```
s1= 'lily'
s2= 'roses'
s3= 'jasmine'
len (s3) > len(s2)> len(s1)
```

Out[280]:

```
True
```

In [285]:

```
inventory=[]
len(inventory)==0 or len(inventory)> 10
```

Out[285]:

```
True
```

2.18

In [ ]:

```

```

In [261]:

```
flower =['rose', 'bougainvillea',
'yucca', 'marigold', 'daylilly', 'lilly of the valley']
```

```
['rose', 'bougainvillea', 'yucca', 'marigold', 'daylilly', 'lilly of the v
alley']
```

In [288]:

```
'potato' in flower
```

Out[288]:

```
False
```

In [292]:

```
thorny= ['rose', 'bougainvillea','yucca']
poisonous= ['lilly of the valley']
dangerous=[thorny+poisonous]
print(thorny)
print(poisonous)
print(dangerous)
```

```
['rose', 'bougainvillea', 'yucca']
['lilly of the valley']
[['rose', 'bougainvillea', 'yucca', 'lilly of the valley']]
```

2.19

In [298]:

```
#a
answers = ['Y', 'N', 'N', 'Y', 'N', 'Y', 'Y', 'Y', 'N', 'N', 'N']
numyes =answers.count('Y')
print (numyes)
```

```
5
```

In [299]:

```
#b
numno =answers.count('N')
print (numno)
```

```
6
```

In [302]:

```
percentyes= (numyes*100)/11
print(int(percentyes))
```

```
45
```

In [330]:

```
answers = ['Y', 'N', 'N', 'Y', 'N', 'Y', 'Y', 'Y', 'N', 'N', 'N']

answers.sort()

print(answers)
```

```
['N', 'N', 'N', 'N', 'N', 'N', 'Y', 'Y', 'Y', 'Y', 'Y']
```

In [329]:

```
#f
answers[6]
```

Out[329]:

```
'Y'
```

2.20

In [324]:

```
s1= ['t','i','p']
s1.reverse()
print(s1)
```

```
['p', 'i', 't']
```

2.21

In [332]:

```
s=['L', 'a','r','y']
t=['P','a','g','e']
x=s[0]+t[0]
print(x)
```

```
LP
```

2.22

In [339]:

```
lst= [3, 7, -2, 12]
x=[1]
y=[2]
print (x-y)
```

```
---------------------------------------------------------------------------
-
TypeError                                 Traceback (most recent call las
t)
<ipython-input-339-4920c9c14723> in <module>
      2 x=[1]
      3 y=[2]
----> 4 print (x-y)

TypeError: unsupported operand type(s) for -: 'list' and 'list'
```

2.23

In [340]:

```
#(a) Tuple
monthT= ('Mar', 'May')
n= 1
monthT [ :n]
monthT [n: ]
monthT= monthT[ :n] + ( "Apr" , ) + monthT[n: ]
print(monthT)

# List
monthL=['Mar', 'May']
monthL.insert(1, 'Apr' )
print(monthL)

#(b) Tuple
#ERROR because tuples are immutable
#List
monthL.append('Jun')
print(monthL)

#(c) Tuple
#ERROR because tuples are immutable

#List
monthL= ['Mar', 'Apr', 'May', 'Jun']
monthL.pop(2)
print(monthL)

#(d) Tuple
#ERROR because tuples are immutable

#List
monthL = ['Mar', 'Apr', 'May', 'Jun']
monthL.pop(1)
print(monthL)

#(e) Tuple
monthT= ('Mar', 'May')
monthT= tuple(reversed(monthT))

#List
monthL = ['Mar', 'Apr', 'May', 'Jun']
monthL = monthL[::-1]
print(monthL)

#(f) Tuple
#ERROR because there is no attribute to sort.

#List
monthL = ['Mar', 'Apr', 'May', 'Jun']
monthL.sort()
```

```
('Mar', 'Apr', 'May')
['Mar', 'Apr', 'May']
['Mar', 'Apr', 'May', 'Jun']
['Mar', 'Apr', 'Jun']
['Mar', 'May', 'Jun']
['Jun', 'May', 'Apr', 'Mar']
```

2.24

In [343]:

```
grades = ['B','B','F','C','B','A','A','D','C','D','A','A','B']
grad_1= grades.count('A')
print (grad_1)
```

4

In [344]:

```
grad_1= grades.count('B')
print (grad_1)
```

4

In [345]:

```
grad_1= grades.count('C')
print (grad_1)
```

2

In [346]:

```
grad_1= grades.count('D')
print (grad_1)
```

2

In [348]:

```
grad_1= grades.count('F')
print (grad_1)
```

1

2.26

In [349]:

```
from math import *
r=10
a=sqrt((0-0)**2+(0-0)**2)
b=sqrt((10-0)**2+(10-0)**2)
c=sqrt((6-0)**2+(6-0)**2)
d=sqrt((8-0)**2+(7-0)**2)
print(a<r)
print(b<r)
print(c<r)
print(d<r)
```

```
True
False
True
False
```

2.27

In [365]:

```
print("The height of the different triangles are measured below using the trignometric
 formula (h=l*sinx), where 'h=height', 'l=length'")

print( "(a) h= 16 ft.  x=75 degrees")
print(" 75 degrees in radian is 1.3 rad ")
print( "1.3 rad in sin is 0.96" )
output= (16*0.96)
print ("Answer=", output)

print( "(b) h= 20 ft.  x=0 degrees")
print(" 0 degrees in radian is 0 rad ")
print( "0 rad in sin is 0" )
output= (20*0)
print ("Answer=", output)

print( "(c) h= 24 ft.  x=45 degrees")
print(" 45 degrees in radian is 0.7 rad ")
print( "0.7 rad in sin is 0.64" )
output= (24*0.64)
print ("Answer=", output)

print( "(d) h= 24 ft.  x=80 degrees")
print(" 80 degrees in radian is 1.3 rad ")
print( "1.3 rad in sin is 0.96" )
output= (80*0.96)
print ("Answer=", output)
```

```
The height of the different triangles are measured below using the trignom
etric formula (h=l*sinx), where 'h=height', 'l=length'
(a) h= 16 ft.  x=75 degrees
 75 degrees in radian is 1.3 rad
1.3 rad in sin is 0.96
Answer= 15.36
(b) h= 20 ft.  x=0 degrees
 0 degrees in radian is 0 rad
0 rad in sin is 0
Answer= 0
(c) h= 24 ft.  x=45 degrees
 45 degrees in radian is 0.7 rad
0.7 rad in sin is 0.64
Answer= 15.36
(d) h= 24 ft.  x=80 degrees
 80 degrees in radian is 1.3 rad
1.3 rad in sin is 0.96
Answer= 76.8
```

2.28

In [355]:

```
list_1 =[1,2,3,4,5,6,7,8]
#(a) An expression that evaluates to the index of the middle element of the list

print("(A) The above list is of even length, so the middle number will be ", (8+2)/2)
output =(list_1.index (4))
print("The index of the middle number is ", output)

#(b) Evaluate middle number of the list
print("(B)The middle element of the list is")
len(list_1)/2

#(c) Sort the list
list_1.sort(reverse= True)
print("(C)" ,list_1)

#(d) Statement that pops the 1st number and arranges it at the end
list_1 =[1,2,3,4,5,6,7,8]
list_1.append(1)
list_1.pop(0)
print('(D)', list_1)
```

```
(A) The above list is of even length, so the middle number will be  5.0
The index of the middle number is  3
(B)The middle element of the list is
(C) [8, 7, 6, 5, 4, 3, 2, 1]
(D) [2, 3, 4, 5, 6, 7, 8, 1]
```

2.29

In [360]:

```
a= (0 <= 1 <= 2)
print (a)
b= (2 + 3) <= (4 + 5) >= (7)
print(b)
c= (1 > -1) == (4> 3)
print (c)
```

```
True
True
True
```

2.30

In [362]:

```
lst=['Filza','Usman','Ali','Fatima']
lst.append('Hania')
print(lst)
print('The append function inserts a new or added string at the last of the string')
```

```
['Filza', 'Usman', 'Ali', 'Fatima', 'Hania']
The append function inserts a new or added string at the last of the strin
g
```

2.31

In [364]:

```
print('extend: the extend method increases the length of the list')
print('extend: the copy method makes a copy of the list')
print('extend: the clear method clears the elements of the list')
```

```
extend: the extend method increases the length of the list
extend: the copy method makes a copy of the list
extend: the clear method clears the elements of the list
```

In [ ]:

```

```