QUEENSBOROUGH COMMUNITY COLLEGE
The City University of New York
Department of Engineering Technology

Programming Exercises - Classes

1. Class Implementation
a) Implement a class *Rectangle* with two attributes, *width* and *height*.
b) Implement an *init* method with an **optional** parameter type.
Set the default value of the attributes of width and height to 1.
c) Implement a *display* method to print the values of width and height.
d) Instantiate two objects of type *rectangle*, one with arguments one without.

```
r1 = Rectangle(4, 5)
r2 = Rectangle()
```

e) Call *display*() to print width and height.
f) Access and print the attribute values of r1 and r2.

```
Example Output
Width: 4
Height: 5
Width: 1
Height: 1
Width of r1 and r2:
4 & 1
Height of r1 and r2:
5 & 1
```

2. Import Class
a) Implement a class *Rectangle* with two attributes, *width* and *height*.
b) Implement an *init* method with an optional parameter type.
Set the default value of the attributes of width and height to 1.
c) Implement a *display* method to print the values of width and height.
d) Implement a *setWidth* method to assign width to the instance variable.
e) Implement a *setHeight* method to assign height to the instance variable.
f) Implement a *getWidth* method to return the value of the instance variable width.
g) Implement a *getHeight* method to return the value of the instance variable height.
h) Implement an *area* method to return the value of area of a rectangle.
i) Save Rectangle class as *rectangle.py*.
j) Import *Rectangle* class from *rectangle.py*.
k) Employs the Rectangle class methods above to set and get various measurements of a rectangle.
1) Instantiate two objects of type *rectangle*, one with arguments one without.

```
r1 = Rectangle(4, 5)
r2 = Rectangle()
```

2) Call *display*() to print width and height.
3) Call *area()* in print() to display the area of r1 and r2.
4) Call setWidth() and setHeight() to update width and height to 6 of r2.
5) Call getWidth() in print() to display the updated width of r2.
6) Call getHeight() in print() to display the updated height of r2.
7) Call *area()* in print() to display the area of r2.

```
Example Output
Width: 4
Height: 5
Area: 20
```

```
Width: 1
Height: 1
Area: 1
Get Width: 6
Get Height: 6
Area: 36
```

3. Import Class

a) Import pi only from math module.
b) Implement a class *Circle* with an attribute, *radius*.
c) Implement an *init* method with an optional parameter type.
   Set the default value of the attributes of radius to 1.
d) Implement a *display* method to print the value of radius.
e) Implement a *setRadius* method to assign radius to the instance variable.
f) Implement a *getRadius* method to return the value of the instance variable radius.
g) Implement an *area* method to return the value of area of a circle.
h) Implement a *circumference* method to return the value of circumference of a circle.
i) Save Rectangle class and Circle class as *shapes.py*.
j) Import *Rectangle* class and Circle class from *shapes.py*.
k) Employs the Rectangle class methods and Circle class methods above and set and get various measurements of a rectangle and a circle.

```
Example Output
Width: 1
Height: 1
Get Width: 1.25
Get Height: 1.25
Area: 1.56250

Radius: 0
Get Radius: 10
Area: 314.15927
Circumference: 62.83185
```