Practice problems

#1: About Variables and Strings:
Write a Python program to ask for a positive real number and as the radius of a circle and then determine the area of a circle given its radius.

a) Print a message to ask the user to enter the radius of the circle.
b) Use the *raw_input* function to read the radius of the circle as a string and assign it into a variable *CString*
c) Use the *float* function to convert the string in *CString* into a real number. Assign the real number into another variable *radius*.
d) Calculate the area of a circle based on the value stored in *radius* and assign the result into another variable *area*. In other words, *area = 3.14* radius* radius*.
e) Print a message on the screen to inform the user that the area of the circle.

```
print "Tell me what is the radius of your circle"
inputString = raw_input()
radius = float( inputString)

area = 3.14*radius*radius
print "The area of your circle is", area
```

#2: About Basic Math, Decision Control and Conditional Statements:
Write a Python program to ask for a positive integer, print out the remainders of the integer divided by 4, by 100, and by 400 respectively, and then print out messages saying whether the given positive integer is divisible by 4, by 100, and by 400 respectively.

a) Print a message to ask the user to enter a positive integer.
b) Use the *raw_input* function to read the integer as a string and assign it into a variable *CString*
c) Use the *int* function to convert the string in *CString* into the integer value. Assign the integer value into another variable *n*.
d) Use the modulo operator % operator to determine and print out the remainder of *n* divided by 4, *n* divided by 100, *n* divided by 400, respectively.
e) Use an *if-else* statement to check whether the remainder of *n* divided by 4 is 0. If so print out a message saying that it is divisible by 4; otherwise

print a message to say it is not. Similarly use *if-else* statements *n* to determine and say whether the given positive integer is divisible by 100 and by 400 respectively.

```
print "The remainder of  ", n, "divided by 4 is ", n%4
if (n%4) == 0:
    print "Yes. It is divisible by 4."
else:
    print "Yes. It is NOT divisible by 4."


print "The remainder of  ", n, "divided by 100 is ",
n%100
if (n%100) == 0:
    print "Yes. It is divisible by 100."
else:
    print "Yes. It is NOT divisible by 100."



print "The remainder of  ", n, "divided by 400 is ",
n%400
if (n%400) == 0:
    print "Yes. It is divisible by 400."
else:
    print "Yes. It is NOT divisible by 400."
```

#3: About Decision Control and Conditional Statements:

Leap years:
A year is a leap year if it is divisible by 4 **except that** any year divisible by 100 is a leap year **only if** it is also divisible by 400. So 1900 is not a leap year, but 2000 is. In other words,

- a year (e.g. 1996) is a leap year if it is divisible by 4 but not by 100,
- a year (e.g. 2000) is a leap year if it is divisible by 400 (and thus by 100 too),
- otherwise, it is not a leap year.

Write a Python program to ask for a positive integer, determine whether it is a leap year, and then print out a message to inform the user whether it is leap year.

a) Follow the steps for problem #2 above to ask for a positive integer and determine whether the given positive integer is divisible by 4, by 100, and by 400 respectively. Then use an *if-else* statement to determine whether the integer represents a leap year based on the definition of leap years above.

```
print "Tell me what is the year of your choice"
inputString = raw_input()
n = int( inputString)

if (n%4)==0 and (n%100) != 0:
    print "It is a leap year"
else:
    if (n%400)==0:
        print "It is a leap year"
    else:
        print "It is NOT a leap year"
```

#4: About Loops:

Print out all the even numbers between two given numbers: Write a Python program to ask for two positive integers represented, print out all the even numbers between the two given positive integers.

```
print "Tell me what is the first number of your
choice"
inputString = raw_input()
number1 = int( inputString)

print "Tell me what is the second number of your
choice"
inputString = raw_input()
number2 = int( inputString)


n = number1

while n <= number2
    if (n%2)==0:
        print n, " is an even number."
```

#5: About Loops:

Print out all the leap years between two given years: Write a Python program to ask for two positive integers represented two years, print out all the leap years between the two given years.

```
print "Tell me what is the beginning year of your choice"
inputString = raw_input()
year1 = int( inputString)

print "Tell me what is the ending year of your choice"
inputString = raw_input()
year2 = int( inputString)


n = year1

while n <= year 2
    if (n%4)==0 and (n%100) != 0:
        print n, " is a leap year"
    else:
        if (n%400)==0:
            print n, " is a leap year"
        else:
            print n, " is NOT a leap year"
```

#6: About the simple nim game TLCW: The following is a possible solution to the TLCW game for Python Programming #3B.

```
inputString = raw_input("What is the maximum number of coins allowed to take each time?")
m = int (  inputString  )


turn = raw_input("Who is the first player? (C for computer, U for user):")
```

```
while n>0 :

    print "************************************"
    print "At the moment we have ", n, " coins to play with."

    if turn=="U":
        print "Dear user, it is your turn now."
        inputString = raw_input("How many coins do you want to take?")
        x = int (  inputString  )

        if x<1 or x>m or x>n:
            print ""
            print "    No Good!!! You are cheating."
            print "    You are a loser."
            n = 0
            turn = "U"

        else:
            print "Ok. You take away ", x, " coins."
            n = n - x
            turn = "C"

    else:

        print "Dear user, it is my turn (computer's turn)now."

        if n<=m:
            x = n
        else:
            import random
            x = random.randint(1, m)

        print "I am going to take away ", x, " coins."
        n = n - x

        turn = "U"



print "****************************************"
print "***           End of Game              ***"
print "****************************************"

if turn == "U":
    print "Dear user, I beat you. But you played a very nice game."
else:
    print "Dear user,you are a mavelous player. You just won."
```