

Luke Scott

COSC 311

Dr. Wang

Homework 1

## 1. Triangular Number Sequence

“TNS.py”

```
# Luke Scott
```

```
# COSC 311
```

```
# Homework 1 - Question 1
```

```
# Dr. Wang
```

```
def generate_triangular_sequence(triangular_sequence):
```

```
    temp = 0
```

```
    for i in range(20):
```

```
        if (i == 0):
```

```
            continue
```

```
            temp += i
```

```
            triangular_sequence.append(temp)
```

```
    print(triangular_sequence)
```

```
def print_odd(triangular_sequence):
```

```
    sum_odd = 0
```

```
    for i in triangular_sequence:
```

```
        if (i % 2 != 0):
```

```
            sum_odd += i
```

```
    print("Sum of Odd Integers in the triangular sequence = ", sum_odd)
```

```
def print_even(triangular_sequence):
    sum_even = 0
    for i in triangular_sequence:
        if (i % 2 == 0):
            sum_even += i
    print("Sum of Even Integers in the triangular sequence = ", sum_even)
```

```
triangular_sequence = list()
generate_triangular_sequence(triangular_sequence)
print_odd(triangular_sequence)
print_even(triangular_sequence)
```

### **Results for TNS.py**

```
[1, 3, 6, 10, 15, 21, 28, 36, 45, 55, 66, 78, 91, 105, 120, 136, 153, 171, 190]
Sum of Odd Integers in the triangular sequence = 660
Sum of Even Integers in the triangular sequence = 670
```

## **2. Construct Decision Tree Model Using Nested If-Statement**

“weather.py”

```
# Luke Scott
# COSC 311
# Dr. Wang
# Homework 1
```

```
def play_tennis(outlook, humidity, wind):
    if (outlook == 'Overcast'):
```

```
    return False
```

```
elif (outlook == 'Sunny'):
```

```
    if (humidity == 'High'):
```

```
        return False
```

```
    else:
```

```
        return True
```

```
else:
```

```
    if (wind == 'strong'):
```

```
        return False
```

```
    else:
```

```
        return True
```

```
outlook = input("What is the outlook for today? 'Sunny', 'Overcast', or 'Rainy' : ")
```

```
humidity = input("What is the humidity for today? 'High' or 'Normal' : ")
```

```
wind = input("How windy is it today? 'Strong' or 'Weak' : ")
```

```
if (play_tennis(outlook, humidity, wind)):
```

```
    print("You can play tennis today.")
```

```
else:
```

```
    print("You cannot play tennis today.")
```

**Results for weather.py**

```

IPdb [33]: runfile('C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1/weather.py', wdir='C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1')

What is the outlook for today? 'Sunny', 'Overcast', or 'Rainy' : Sunny

What is the humidity for today? 'High' or 'Normal' : High

How windy is it today? 'Strong' or 'Weak' : Weak
You cannot play tennis today.

IPdb [34]: runfile('C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1/weather.py', wdir='C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1')

What is the outlook for today? 'Sunny', 'Overcast', or 'Rainy' : Overcast

What is the humidity for today? 'High' or 'Normal' : Normal

How windy is it today? 'Strong' or 'Weak' : Strong
You cannot play tennis today.

IPdb [35]: runfile('C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1/weather.py', wdir='C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homework1')

What is the outlook for today? 'Sunny', 'Overcast', or 'Rainy' : Rainy

What is the humidity for today? 'High' or 'Normal' : High

How windy is it today? 'Strong' or 'Weak' : Strong
You can play tennis today.

```

### 3. Draw an Octagon

“octagon.py”

# Luke Scott

# COSC 311

# Dr. Wang

# Homework 1

def octagon(o):

for i in range(o\*2):

if (i < o):

a = ""

for k in range(o - i):

a += " "

for k in range(o + i\*2):

a += "\*"

```

        for k in range(o - i):
            a += " "

        print(a)
    else:
        a = ""

        for k in range(o * 3):
            a += "*"

        print(a)

```

```

for i in range(o):
    a = ""

    for k in range(i+1):
        a += " "

    for k in range((o*3) - ((i+1)*2)):
        a += "*"

    for k in range(i+1):
        a += " "

    print(a)

```

```

o = int(input("Enter the size of your octagon : "))
octagon(o)

```

**Results for octagon.py**

[illegible]

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## 4. Monte Carlo Simulation

“dice.py”

## # Luke Scott

# COSC 311

# Dr. Wang

## # Homework 1

from random import randint

```
def calculate(times, total):
```

```
return float((times / total)*100)
```

```
def roll(times_to_roll):
```

```
rolls = [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
```

```

for i in range(times_to_roll):

    total = (randint(1,6) + randint(1,6))-2

    rolls[total] += 1

for i in range(11):

    print("The percentage of", i+2, "'s rolled is %", round(calculate(rolls[i], times_to_roll),4))

n = int(input("Enter how many times you would like to roll the dice : "))

roll(n)

```

### Results for dice.py

```

Enter how many times you would like to roll the dice : 100
The percentage of 2 's rolled is % 2.0
The percentage of 3 's rolled is % 7.0
The percentage of 4 's rolled is % 11.0
The percentage of 5 's rolled is % 11.0
The percentage of 6 's rolled is % 13.0
The percentage of 7 's rolled is % 16.0
The percentage of 8 's rolled is % 17.0
The percentage of 9 's rolled is % 11.0
The percentage of 10 's rolled is % 7.0
The percentage of 11 's rolled is % 4.0
The percentage of 12 's rolled is % 1.0

IPdb [45]: runfile('C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homeworks/dice.py', wdir='C:/Users/Lscot/OneDrive/Documents/School Work/Spring 2023/COSC311/Homeworks', namespace=None)

Enter how many times you would like to roll the dice : 10000
The percentage of 2 's rolled is % 2.67
The percentage of 3 's rolled is % 5.76
The percentage of 4 's rolled is % 8.86
The percentage of 5 's rolled is % 11.34
The percentage of 6 's rolled is % 13.81
The percentage of 7 's rolled is % 16.24
The percentage of 8 's rolled is % 13.38
The percentage of 9 's rolled is % 11.14
The percentage of 10 's rolled is % 8.48
The percentage of 11 's rolled is % 5.56
The percentage of 12 's rolled is % 2.76

```