In [1]:

```
import numpy as np
import matplotlib.pyplot as plt
```

Problem 1 (3-Color Sine Wave)

Problem 1.1

In [2]:

```
x = np.arange(0, (4*np.pi)+.1, .1) #creating an array that goes from 0 to 4pi in steps of
 .1
```

Problem 1.2

In [3]:

```
y = np.sin(x) #y as a function of sin(x)
```

Problem 1.3

In [7]:

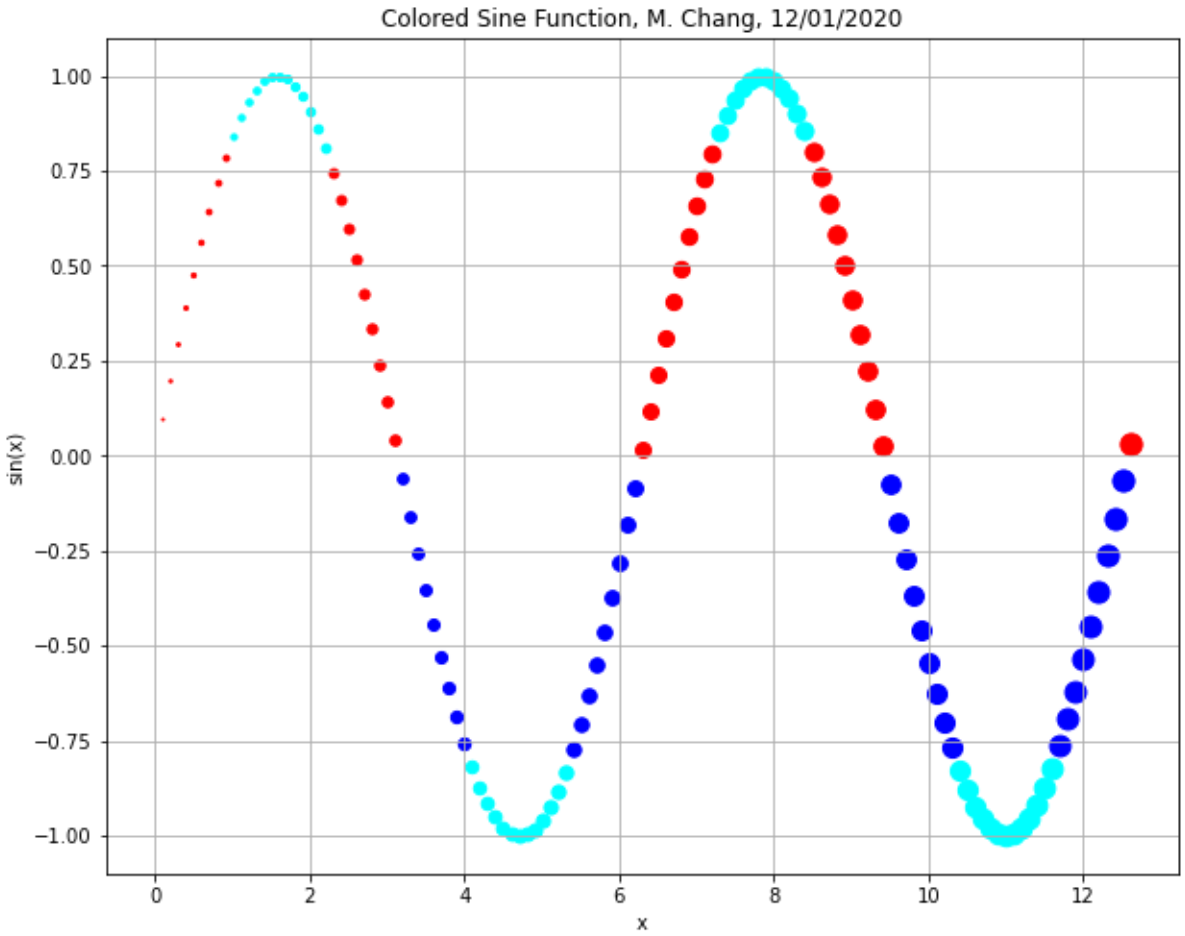
```
plt.figure(figsize=(10,8))

for i in np.arange(0, len(x), 1): #an array of the indices
    if ((y[i] >= 0)&(y[i] < 0.8)): #if y is greater than or equal to zero and less than 0.
8, point will be red
        c = "red"
    elif((y[i] < 0)&(y[i] > -0.8)): #if y is less than zero and greater than -0.8, point w
ill be blue
        c = "blue"
    else: #if y is greater than or equal to 0.8 or less than or equal to -0.8, point will
 be cyan
        c = "cyan"
    s = 10 * x[i] #size of point varying depending on x value
    plt.scatter(x[i], y[i], color = c, s = s) #plotting point

#labels
plt.xlabel("x")
plt.ylabel("sin(x)")
plt.title("Colored Sine Function, M. Chang, 12/01/2020")

#gridline
plt.grid()

plt.savefig("Chang_3ColorSine.png", dpi=200)
```



Problem 2 (Using Loops and Conditionals)

Problem 2.1

In [5]:

```
V = [5, 17, -3, 7, 0, -7, 12, 15, 20, -6, 6, 4, -7, 19] #making V list
```

Problem 2.2

In [6]:

```
N = []
for n in V:
    if ((n > 1)&((n%3==0)|(n%5==0))): #if number in list is greater than one and either di
visible by 3 or 5, the number becomes doubled
        n = 2 * n
    elif((n < -1) & (n > -5)): #if number in list is less than -1 and greater than -5, the
number becomes cubed
        n = n ** 3
    N.append(n) #adding to list
print(N)
```

```
[10, 17, -27, 7, 0, -7, 24, 30, 40, -6, 12, 4, -7, 19]
```