Chapter 03: Imperative Programming

Practice Problem 3.1

In [1]:

```
fahrenheit = eval(input("enter the temperature in degree fahrenheit: "))
celsius = 5/9*(fahrenheit-32)
print("The temperature in degree celsius is", celsius)
```

```
enter the temperature in degree fahrenheit: 45
The temperature in degree celsius is 7.222222222222222
```

Practice Problem 3.2

In [2]:

```
#(a)
age = int(input("enter your age:" ))
if age > 62:

    print("you can get your pension benefits!")
```

```
enter your age:62
```

In [3]:

```
#(b)
name = ['Musical','Aaron','Williams','Gehrig','Ruth']
if name == ['Musical','Aaron','Williams','Gehrig','Ruth']:

    print("one of the top 5 baseball players,ever!")
```

```
one of the top 5 baseball players,ever!
```

In [4]:

```
#(c)
hits = eval(input("enter hits: "))
sheild = eval(input("enter shields: "))

if hits > 10 and sheild == 0:

    print("You are dead")
else:
    print("You are alive")
```

```
enter hits: 10
enter shields: 0
You are alive
```

In [5]:

```
#(d)
north = 3
south = 4
east = 5
west = 6
if north or south or east or west:

    print('I can escape.')
```

```
I can escape.
```

Practice Problem 3.3

In [6]:

```
#(a)
year = eval(input("enter the year:" ))
if year % 4 == 0:

    print('could be a leap year.')

else:
    print('Definitely not a leap year')
```

```
enter the year:2019
Definitely not a leap year
```

In [7]:

```
#(b)
if list('ticket') == list('lottery'):

    print('you won!')

else:
    print('Better luck next time...')
```

```
Better luck next time...
```

Pratice Problem 3.4

In [8]:

```
users = ['joe','sue','hani','sophie']
id = input('login: ')
if id in users:
    print('You are in!')

else:
    print('user unknown.')

print('done')
```

```
login: Bilal
user unknown.
done
```

Practice Problem 3.5

In [9]:

```
wordList = eval(input('enter word list: '))
for word in wordList:
    if len(word) == 4:
        print('word')
```

```
enter word list: "pencil", "marker", "scale", "eraser"
```

Practice Problem 3.6

In [10]:

```
#(a)
for i in range(0,10):
    print(i)
```

```
0
1
2
3
4
5
6
7
8
9
```

In [11]:

```
#(b)
for i in range(0,2):
    print(i)
```

```
0
1
```

Practice Problem 3.7

In [12]:

```
#(a)
for i in range(3,13):
    print(i)
```

```
3
4
5
6
7
8
9
10
11
12
```

In [13]:

```
#(b)
for i in range(0,10,2):
    print(i)
```

```
0
2
4
6
8
```

In [14]:

```
#(c)
for i in range(0,24,3):
    print(i)
```

```
0
3
6
9
12
15
18
21
```

In [15]:

```
#(d)
for i in range(3,12,5):
    print(i)
```

```
3
8
```

Practice Problem 3.8

In [16]:

```
import math
radius = eval(input('Enter the radius of circle: '))
def perimeter(radius):
    result = 2*math.pi*radius
    return result
```

```
Enter the radius of circle: 5
```

Practice Problem 3.9

In [17]:

```
def average(x,y):
    return (x+y)/2
average(6,10)
```

Out[17]:

```
8.0
```

Practice Problem 3.10

In [18]:

```
s = input("enter the string:" )
def noVowel(s):
    'return True if string s contain no vowel, Flase otherwise'
    for c in s:
        if c in 'aeiouAEIOU':
            return True
        else:
            return False
print (noVowel(s))
```

```
enter the string:Bilal
False
```

Practice Problem 3.11

In [19]:

```
numlst = [1,3,4,5,6,8,9,11,14,18,21,24]
def allEven(numlst):
    'return True if all integers in numList are even, False otherwise'
    for num in numlst:
        if num % 2 == 0:
            return True
        else:
            return False
print(allEven(numlst))
```

```
False
```

Practice Problem 3.12

In [20]:

```
def negatives(n):
    lst = []
    for i in range(0,n):
        x = int(input("Enter number: "))
        lst.append(x)
    print(lst)
    for i in lst:
        if i < 0:
            print(i)
    return
n = int(input("Enter how many number you want to add in list: "))
negatives(n)
```

```
Enter how many number you want to add in list: 4
Enter number: 45
Enter number: 89
Enter number: 76
Enter number: 54
[45, 89, 76, 54]
```

Practice Problem 3.13

In [21]:

```
#(a)
def average(x, y):
    a = (x+y)/2
    return a
help(average)
average(6, 10)
```

```
Help on function average in module __main__:

average(x, y)
    #(a)
```

Out[21]:

```
8.0
```

In [22]:

```
#(b)
```

In [23]:

```
#(c)
```

In [24]:

```
#(d)
```

Practice Problem 3.14

In [25]:

```
a = [5, 6, 7]
print(a)
b = a
print(b)
a = 8
print(a)
```

```
[5, 6, 7]
[5, 6, 7]
8
```

Practice Problem 3.15

In [26]:

```
team = ['Ava', 'Eleanor', 'Clare', 'Sarah']
temp = team[0]
team[0] = team[-1]
team[-1] = temp
team
```

Out[26]:

```
['Sarah', 'Eleanor', 'Clare', 'Ava']
```

Practice Problem 3.16

In [27]:

```
ingredients = ['flour', 'sugar', 'buttter', 'apples']
def swapFL(ingredients):
    lst[0], lst[-1] = lst[-1], lst[0]
ingredients
```

Out[27]:

```
['flour', 'sugar', 'buttter', 'apples']
```

Practice Problem 3.17

In [28]:

```
#(a)
eval('2*3+1')
```

Out[28]:

```
7
```

In [29]:

```
#(b)
eval("'hello'")
```

Out[29]:

```
'hello'
```

In [30]:

```
#(c)
eval("'hello' + ' ' + 'world!'")
```

Out[30]:

```
'hello world!'
```

In [31]:

```
#(d)
eval("'ASCII'.count('I')")
```

Out[31]:

```
2
```

In [32]:

```
#(e)
eval("'x = 5'")
```

Out[32]:

```
'x = 5'
```

Practice Problem 3.18

In [33]:

```
#(a)
a = 3
b = 4
c = 5
if a<b:
    print('OK')
```

```
OK
```

In [34]:

```
#(b)
a = 3
b = 4
c = 5
if c<b:
    print('OK')
```

In [35]:

```
#(c)
a = 3
b = 4
c = 5
if a+b == c:
    print('OK')
```

In [36]:

```
#(d)
a = 3
b = 4
c = 5
if a**2+b**2 == c**2:
    print('OK')
```

OK

Practice Problem 3.19

In [37]:

```
#(a)
a = 3
b = 4
c = 5
if a<b:
    print('OK')

else:
    print('NOT OK')
```

OK

In [38]:

```
#(b)
a = 3
b = 4
c = 5
if c<b:
    print('OK')

else:
    print('NOT OK')
```

```
NOT OK
```

In [39]:

```
#(c)
a = 3
b = 4
c = 5
if a+b == c:
    print('OK')

else:
    print('NOT OK')
```

```
NOT OK
```

In [40]:

```
#(d)
a = 3
b = 4
c = 5
if a**2+b**2 == c**2:
    print('OK')

else:
    print('NOT OK')
```

```
OK
```

Practice Problem 3.20

In [41]:

```
#(a)
list = ['January', 'Febuary', 'March', 'April']
for i in list:
    print(i[:3])
```

```
Jan
Feb
Mar
Apr
```

Practice Problem 3.21

In [42]:

```
lst = [2, 3, 4, 5, 6, 8, 9, 10, 11, 12]
for i in lst:
    if (i%2 == 0):
        print(i)
```

```
2
4
6
8
10
12
```

Practice Problem 3.22

In [43]:

```
lst = [2, 3, 4, 5, 6, 8, 9, 10, 11, 12]
for i in lst:
    if ((i**2))%8 == 0:
        print(i)
```

```
4
8
12
```

Practice Problem 3.23

In [44]:

```
#(a)
for i in range(0,2):
    print(i)
```

```
0
1
```

In [45]:

```
#(b)
for i in range(0,1):
    print(i)
```

```
0
```

In [46]:

```
#(c)
for i in range(3,7):
    print(i)
```

```
3
4
5
6
```

In [47]:

```
#(d)
for i in range(1,2):
    print(i)
```

```
1
```

In [48]:

```
#(e)
for i in range(5,22,4):
    print(i)
```

```
5
9
13
17
21
```

Practice Problem 3.24

In [49]:

```
n = int(input("enter list of words: "))
lst = []
for i in range(0,n):
    x = str(input("enter word: "))
    lst.append(x)
print(lst)
for j in lst:
    if j == "secret":
        lst.remove("secret")
print(lst)
```

```
enter list of words: 5
enter word: cia
enter word: secret
enter word: mi6
enter word: isi
enter word: secret
['cia', 'secret', 'mi6', 'isi', 'secret']
['cia', 'mi6', 'isi']
```

Practice Problem 3.25

In [50]:

```
name = ['Ellie', 'Steve', 'Sam', 'Owen', 'Gavin']
for i in name:
    if i[0] in 'ABCDEFGHIJKLM':
        print(i)
```

```
Ellie
Gavin
```

Practice Problem 3.26

In [51]:

```
n = eval(input("enter number of words you want to add in a list: "))
lst = []
for i in range(0,n):
    a = int(input("enter number: "))
    lst.append(a)
print(lst)
list = [lst[0], lst[-1]]
print('The first list element is: ',list[0])
print('The last list element is: ',list[-1])
```

```
enter number of words you want to add in a list: 4
enter number: 3
enter number: 5
enter number: 7
enter number: 9
[3, 5, 7, 9]
The first list element is:  3
The last list element is:  9
```

Practice Problem 3.27

In [52]:

```
n = int(input("enter positive integers: "))
for i in range(0, 5):
    result = n*i
    print(result)
```

```
enter positive integers: 5
0
5
10
15
20
```

Practice Problem 3.28

In [53]:

```
n = int(input("enter integers: "))
for i in range(0, 3):
    if i != n:
        result = i**2
    print(result)
```

```
enter integers: 3
0
1
4
```

Practice Problem 3.29

In [54]:

```
n = int(input("enter a positive integer: "))
for i in range(1,n+1):
    if(n%i == 0):
        print(i)
```

```
enter a positive integer: 49
1
7
49
```

Practice Problem 3.30

In [56]:

```
n1 = int(input("Enter first number: "))
n2 = int(input("Enter second number: "))
n3 = int(input("Enter third number: "))
n4 = int(input("Enter last number: "))
avg =(n1+n2+n3)/3
if avg == n4:
    print("Equal")
```

```
Enter first number: 5
Enter second number: 4
Enter third number: 3
Enter last number: 4
Equal
```

Practice Problem 3.31

In [57]:

```
x = eval(input("enter x coordinate: "))
y = eval(input("enter y coordinate: "))
if (x and y) <=10 and (x and y) >= -10:
    print("t is in!")
```

```
enter x coordinate: 5
enter y coordinate: 6
t is in!
```

Practice Problem 3.32

In [59]:

```
n = int(input("enter positive digit integer: "))
for i in repr(n):
    if i.isdigit():
        print(i)
```

```
enter positive digit integer: 4567
4
5
6
7
```

Practice Problem 3.33

In [65]:

```
#(a)
def reverse_string(s):
    print(s[::-1])
    return
s = str(input("enter a string: "))
reverse_string(s)
```

```
enter a string: abc
cba
```

In [67]:

```
#(b)
def reverse_string(s):
    print(s[::-1])
    return
s = str(input("enter a string: "))
reverse_string(s)
```

```
enter a string: zyx
xyz
```

Practice Problem 3.34

In [68]:

```
#(a)
def pay(h, w):
    if h> 40:
        payment = (40*w)+((w*1.5)*(h-40))
        print("Employee payment is: ",payment)
    else:
        payment = h*w
        print("Emloyee paymet is: ",payment)
        return
h = eval(input("Enter hours emoloyement worked: "))
w = eval(input("Enter hourly wages of employement: "))
pay(h,w)
```

```
Enter hours emoloyement worked: 30
Enter hourly wages of employement: 10
Emloyee paymet is:  300
```

In [69]:

```
#(b)
#(a)
def pay(h, w):
    if h> 40:
        payment = (40*w)+((w*1.5)*(h-40))
        print("Employee payment is: ",payment)
    else:
        payment = h*w
        print("Emloyee paymet is: ",payment)
        return
h = eval(input("Enter hours emoloyement worked: "))
w = eval(input("Enter hourly wages of employement: "))
pay(h,w)
```

```
Enter hours emoloyement worked: 48
Enter hourly wages of employement: 15
Employee payment is:  780.0
```

Practice Problem 3.35

In [70]:

```
#(a)
def prob(n):
    p = 2**(-n)
    print(p)
    return
n = int(input("Enter nonnegative integer: "))
prob(n)
```

```
Enter nonnegative integer: 4
0.0625
```

In [71]:

```
#(b)
def prob(n):
    p = 2**(-n)
    print(p)
    return
n = int(input("Enter nonnegative integer: "))
prob(n)
```

```
Enter nonnegative integer: 9
0.001953125
```

Practice Problem 3.36

In [73]:

```
#(a)
def reverse_int(n):
    reverse = 0
    while(n>0):
        remainder = n%10
        reverse = (reverse*10)+remainder
        n = n//10
    print(reverse)
    return
n = int(input("enter number: "))
reverse_int(n)
```

```
enter number: 589
985
```

In [76]:

```
#(b)
def reverse_int(n):
    reverse = 0
    while(n>0):
        remainder = n%10
        reverse = (reverse*10)+remainder
        n = n//10
    print(reverse)
    return
n = int(input("enter number: "))
reverse_int(n)
```

```
enter number: 001
1
```

Practice Problem 3.37

In [81]:

```
#(a)
from math import sqrt
def point(x1, y1, x2, y2):
    if (x1-x2) == 0:
        dist = sqrt((x2-x1)**2+(y2-y1)**2)
        print("slope is infinity and Distance between two point is: ",dist,"cm")
    else:
        slope = (y2-y1)/(x2-x1)
        dist = sqrt((x2-x1)**2+(y2-y1)**2)
        print("slope is: ",slope,"\nDistance between two point is: ",dist,"cm")
    return
x1 = eval(input("enter x cordinate of first point: "))
x2 = eval(input("enter x cordinate of second point: "))
y1 = eval(input("enter y cordinate of first point: "))
y2 = eval(input("enter y cordinate of second point: "))
point(x1, y1, x2, y2)
```

```
enter x cordinate of first point: 5
enter x cordinate of second point: 3
enter y cordinate of first point: 8
enter y cordinate of second point: 6
slope is:  1.0
Distance between two point is:  2.8284271247461903 cm
```

In [82]:

```
#(b)
from math import sqrt
def point(x1, y1, x2, y2):
    if (x1-x2) == 0:
        dist = sqrt((x2-x1)**2+(y2-y1)**2)
        print("slope is infinity and Distance between two point is: ",dist,"cm")
    else:
        slope = (y2-y1)/(x2-x1)
        dist = sqrt((x2-x1)**2+(y2-y1)**2)
        print("slope is: ",slope,"\nDistance between two point is: ",dist,"cm")
    return
x1 = eval(input("enter x cordinate of first point: "))
x2 = eval(input("enter x cordinate of second point: "))
y1 = eval(input("enter y cordinate of first point: "))
y2 = eval(input("enter y cordinate of second point: "))
point(x1, y1, x2, y2)
```

```
enter x cordinate of first point: 8
enter x cordinate of second point: 16
enter y cordinate of first point: 5
enter y cordinate of second point: 4
slope is:  -0.125
Distance between two point is:  8.06225774829855 cm
```

Practice Problem 3.38

In [84]:

```
def abbreviation(day):
    print(day[:2])
    return
day = str(input("Enter day of a week: "))
abbreviation(day)
```

```
Enter day of a week: Friday
Fr
```

Practice Problem 3.39

In [87]:

```
#(a)
def collision(x1, y1, r1, x2, y2, r2):
    if x1 == x2 or r1 == r2:
        print(True)
    else:
        print(False)
    return
x1 = eval(input("Enter x coordinate of first circle: "))
y1 = eval(input("Enter y coordinate of first circle: "))
r1 = eval(input("Enter radius of first circle: "))
x2 = eval(input("Enter x coordinate of second circle: "))
y2 = eval(input("Enter y coordinate of second circle: "))
r2 = eval(input("Enter radius of second circle: "))
collision(x1, y1,r1, x2, y2, r2)
```

```
Enter x coordinate of first circle: 4
Enter y coordinate of first circle: 4
Enter radius of first circle: 3
Enter x coordinate of second circle: 8
Enter y coordinate of second circle: 8
Enter radius of second circle: 5
False
```

In [88]:

```
#(b)
def collision(x1, y1, r1, x2, y2, r2):
    if x1 == x2 or r1 == r2:
        print(True)
    else:
        print(False)
    return
x1 = eval(input("Enter x coordinate of first circle: "))
y1 = eval(input("Enter y coordinate of first circle: "))
r1 = eval(input("Enter radius of first circle: "))
x2 = eval(input("Enter x coordinate of second circle: "))
y2 = eval(input("Enter y coordinate of second circle: "))
r2 = eval(input("Enter radius of second circle: "))
collision(x1, y1,r1, x2, y2, r2)
```

```
Enter x coordinate of first circle: 5
Enter y coordinate of first circle: 5
Enter radius of first circle: 9
Enter x coordinate of second circle: 9
Enter y coordinate of second circle: 9
Enter radius of second circle: 9.5
False
```

Practice Problem 3.40

In [92]:

```
def partition(lst):
    for i in lst:
        if i[0] in "ABCDEFGHIJKLM":
            print(i)
partition(['Eleanor', 'Evelyn', 'Sammy', 'Owen', 'Gavin'])
```

```
Eleanor
Evelyn
Gavin
```

Practice Problem 3.41

In [93]:

```
def lastF(FirstName, LastName):
    x = len(FirstName)
    print(LastName+","+FirstName[:1-x])
    return
FirstName = str(input("Enter first name: "))
LastName = str(input("Enter last name: "))
lastF(FirstName, LastName)
```

```
Enter first name: Bilal
Enter last name: Yousuf
Yousuf,B
```

Practice Problem 3.42

In [94]:

```
def avg(l1, l2, l3, l4):
    a1 = sum(l1)/len(l1)
    a2 = sum(l2)/len(l2)
    a3 = sum(l3)/len(l3)
    a4 = sum(l4)/len(l4)
    print("",a1,"\n",a2,"\n",a3,"\n",a4)
    return
avg([95, 92, 86, 87], [66, 54], [89, 72, 100], [33, 0, 0])
```

```
 90.0
 60.0
 87.0
 11.0
```

Practice Problem 3.43

In [95]:

```
def hit(x1, y1, r1, x2, y2):
    if (x2<=r1) and (y2<=r1):
        print(True)
    else:
        print(False)
    return
hit(0, 0, 3, 3, 0)
hit(0, 0, 3, 4, 0)
```

```
True
False
```

Practice Problem 3.44

In [96]:

```
def distance(time):
    s = 340.29
    d = s*time
    print("distance of thunder is:",d/1000,"km")
    return
distance(8)
```

```
distance of thunder is: 2.7223200000000003 km
```

In [ ]:

```

```